

ARIB STD-T104-36.521-3V10.4.0

Evolved Universal Terrestrial
Radio Access (E-UTRA);
User Equipment (UE) conformance
specification;
Radio transmission and reception;
Part 3: Radio Resource
Management (RRM) conformance
testing
(Release 10)

Note: Since the national regulatory requirements applicable to the IMT-Advanced radio system have not yet been set forth, this ARIB standard shall not practically be used for manufacturing, installation and operation of the LTE-Advanced System in Japan. It is therefore anticipated that this standard will be revised in response to the implementation of the relevant national regulations. Refer to "Industrial Property Rights (IPR)" in the preface of ARIB STD-T104 for Related Industrial Property Rights. Refer to "Notice" in the preface of ARIB STD-T104 for Copyrights

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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

The present document is part 3 of a multi-parts TS:

3GPP TS 36.521-1 [10]: Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification Radio transmission and reception; Part 1: Conformance Testing.

3GPP TS 36.521-2 [23]: Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification Radio transmission and reception; Part 2: Implementation Conformance Statement (ICS).

3GPP TS 36.521-3: Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification Radio transmission and reception; Part 3: Radio Resource Management (RRM) conformance testing.

1 Scope

The present document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain requirements for support of RRM (Radio Resource Management) as part of the 3G Long Term Evolution (3G LTE).

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the "test applicability" part of the test.

For example only Release 8 and later UE declared to support LTE shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]	3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
[1]	3011 1K 21.703. Vocabulary for 3011 Specifications.
[2]	3GPP TS 36.101: "E-UTRA UE radio transmission and reception".
[3]	ITU-R Recommendation SM.329-10, "Unwanted emissions in the spurious domain".
[4]	3GPP TS 36.133: "E-UTRA requirements for support of radio resource management".
[5]	3GPP TS 36.331: "E-UTRA Radio Resource Control (RRC): protocol specification".
[6]	3GPP TS 36.304: "E-UTRA UE procedures in idle mode".
[7]	3GPP TS 36.508: "Common test environments for User Equipment (UE)".
[8]	3GPP TS 36.213: "E-UTRA Physical layer procedures".
[9]	3GPP TS 36.211: "E-UTRA Physical Channels and Modulation".
[10]	3GPP TS 36.521-1: "User Equipment (UE) conformance specification Radio transmission and reception. Part 1: Conformance Testing".
[11]	3GPP TS 36.321: "E-UTRA Medium Access Control (MAC): protocol specification".
[12]	3GPP TS 36.214: "E-UTRA Physical layer - Measurements".
[13]	3GPP TS 45.010: "Radio subsystem synchronization".
[14]	3GPP TS 36.306: "E-UTRA UE radio access capabilities".
[15]	3GPP TS 45.008: "Radio subsystem link control".
[16]	3GPP TS 45.005: "Radio transmission and reception"
[17]	3GPP2 C.S0033-B: "Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Terminal".

[18]	3GPP2 C.S0024-B: "cdma2000 High Rate Packet Data Air Interface Specification".
[19]	3GPP2 C.S0011-C: "Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations"
[20]	3GPP TR 36.903: "Derivation of test tolerances for Radio Resource Management (RRM) conformance tests ".
[21]	3GPP TS 25.133: "Requirements for Support of Radio Resource Management (FDD)".
[22]	3GPP TS 25.123: "Requirements for Support of Radio Resource Management (TDD)".
[23]	3GPP TS 36.521-2: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Implementation Conformance Statement (ICS)".
[24]	3GPP TS 34.108: "UTRA Common test environments for User Equipment (UE)".
[25]	3GPP TS 36.521-3 Release 10: "User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Radio Resource Management (RRM) conformance testing".
[26]	3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification".
[27]	3GPP TS 37.571-1: User Equipment (UE) conformance specification for UE positioning; Part 1: Conformance test specification.
[28]	3GPP TS 36.423: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

Carrier aggregation: Aggregation of two or more component carriers in order to support wider transmission bandwidths.

Carrier aggregation band: A set of one or more operating bands across which multiple carriers are aggregated with a specific set of technical requirements.

Carrier aggregation bandwidth class: A class defined by the aggregated transmission bandwidth configuration and maximum number of component carriers supported by a UE.

Carrier aggregation configuration: A combination of CA operating band(s) and CA bandwidth class(es) supported by a UE.

Channel edge: The lowest and highest frequency of the carrier, separated by the channel bandwidth.

Channel bandwidth: The RF bandwidth supporting a single E-UTRA RF carrier with the transmission bandwidth configured in the uplink or downlink of a cell. The channel bandwidth is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

Contiguous carriers: A set of two or more carriers configure in a spectrum block where there are no RF requirements based on co-existence for un-coordinated operation within the spectrum block.

Inter-band carrier aggregation: Carrier aggregation of component carriers in different operating bands.

NOTE: Carriers aggregated in each band can be contiguous or non-contiguous

Intra-band carrier aggregation: Contiguous carriers aggregated in the same operating band.

Intra-band non-contiguous carrier aggregation: Non-contiguous carriers aggregated in the same operating band.

Maximum throughput: The maximum achievable throughput for a reference measurement channel.

Maximum Output Power: The mean power level per carrier of UE measured at the antenna connector in a specified reference condition.

Mean power: When applied to E-UTRA transmission this is the power measured in the operating system bandwidth of the carrier. The period of measurement shall be at least one subframe (1ms) unless otherwise stated.

Occupied bandwidth: The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage $\beta/2$ of the total mean power of a given emission.

Output power: The mean power of one carrier of the UE, delivered to a load with resistance equal to the nominal load impedance of the transmitter.

Primary Cell: As defined in TS 36.331 [5] subclause 3.1.

Secondary Cell: As defined in TS 36.331[5] subclause 3.1.

Serving Cell: As defined in TS 36.331 [5] subclause 3.1.

Throughput: The number of payload bits successfully received per second for a reference measurement channel in a specified reference condition.

Transmission bandwidth: Bandwidth of an instantaneous transmission from a UE or BS, measured in Resource Block units.

Transmission bandwidth configuration: The highest transmission bandwidth allowed for uplink or downlink in a given channel bandwidth, measured in Resource Block units.

Symbols 3.2

For the purposes of the present document, the following symbols apply:

$BW_{Channel}$	Channel bandwidth, defined in TS 36.101 subclause 3.2
$\mathrm{BW}_{\mathrm{Channel_CA}}$	Aggregated channel bandwidth, expressed in MHz, defined in TS 36.101 subclause 3.2.
CPICH_Ec	Average energy per PN chip for the CPICH
CPICH_Ec/Io	The ratio of the received energy per PN chip for the CPICH to the total received power spectral density at the UE antenna connector.
Ec	Average energy per PN chip
Ês	Received energy per RE (power normalized to the subcarrier spacing) during the useful part of the symbol, i.e. excluding the cyclic prefix, at the UE antenna connector
Io	The total received power density, including signal and interference, as measured at the UE antenna connector.
Ioc	The power spectral density (integrated in a noise bandwidth equal to the chip rate and normalized to the chip rate) of a band limited noise source (simulating interference from cells, which are not defined in a test procedure) as measured at the UE antenna connector.
Iot	The received power spectral density of the total noise and interference for a certain RE (power integrated over the RE and normalized to the subcarrier spacing) as measured at the UE antenna connector
N_{oc}	The power spectral density of a white noise source (average power per RE normalised
	to the subcarrier spacing), simulating interference from cells that are not defined in a test procedure, as measured at the UE antenna connector
n_{PRB}	Physical Resource Block number as defined in subclause 3.1 in 3GPP TS 36.211.
$P_{ m CMAX}$	Configured UE transmitted power as defined in subclause 6.2.5 in 3GPP TS 36.101.
S	Defined in TS 36.304, subclause 5.2.3.2 for E-UTRAN
SCH_Ec/Ior	The ratio of the transmit energy per PN chip of the SCH to the total transmit power spectral density at the UTRA Node B antenna connector
SCH_RP	Received (linear) average power of the resource elements that carry E-UTRA

synchronisation signal, measured at the UE antenna connector

Defined in TS 36.304 $S_{ServingCcell}$

Defined in TS 25.304, subclause 5.2.6.1.5 Sintersearch

Defined in TS 25.304, subclause 5.2.6.1.5 for UTRAN and in TS 36.304, subclause Sintrasearch

5.2.4.7 for E-UTRAN

Snonintrasearch Defined in TS 36.304, subclause 5.2.4.7 SsearchRAT Defined in TS 25.304, subclause 5.2.6.1.5 $Thresh_{x, high}$ Defined in TS 36.304, subclause 5.2.4.7 Thresh_{x, low} Defined in TS 36.304, subclause 5.2.4.7 $Thresh_{serving,\ low}$ Defined in TS 36.304, subclause 5.2.4.7

The RRC Re-establishment delay requirement, the time between the moment when T_{RE-ESTABLISH-REQ}

erroneous CRCs are applied, to when the UE starts to send preambles on the PRACH.

Defined in TS 25.304, subclause 5.2.6.1.5 Treselection $Treselection_{RAT}$ Defined in TS 36.304, subclause 5.2.4.7 $Treselection_{EUTRAN} \\$ Defined in TS 36.304, subclause 5.2.4.7 Defined in TS 36.304, subclause 5.2.4.7 $Treselection_{UTRAN}$ $Treselection_{GERAN}$ Defined in TS 36.304, subclause 5.2.4.7

Basic time unit, defined in TS 36.211, clause 4 T_{S}

3.3 **Abbreviations**

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

1x RTT CDMA2000 1x Radio Transmission Technology

ARO Automatic Repeat Request **AWGN** Additive White Gaussian Noise **BCCH Broadcast Control Channel**

BCH Broadcast Channel Base Station BS

Base transceiver Station Identity Code **BSIC**

Carrier Aggregation CA **Component Carriers** CC

CCCH SDU Common Control Channel SDU **CCTrCH** Coded Composite Transport Channel

CFN Connection Frame Number **CPICH** Common Pilot Channel

CPICH Ec/No CPICH received energy per chip divided by the power density in the band

C-RNTI Cell RNTI

COI Channel Quality Indicator

DL Downlink

DCCH Dedicated Control Channel Dedicated Physical Channel DPCH Dedicated Physical Control Channel DPCCH

DRX Discontinuous Reception DTX Discontinuous Transmission Downlink Pilot Time-Slot **DwPTS**

E-UTRA Absolute Radio Frequency Channel Number **EARFCN**

EPRE Energy Per Resource Element

Evolved UMTS Terrestrial Radio Access E-UTRA

Evolved UMTS Terrestrial Radio Access Network E-UTRAN

FDD Frequency Division Duplex FGI Feature Group Indicator Fixed Reference Channel **FRC**

GSM Global System for Mobile communication **HARQ** Hybrid Automatic Repeat Request

НО Handover

HRPD High Rate Packet Data MAC Medium Access Control OCNG OFDMA Channel Noise Generator

OFDM Orthogonal Frequency Division Multiplexing
OFDMA Orthogonal Frequency Division Multiple Access

PBCH Physical Broadcast Channel
PCC Primary Component Carrier
PCCH Paging Control Channel

P-CCPCH Primary Common Control Physical Channel

PCell Primary Cell

PCFICH Physical Control Format Indicator Channel
PDCCH Physical Downlink Control Channel
PDSCH Physical Downlink Shared Channel
PHICH Physical Hybrid ARQ Indicator Channel

Public Land Mobile Network **PLMN** Precoding Matrix Indicator **PMI** Physical Random Access Channel **PRACH** PSS Primary Synchronization Signal PSS RA PSS-to-EPRE ratio for the channel PSS **PUCCH** Physical Uplink Control Channel **PUSCH** Physical Uplink Shared Channel Random Access Channel **RACH RAT** Radio Access Channel

REFSENS Reference Sensitivity power level

RLC Radio Link Control

RMC Reference Measurement Channel

r.m.s Root Mean Square RNC Radio Network Controller

RNTI Radio Network Temporary Identifier

RRC Radio Resource Control
RRM Radio Resource Management
RSRP Reference Signal Received Power
RSRQ Reference Signal Received Quality
RSSI Received Signal Strength Indicator
SCC Secondary Component Carrier
SCH Synchronization Channel

SCell Secondary Cell
SDU Service Data Unit
SFN System Frame Number
SNR Signal-to-Noise Ratio
SON Self Organizing Network
SRS Sounding Reference Signal
SSS Secondary Synchronization Signal

SSS_RA SSS-to-RS EPRE ratio for the channel SSS

TDD Time Division Duplex
TTI Transmission Time Interval

UE User Equipment

UL Uplink

UMTS Universal Mobile Telecommunications System

UpPTS Uplink Pilot Time-Slot

UTRA UMTS Terrestrial Radio Access

UTRAN UMTS Terrestrial Radio Access Network

3A Requirements for support of RRM

3A.1 General

Radio Resource Management (RRM) ensures the efficient use of the available radio resources and also provides mechanisms that enable E-UTRAN to meet radio resource related requirements. The requirements that are tested include:

- Idle mode, the cell re-selection algorithms that are controlled by the setting of parameters (thresholds and hysteresis values) that define the best cell and/or determine when the UE should select a new cell
- The configuration of the UE measurement and reporting procedures that are transmitted via dedicated signalling in connected mode
- Connected mode, the mobility of radio connections that has to be supported
- Handover decisions that may be based on UE or eNB measurements
- Inter-RAT RRM, the management of radio resources in connection with inter-RAT mobility, e.g. Inter-RAT handover

Inter frequency and inter-RAT test cases are performed without frequency overlapping between cells required in the test.

- For bands with bandwidth not accommodating all the cells required in the test without frequency overlapping, inter band testing shall be done according to subclause 3A.3.5. If the UE does not support the combination given in subclause 3A.3.5, the relevant tests are applicable only to the bands with the necessary bandwidth.
- In case when frequency overlapping occurs due to the frequency channel selection defined for the test (i.e. Cell number as per Annex E), other frequency channels which avoid the frequency overlapping shall be selected. If no suitable selection is found the test is not applicable for the affected band.

For test cases in clauses 4, 5, 6, 7, 8, 9 the initial conditions of the downlink physical channels signal levels and downlink physical channels required are specified in Annex C.0.

Unless otherwise mentioned, in those test case where delay is the test criteria, if HARQ or even RLC retransmission happens and is detected by SS, the extra delay due to retransmission shall be excluded in the delay calculation before making a pass or fail judgement on the UE in the test.

3A.2 Requirements Classification for Statistical Testing

The test requirements are expressed as absolute requirements with a single value stating the requirement or expressed as a success rate. The statistical nature depends on the type of test requirement. Some have large statistical variations, while others are not statistical in nature at all. When testing a parameter with a statistical nature, a confidence level is set. This establishes the probability that a Device Under Test (DUT) passing the test actually meets the test requirement and determines how many times a test have to be repeated and what the pass and fail criteria is. The statistical significance shall be set according to Annex G.

3A.3 RRM Test Configurations

The cell configuration of cells described in the test cases shall be set according to TS 36.508 [7] section 4.4.7.

3A.3.1 UE with Single or Multiple Antenna Connector

For testing a UE with more than one E-UTRA antenna connector, the connection diagram configurations are described in TS 36.508 [7] Annex A for the case of 2 E-UTRA RX antennas. For UEs with more than one E-UTRA antenna connector the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated. The levels of the test signal applied to each of the antenna connectors shall be as defined in the respective test cases.

For testing a UE with a single E-UTRA antenna connector, the connection diagram configurations are not described in TS 36.508 [7] Annex A. If the E-UTRA UE supports only single RX antenna, the RX diversity connector in the diagram is not applicable.

3A.3.2 Test configuration for Inter band test cases

It is allowed to use separate AWGN generators for the different bands in interband test cases, although the connection diagrams in 36.508 Annex A display one wideband AWGN generator per DUT antenna connector. When interband test

cases are also inter RAT, then it is necessary to use separated AWGN generators per RAT because of different noise density in different RATs. This is displayed accordingly in the connections in 36.508 Annex A.

3A.3.3 Test configuration for Inter RAT test cases

The DUT may employ common antennas for different RATs or separated ones, leading to different connections. The diagrams in 36.508 Annex A display only the connections with common antennas for different RATs without excluding the separate case. Note that in case of separate antennas, also separate AWGNs and faders are necessary, if applicable.

The non E-UTRA RATs are undefined with respect to the RX antenna configuration. The diagrams in 36.508 Annex A display RX diversity with 2 antennas for the non E-UTRA RATs without excluding the single antenna case. If the non E-UTRA RAT support only single RX antenna, the RX diversity connector in the diagram is not applicable.

For UEs with more than one non-E-UTRA antenna connector the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated. The levels of the test signal applied to each of the antenna connectors shall be as defined in the respective test cases.

With respect to the non E-UTRAN cell and AWGN, the diagrams in 36.508 Annex A are fully equipped, even if for certain RATs (e.g. GSM) the AWGN generator may be not applicable.

3A.3.4 UE with Multiband Capability

The Radio Resource Management performance of a UE in sections 4-8 is considered to be independent from all bands. Therefore, the required performance in the respective test cases can be verified in one of the bands supported by the UE, with the exception of inter-band testing requirements in clause 3A.1. The test cases in section 9 are considered to be band dependant and are therefore applicable in all of the supported bands in the UE.

3A.3.5 Operating band configuration

Inter-band configuration is not affecting the test purpose since the minimum requirements are valid regardless of band. Band combinations defined in table 3A.3.5-1 shall be used for testing.

Table 3A.3.5-1: Inter-band configuration

Additional hand

band under test	Additional band						
5,12,13,14,17	4						
11,18,19,21	1						
Note 1: The band under test	should contain the inter-						
frequency (neighb	our) cell.						
Note 2: The additional band s	should contain the serving cell						
of the test. If more	than one inter-frequency cell						
is needed, that cel	Il should be on the additional						
band.							
Note 3: For inter-RAT tests, t	he E-UTRAN cell is on the						
additional band, and the non-E-UTRAN cell							
which is specified in 34.121-1, is on the band							
under test, otherwise not tested.							
Note 4: Bands 5 and 11 only	need inter-band configuration						
in test cases where 3 cells are required							

4 E-UTRAN RRC_IDLE State Mobility

Band under teet

After the UE has switched on and a PLMN has been selected, the cell selection process takes place. This process allows the UE to select a suitable cell where to camp on in order to access available services. In this process the UE can use stored information (*Stored information cell selection*) or not (*Initial cell selection*).

When the UE is in either Camped Normally state or Camped on Any Cell state on a cell, the UE attempts to detect, synchronise, and monitor intra-frequency, inter-frequency and inter-RAT cells indicated by the serving cell, the cell reselection evaluation process takes place. This process allows the UE to select a more suitable cell and camp on it. In this

process the UE measurement activity is controlled by measurement rules defined in TS 36.304 [6] clause 5.2.4.2, allowing the UE to limit its measurement activity.

4.1 E-UTRAN Cell Selection

Editor's note: There are currently no tests defined for E-UTRAN cell selection.

4.2 E-UTRAN Cell Re-Selection

4.2.1 E-UTRAN FDD - FDD cell re-selection intra frequency case

4.2.1.1 Test purpose

To verify that when the current and target cell operates on the same carrier frequency the UE is able to search and measure cells to meet the intra-frequency cell re-selection requirements.

4.2.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

4.2.1.3 Minimum conformance requirements

The cell re-selection delay shall be less than $T_{evaluate\ E-UTRAN_Intra} + T_{SI-EUTRA}$ in RRC_IDLE state.

The UE shall be able to identify new intra-frequency cells and perform RSRP measurement of identified intra-frequency cells without an explicit intra-frequency neighbour list containing physical layer cell identities.

The UE shall be able to evaluate whether a newly detectable intra-frequency cell meets the re-selection criteria defined in TS 36.304 [6] within $T_{\text{detect, EUTRAN_Intra}}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 when Treselection = 0 provided that the cell is at least 3 dB better ranked.

The UE shall measure RSRP at least every $T_{measure,EUTRAN_Intra}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter RSRP measurement of each measured intra-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN_Intra}/2$.

For an intra-frequency cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met the re-selection criterion defined in TS 36.304 [6] within $T_{evaluateFDD,Intra}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 when Treselection = 0 provided that the cell is at least 3 dB better ranked. When evaluating cells for re-selection, the side conditions are RSRP and SCh apply to both serving and non-serving intra-frequency cells.

If Treselection timer has a non-zero value and the intra-frequency cell is better ranked than the serving cell, the UE shall evaluate this intra-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall re-select that cell.

The UE shall evaluate the intra-frequency cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds. When a non-zero value of Treselection is used, the UE shall only perform reselection on an evaluation which occurs simultaneously to, or later than the expiry of the Treselection timer.

At intra-frequency cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target intra-frequency cell for paging reception. The interruption time shall not exceed $T_{SI\text{-}EUTRA} + 50$ ms. $T_{SI\text{-}EUTRA}$ is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks as defined in TS 36.331 [5] for a E-UTRAN cell.

For idle mode cell re-selection purposes, the UE shall be capable of monitoring at least:

- Intra-frequency carrier

In addition to the requirements defined in TS 36.133 [4] clause 4.2.2.9 a UE in RRC_IDLE state shall be capable of monitoring a total of at least 8 carrier frequency layers, which includes serving layer, comprising of any defined in TS 36.133 [4] clause 4.2.2.9 combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 cells), cdma2000 1x and HRPD layers.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.3 and A.4.2.1.

4.2.1.4 Test description

4.2.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.20.
- 2. The general test parameter settings are set up according to Table 4.2.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.2.1.4.3
- 5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.2.1.4.1-1: General Test Parameters for E-UTRAN FDD-FDD intra cell re-selection test case

Parameter		Unit	Value	Comment
Initial	Active cell		Cell1	
condition	Neighbour cells		Cell2	
T2 end	Active cell		Cell2	
condition	Neighbour cells		Cell1	
Final condition	Visited cell		Cell1	
E-UTRA RI	F Channel Number		1	Only one FDD carrier frequency is used.
Channel Ba	andwidth (BW _{channel})	MHz	10	
Time offset	t between cells		3 ms	Asynchronous cells 3ms or 92160*Ts
Access Bar	Access Barring Information		Not Sent	No additional delays in random access procedure.
PRACH co	PRACH configuration		4	As specified in table 5.7.1-2 in 3GPP TS 36.211 [9]
DRX cycle	DRX cycle length		1.28	The value shall be used for all cells in the test.
T1		S	>7	During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2
T2		S	40	T2 need to be defined so that cell reselection reaction time is taken into account.
ТЗ		S	15	T3 need to be defined so that cell reselection reaction time is taken into account.

4.2.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one E-UTRA FDD carrier. In the test there are three successive time periods, with time duration of T1, T2 and T3 respectively. Only Cell 1 is already identified by the UE prior to the start of the test, i.e. Cell 2 is not identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2. Set Cell 2 physical cell identity = initial cell 2 physical cell identity.
- 2. Set the parameters according to T1 in Table 4.2.1.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for one iteration of the test procedure loop.
- 4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.2.1.5-1.
- 5. The SS waits for random access requests information from the UE to perform cell re-selection to a newly detectable cell, Cell 2.
- 6. If the UE responds on the newly detectable cell, Cell 2 during time duration T2 within 34 seconds from the beginning of time period T2, then count a success for the event "Re-select newly detected Cell 2". Otherwise count a fail for the event "Re-select newly detected Cell 2".
- 7. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, continue with step 8. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, skip to step 12.
- 8. The SS shall switch the power setting from T2 to T3 as specified in Table 4.2.1.5-1.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection to an already detected cell, Cell 1.
- 10. If the UE responds on the already detected cell, Cell 1 during time duration T3 within 8 seconds from the beginning of time period T3, then count a success for the event "Re-select already detected Cell 1". Otherwise count a fail for the event "Re-select already detected Cell 1".
- 11. If the UE has re-selected Cell 1 within T3, after the re-selection or when T3 expires, skip to step 13. Otherwise, if T3 expires and the UE has not yet re-selected Cell 1, continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 13. Repeat step 2-12 until a test verdict has been achieved.
 Each of the events "Re-select newly detected Cell 2" and "Re-select already detected Cell 1" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.
 - If both events pass, the test passes. If one event fails, the test fails.

4.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.2.1.4.3-1: Common Exception messages for E-UTRAN FDD-FDD intra cell re-selection test case

Default Message Contents						
Common contents of system information	Table H.2.1-1					
blocks exceptions	Table H.2.1-2					
Default RRC messages and information	Table H.3.2-1					
elements contents exceptions						

4.2.1.5 Test requirement

Tables 4.2.1.4.1-1 and 4.2.1.5-1 defines the primary level settings including test tolerances for E-UTRAN FDD-FDD intra-frequency cell re-selection test case.

Table 4.2.1.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD intra frequency cell re-selection test case

Parameter	Unit		Cell 1			Cell 2		
		T1 T2 T3		T3	T1	T2	Т3	
E-UTRA RF Channel			1			1		
Number								
BW _{channel}	MHz		10			10		
OCNG Patterns								
defined in D.1.2 (OP.2			OP.2 FDD			OP.2 FDD)	
FDD)								
PBCH_RA								
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB	dB		0			0		
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA ^{Note 1}								
OCNG_RB ^{Note 1}								
Qrxlevmin	dBm	-140	-140	-140	-140	-140	-140	
Pcompensation	dB	0	0	0	0	0	0	
Qhyst _s	dB	0	0	0	0	0	0	
Qoffset _{s, n}	dB	0	0	0	0	0	0	
Cell_selection_and_re								
selection_quality_mea			RSRP			RSRP		
surement				T = = :				
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	16.00	-3.55	3.24	-infinity	3.24	-3.55	
Noc Note 2	dBm/15 kHz			•	-98			
\hat{E}_s/N_{oc}	dB	16.00	13.00	16.45	-infinity	16.45	13.00	
RSRP Note 3	dBm/15 kHz	-82.00	-85.00	-81. 55	-infinity	-81. 55	-85.00	
Treselection	S	0	0	0	0	0	0	
Sintrasearch	dB	Not sent			Not sent			
Propagation Condition					AWGN			
NI-4- 4: OONO -b-III b-		41II	£			I 4		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell re-selection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell test requirement in this case is expressed as:

 $Cell \ re-selection \ delay \ to \ a \ newly \ detectable \ cell = T_{detect,E-UTRAN_Intra} + T_{SI-EUTRAN_Intra} + T_{SI-EUTRAN_I$

 $T_{detect,E-UTRAN\ Intra} = 32 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.3.

 $T_{SI-EUTRA}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test; as specified in TS 36.133 [4] clause 4.2.2.3

The cell re-selection delay to a newly detectable cell shall be less than a total of 34 seconds in this test case (note: this gives a total of 33.28 seconds but the test allows 34 seconds).

The cell re-selection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1.

The cell re-selection delay to an already detected cell test requirement in this case is expressed as:

 $Cell \ re-selection \ to \ an \ already \ detected \ cell \ delay = T_{evaluate, E-UTRAN_Intra} + T_{SI-EUTRAN_Intra} + T_{SI-EUTR$

 $T_{evaluate,E-UTRAN_Intra} = 6.40 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.3.

 $T_{SI-EUTRA}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test; as specified in TS 36.133 [4] clause 4.2.2.3

The cell re-selection delay to an already detected cell shall be less than a total of 8 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

For the test to pass, both events above shall pass.

The statistical pass/ fail decisions are done separated for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

4.2.2 E-UTRAN TDD - TDD cell re-selection intra frequency case

4.2.2.1 Test purpose

To verify that when the current and target cell operates on the same carrier frequency the UE is able to search and measure cells to meet the intra-frequency cell re-selection requirements.

4.2.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

4.2.2.3 Minimum conformance requirements

The cell re-selection delay shall be less than T_{evaluate,E-UTRAN_Intra} + T_{SI-EUTRA} in RRC_IDLE state.

The UE shall be able to identify new intra-frequency cells and perform RSRP measurement of identified intra-frequency cells without an explicit intra-frequency neighbour list containing physical layer cell identities.

The UE shall be able to evaluate whether a newly detectable intra-frequency cell meets the re-selection criteria defined in TS 36.304 [6] within $T_{detect,EUTRAN_Intra}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 when Treselection = 0.

The UE shall measure RSRP at least every $T_{measure,EUTRAN_Intra}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter RSRP measurements of each measured intra-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN_Intra}$.

For an intra-frequency cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met the re-selection criterion defined in TS 36.304 [6] within $T_{\text{evaluate,E-UTRAN_Intra}}$ as defined in table 4.2.2.3-1 of TS 36.133 [4] clause 4.2.2.3 when Treselection = 0 provided that the cell is at least 3 dB better ranked. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and non-serving intra-frequency cells.

If Treselection timer has a non-zero value and the intra-frequency cell is better ranked than the serving cell, the UE shall evaluate this intra-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall re-select that cell.

The UE shall evaluate the intra-frequency cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds.

At intra-frequency cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target intra-frequency cell for paging reception. The interruption time shall not exceed $T_{SI\text{-}EUTRA} + 50$ ms. $T_{SI\text{-}EUTRA}$ is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks as defined in TS 36.331 [5] for a E-UTRAN cell.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.3 and A.4.2.2.

4.2.2.4 Test description

4.2.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.20.
- 2. The general test parameter settings are set up according to Table 4.2.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.2.2.4.3.
- 5. There is one E-UTRA TDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Table clause C.0 and C.1 for this test.

Table 4.2.2.4.1-1: General Test Parameters for E-UTRAN TDD-TDD intra cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	al condition Active cell		Cell1	
	Neighbour cells		Cell2	
T2 end	Active cell		Cell2	
condition	Neighbour cells		Cell1	
Final condition	Visited cell		Cell1	
E-UTRA RF Cha	nnel Number		1	Only one TDD carrier frequency is used.
Channel Bandwid	dth (BW _{channel})	MHz	10	
Time offset between	een cells	μS	3	Synchronous cells
				3μs or 92*Ts
Access Barring Ir	Access Barring Information		Not	No additional delays in random access procedure.
			Sent	
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in 3GPP TS 36.211
DRX cycle length		S	1.28	The value shall be used for all cells in the test.
T1		S	>7	During T1, Cell 2 shall be powered off, and during the off
				time the physical cell identity shall be changed, The intention
				is to ensure that Cell 2 has not been detected by the UE prior
				to the start of period T2
T2		s	40	T2 need to be defined so that cell re-selection reaction time
				is taken into account.
T3		s	15	T3 need to be defined so that cell re-selection reaction time
				is taken into account.

4.2.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one E-UTRA TDD carrier. In the test there are three successive time periods, with time duration of T1, T2, and T3 respectively. Only Cell 1 is already identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure"

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2. Set Cell 2 physical cell identity = initial cell 2 physical cell identity.
- 2. Set the parameters according to T1 in Table 4.2.2.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for one iteration of the test procedure loop.
- 4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.2.2.5-1.
- 5. The SS waits for random access requests information from the UE to perform cell re-selection to a newly detectable cell, Cell 2.
- 6. If the UE responds on the newly detectable cell, Cell 2, during time duration T2 within 34 seconds from the beginning of time period T2, then count a success for the event "Re-select newly detected Cell 2". Otherwise count a fail for the event "Re-select newly detected Cell 2".
- 7. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, continue with step 8. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, skip to step 12.
- 8. The SS shall switch the power setting from T2 to T3 as specified in Table 4.2.2.5-1.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection to an already detected cell, Cell 1.

- 10. If the UE responds on the already detected cell, Cell 1, during time duration T3 within 8 seconds from the beginning of time period T3, then count a success for the event "Re-select already detected Cell 1". Otherwise count a fail for the event "Re-select already detected Cell 1".
- 11. If the UE has re-selected Cell 1 within T3, after the re-selection or when T3 expires, skip to step 13. Otherwise, if T3 expires and the UE has not yet re-selected Cell 1, continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 13. Repeat step 2-12 until a test verdict has been achieved.

Each of the events "Re-select newly detected Cell 2" and "Re-select already detected Cell 1" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

If both events pass, the test passes. If one event fails, the test fails.

4.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.2.2.4.3-1: Common Exception messages for E-UTRAN TDD-TDD intra cell re-selection test case

Default Message Contents						
	Table H.2.1-1					
blocks exceptions	Table H.2.1-2					
Default RRC messages and information	Table H.3.2-2					
elements contents exceptions						

4.2.2.5 Test requirement

Tables 4.2.2.4.1-1, and 4.2.2.5-1 defines the primary level settings including test tolerances for E-UTRAN TDD-TDD intra frequency cell re-selection test case.

Table 4.2.2.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD-TDD intra frequency cell re-selection test case

Parameter	Unit		Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1			1		
Number								
BW _{channel}	MHz		10			10		
OCNG Pattern defined			OP.2 TDD			OP.2 TDD		
in D.2.2 (OP.2 TDD)								
PBCH_RA		•		•		•		
PBCH_RB								
PSS_RA								
SSS_RA								
PCFICH_RB								
PHICH_RA								
PHICH_RB	dB		0		0			
PDCCH_RA								
PDCCH_RB								
PDSCH_RA								
PDSCH_RB								
OCNG_RA ^{Note 1}								
OCNG_RB ^{Note 1}								

Qrxlevmin	dBm	-140			-140		
Pcompensation	dB		0		0		
Qhyst _s	dB		0		0		
Qoffset _{s, n}	dB		0			0	
Cell_selection_and_ reselection_quality_m easurement			RSRP			RSRP	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	16.00	-3.55	3.24	-infinity	3.24	-3.55
N_{oc}	dBm/15 kHz	-98					
\hat{E}_s/N_{oc}	dB	16.00	13.00	16.45	-infinity	16.45	13.00
RSRP	dBm/15 kHz	-82.00	-85.00	-81. 55	-infinity	-81. 55	-85.00
Treselection	S	0	0	0	0	0	0
Sintrasearch	dB	Not sent Not sent					
Propagation Condition		AWGN					

The cell re-selection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell test requirement in this case is expressed as:

Cell re-selection delay to a newly detectable $cell = T_{detect,EUTRAN_Intra} + T_{SI-EUTRA}$

 $T_{detect,EUTRAN_Intra} = 32 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.3.

density is achieved for all OFDM symbols.

 $T_{SI-EUTRA}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test; as specified in TS 36.133 [4] clause 4.2.2.7

The cell re-selection delay to a newly detectable cell shall be less than a total of 34 seconds in this test case (note: this gives a total of 33.28 seconds but the test allows 34 seconds).

The cell re-selection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 1 and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1.

The cell re-selection delay to an already detected cell test requirement in this case is expressed as:

Cell re-selection to an already detected cell delay = $T_{evaluate,E-UTRAN_Intra} + T_{SI-EUTRA}$

 $T_{evaluate,E-UTRAN\ Intra} = 6.40 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.3

 $T_{SI-EUTRA} = 1280 \text{ ms}$; as specified in TS 36.133 [4] clause 4.2.2.7

The cell re-selection delay to an already detected cell shall be less than a total of 8 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

For the test to pass, both events above shall pass.

The statistical pass/ fail decisions are done separated for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

4.2.3 E-UTRAN FDD - FDD cell re-selection inter frequency case

Editor's note: This Test case is incomplete for frequencies above 3GHz

- The Test system uncertainties applicable above 3GHz are undefined
- The Test Tolerances and Test Requirements applicable above 3GHz are undefined

4.2.3.1 Test purpose

To verify that when the neighbour cell operates on a different carrier frequency, compared to the current cell the UE is able to search and measure cells to meet the inter-frequency cell re-selection requirements.

4.2.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

4.2.3.3 Minimum conformance requirements

The cell re-selection delay shall be less than T_{evaluate.E-UTRAN Inter} + T_{SI-EUTRA} in RRC_IDLE state.

The UE shall be able to identify new inter-frequency cells and perform RSRP measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for inter-frequency layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher_priority_search} = (60 * N_{layers})$ seconds, where the parameter N_{layers} is the total number of configured higher priority E-UTRA carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below for lower or equal priority inter-frequency layers.

The UE shall be able to evaluate whether a newly detectable lower or equal priority inter-frequency cell meets the reselection criteria defined in TS 36.304 [6] within $K_{carrier} * T_{detect,EUTRAN_Inter}$ (as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4) if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when Treselection_{EUTRAN} = 0 provides that the re-selection criteria is met by a margin of at least 5 dB for reselection based on ranking or 6 dB for re-selection based on absolute priorities. The parameter $K_{carrier}$ is the number of E-UTRA inter-frequency carriers indicated by the serving cell.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,EUTRAN_Inter}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateFDD, Inter}$ + Treselection_{EUTRAN}) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection. If the UE detects on an E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure RSRP at least every $K_{carrier} * T_{measure,EUTRAN_Inter}$ DRX cycle as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 for identified lower or equal priority inter-frequency cells. If the UE detects on an E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRP measurements of each measured higher, lower and equal priority inter-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN_Inter}/2$.

The UE shall not consider an E-UTRA neighbour cell in cell re-selection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met re-selection criterion defined in TS 36.304 [6] within $K_{carrier} * T_{evaluate,E-UTRAN_Inter}$ as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 when Treselection_{EUTRAN} = 0 provides that the re-selection criteria is met by a margin of at least 5 dB for re-selection based on ranking or 6 dB for re-selection based on absolute priorities. When evaluating cells for re-selection, the side conditions for RSRP and SCH apply to both serving and inter-frequency cells.

If Treselection_{EUTRAN} timer has a non-zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the Treselection_{EUTRAN} time. If this cell remains better ranked within this duration, then the UE shall re-select that cell.

The UE shall evaluate the inter-frequency cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds. When a non-zero value of Treselection_{EUTRAN} is used, the UE shall only perform re-selection on an evaluation which occurs simultaneously to, or later than the expiry of the Treselection_{EUTRAN} timer.

At inter-frequency cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target inter-frequency cell for paging reception. The interruption time shall not exceed $T_{SI\text{-}EUTRA} + 50$ ms. $T_{SI\text{-}EUTRA}$ is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks as defined in TS 36.331 [5] for a E-UTRAN cell.

For idle mode cell re-selection purposes, the UE shall be capable of monitoring at least:

- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers

In addition to the requirements defined in TS 36.133 [4] clause 4.2.2.9 a UE in RRC_IDLE state shall be capable of monitoring a total of at least 8 carrier frequency layers, which includes serving layer, comprising of any defined in TS 36.133 [4] clause 4.2.2.9 combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 cells), cdma2000 1x and HRPD layers.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.4 and A.4.2.3.

4.2.3.4 Test description

4.2.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 4.2.3.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.2.3.4.3.
- 5. There are two E-UTRA FDD carriers and two cells specified in the test. Cell 2 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.2.3.4.1-1: General Test Parameters for E-UTRAN FDD-FDD inter frequency cell re-selection test case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation phase, so that reselection to cell 1 occurs during the first T1 phase
T1 end	Active cell		Cell1	UE shall perform reselection to cell 1 during T1
condition	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
E-UTRA RF	Channel Number		1, 2	Two FDD carrier frequencies are used.
Time offset	between cells	ms	3	Asynchronous cells
				3ms or 92160*Ts
PRACH configuration			4	As specified in table 5.7.1-2 in TS 36.211 [9]
Access Bar	ring Information	-	Not Sent	No additional delays in random access procedure.
DRX cycle I	ength	S	1.28	The value shall be used for all cells in the test.
T1		S	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
T3		S	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

4.2.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one of the E-UTRA FDD carriers. In the test there are three successive time periods, with time duration of T1, T2 and T3 respectively. Both Cell 1 and Cell 2 are already identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas and Cell 2 is of higher priority than Cell 1. Furthermore, UE has not registered with network for the tracking area containing Cell 1.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to duration T0 in Table 4.2.3.5-1
- 3. Set the parameters according to duration T1 in Table 4.2.3.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 4. The SS waits for random access requests information from the UE to perform cell re-selection on the lower priority cell, Cell 1.
- 5. If the UE responds on lower priority cell, Cell 1 during time duration T1 within 8 seconds from the beginning of time period T1, then count a success for the event "Re-select lower priority Cell 1". Otherwise count a fail for the event "Re-select lower priority Cell 1".
- 6. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 7. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 12.
- 7. The SS shall switch the power setting from T1 to T2 as specified in Table 4.2.3.5-2. During time duration T2, Cell 2 shall be powered OFF and the physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) shall be changed to ensure Cell 2 is not detected by the UE.
- 8. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.2.3.5-2.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection on the higher priority cell, Cell 2.

- 10. If the UE responds on higher priority cell, Cell 2 during time duration T3 within 68 seconds from the beginning of time period T3, then count a success for the event "Re-select higher priority Cell 2". Otherwise count a fail for the event "Re-select higher priority Cell 2".
- 11. If the UE has re-selected Cell 2 within T3, after the re-selection or when T3 expires, skip to step 13. Otherwise, if T3 expires and the UE has not yet re-selected Cell 2, continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 2. Set the parameters according to duration T0 in Table 4.2.3.5-1.
- 13. Repeat step 3-12 until a test verdict has been achieved.

Each of the events "Re-select lower priority Cell 1" and "Re-select higher priority Cell 2" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

If both events pass, the test passes. If one event fails, the test fails.

4.2.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.2.3.4.3-1: Common Exception messages for E-UTRAN FDD-FDD inter frequency cell reselection test case

Default Message Contents					
	Table H.2.2-1				
blocks exceptions	Table H.2.2-2				
Default RRC messages and information	Table H.3.2-1				
elements contents exceptions					

4.2.3.5 Test requirement

Tables 4.2.3.4.1-1, 4.2.3.5-1 and 4.2.3.5-2 define the primary level settings including test tolerances for E-UTRAN FDD-FDD inter-frequency cell re-selection test case. Note that the time period for T0 is system implementation dependent.

Table 4.2.3.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD inter frequency cell re-selection test case

Parameter	Unit	Cell 1	Cell 2
		T0	
E-UTRA RF Channel number		1	2
BW _{channel}	MHz	10	
OCNG Patterns defined in		OP.2 F	-DD
D.1.2 (OP.2 FDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB]	
PDSCH_RB	dB]	
OCNG_RA ^{Note 1}	dB]	
OCNG_RB ^{Note 1}	dB	1	

Qrxlevmin	dBm	-140)
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-99,	1
RSRP Note 3	dBm/15 KHz	-102.8	-83.2
\hat{E}_{s}/I_{ot}	dB	-3.70	15.90
\hat{E}_s/N_{oc}	dB	-3.70	15.90
Treselection _{EUTRAN}	S	0	0
Snonintrasearch	dB	50	Not sent
Thresh _{x, high}	dB	48	48
Thresh _{serving, low}	dB	44	44
Thresh _{x, low}	dB	50	50
Propagation Condition		AWG	SN

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 4.2.3.5-2: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD inter frequency cell re-selection test case

Parameter	Unit		Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel number			1	•		2		
BW _{channel}	MHz		10			10		
OCNG Patterns defined in			P.2 FDD			OP.2 FDD		
D.1.2 (OP.2 FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB]						
SSS_RA	dB]						
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB		0			0		
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA ^{Note 1}	dB							
OCNG_RB ^{Note 1}	dB							

Qrxlevmin	dBm		-140			-140		
$N_{oc}^{ m Note~2}$	dBm/15 kHz				-99,1			
RSRP Note 3	dBm/15 KHz	-83.2	-83.2	-83.2	-102.8	-infinity	-85.2	
\hat{E}_{s}/I_{ot}	dB	15.90	15.90	15.90	-3.70	-infinity	13.90	
\hat{E}_s/N_{oc}	dB	15.90	15.90	15.90	-3.70	-infinity	13.90	
Treselection _{EUTRAN}	S		0			0		
Snonintrasearch	dB		50		Not sent			
Thresh _{x, high}	dB	48		48				
Thresh _{serving, low}	dB	44		44 44		44		
Thresh _{x, low}	dB	50			50			
Propagation Condition		AWGN			·			

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $\,N_{oc}\,$ to be fulfilled.
- Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell re-selection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1.

The cell re-selection delay to lower priority test requirement in this case is expressed as:

 $Cell \ re-selection \ delay \ to \ lower \ priority = T_{evaluate,E-UTRAN_Inter} + T_{SI-EUTRA}$

 $T_{evaluate,E-UTRAN_Inter} = 6.40 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.4

 $T_{SI-EUTRA} = 1280 \text{ ms}$; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to lower priority shall be less than a total of 8 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

The cell re-selection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 2 and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to higher priority test requirement in this case is expressed as:

 $Cell \ re-selection \ delay \ to \ higher \ priority = T_{higher_priority_search} + T_{evaluate,E_UTRAN_Inter} + T_{SI-EUTRAN_Inter} + T_{SI-EUTRAN_Inter} + T_{evaluate,E_UTRAN_Inter} + T_$

 $T_{higher_priority_search} = 60 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2

 $T_{evaluate,E-UTRAN\ Inter} = 6.40\ s;$ as specified in TS 36.133 [4] clause 4.2.2.4

 $T_{SI-EUTRA} = 1280 \text{ ms}$; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to higher priority shall be less than a total of 68 seconds in this test case (note: this gives a total of 67.68 seconds but the test allows 68 seconds).

For the test to pass, both events above shall pass.

The statistical pass/ fail decisions are done separately for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

4.2.4 E-UTRAN FDD - TDD cell re-selection inter frequency case

4.2.4.1 Test purpose

To verify that when the neighbour cell operates on a different carrier frequency and mode, compared to the current cell the UE is able to search and measure cells to meet the inter-frequency cell re-selection requirements.

4.2.4.2 Test applicability

This test applies to all types of E-UTRA UE supporting FDD and TDD release 9 and forward.

4.2.4.3 Minimum conformance requirements

The UE shall be able to identify new inter-frequency cells and perform RSRP or RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If $Srxlev > S_{nonIntraSearchP}$ and $Squal > S_{nonIntraSearchQ}$ then the UE shall search for inter-frequency layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in section 4.2.2.

If $Srxlev \leq S_{nonIntraSearchP}$ or $Squal \leq S_{nonIntraSearchQ}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell meets the reselection criteria defined in TS36.304 [6] within $K_{carrier} * T_{detect,EUTRAN_Inter}$ if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when $T_{reselection} = 0$ provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities.

The parameter $K_{carrier}$ is the number of E-UTRA inter-frequency carriers indicated by the serving cell. An inter-frequency cell is considered to be detectable according to RSRP, RSRP $\hat{E}s/Iot$, SCH_RP and SCH $\hat{E}s/Iot$ defined in Annex I.1.2 for a corresponding Band.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,E-UTRAN_Inter}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure RSRP or RSRQ at least every $K_{carrier} * T_{measure,EUTRAN_Inter}$ (see table 4.2.4.3-1) for identified lower or equal priority inter-frequency cells. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRP or RSRQ measurements of each measured higher, lower and equal priority inter-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure, EUTRAN_Inter}/2$.

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met reselection criterion defined TS 36.304 [6] within $K_{carrier} * T_{evaluate,E-UTRAN_Inter}$ when $T_{reselection} = 0$ as specified in table 4.2.4.3-1 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and inter-frequency cells.

If $T_{reselection}$ timer has a non zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the $T_{reselection}$ time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

Table 4.2.4.3-1: T_{detect,EUTRAN_Inter}, T_{measure,EUTRAN_Inter} and T_{evaluate,E-UTRAN_Inter}

DRX cycle length [s]	T _{detect,EUTRAN_Inter} [s] (number of DRX cycles)	T _{measure,EUTRAN_Inter} [s] (number of DRX cycles)	T _{evaluate,E} . UTRAN_Inter [s] (number of DRX cycles)
0.32	11.52 (36)	1.28 (4)	5.12 (16)
0.64	17.92 (28)	1.28 (2)	5.12 (8)
1.28	32(25)	1.28 (1)	6.4 (5)
2.56	58.88 (23)	2.56 (1)	7.68 (3)

For higher priority cells, a UE may optionally use a shorter value for $T_{\text{measureE-UTRA_Inter}}$, which shall not be less than Max(0.64 s, one DRX cycle).

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.4 and A.4.2.4.

4.2.4.4 Test description

4.2.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 4.2.4.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.2.4.4.3.
- 5. There are two E-UTRA carriers and two cells specified in the test. One E-UTRA FDD Cell 1 is the neighbour cell on the FDD carrier frequency, One E-UTRA TDD Cell 2 is the cell on the TDD carrier frequency and is used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.2.4.4.1-1: General Test Parameters for E-UTRAN FDD-TDD inter frequency cell re-selection test case

	Parameter	Unit	Value	Comment
Initial	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation
condition				phase, so that reselection to cell 1 occurs during
				the first T1 phase
T1 end	Active cell		Cell1	UE shall perform reselection to cell 1 during T1
condition	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
Cell 1 E-U	TRA RF Channel		1	One FDD carrier frequency is used. And Cell 1 is on RF channel number 1.
Cell 2 E-U	TRA RF Channel		2	One TDD carrier frequencies is used. And Cell 2
Number				is on RF channel number 2.
Time offse	t between cells		3 ms	Asynchronous cells
E-UTRA F	DD PRACH		4	As specified in table 5.7.1-2 in 3GPP TS 36.211
configurati	on			·
E-UTRA T	E-UTRA TDD PRACH		53	As specified in table 5.7.1-3 in 3GPP TS 36.211
configurati	on			
Special su	Special subframe configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-dov	Jplink-downlink configuration		1	As specified in table 4.2-2 in 3GPP TS 36.211
E-UTRA F	-UTRA FDD Access Barring		Not Sent	No additional delays in random access
Information	า			procedure.
E-UTRA T	E-UTRA TDD Access Barring		Not Sent	No additional delays in random access
Information	า			procedure.
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1	-	S	15	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s	>7	During T2, cell 2 shall be powered off, and
				during the off time the physical cell identity shall
				be changed, The intention is to ensure that cell 2
				has not been detected by the UE prior to the
				start of period T3.
T3	T3		75	T3 need to be defined so that cell re-selection
				reaction time is taken into account.

4.2.4.4.2 Test procedure

The test scenario comprises of 1 E-UTRA FDD Cell 1 and 1 E-UTRA TDD Cell 2. The UE is requested to monitor the neighbouring cell on the E-UTRA TDD carriers. In the test there are three successive time periods, with time duration of T1, T2 and T3 respectively. Both Cell 1 and Cell 2 are already identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas and Cell 2 is of higher priority than Cell 1. Furthermore, UE has not registered with network for the tracking area containing Cell 1.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to duration T0 in Table 4.2.4.5-1
- 3. Set the parameters according to duration T1 in Table 4.2.4.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 4. The SS waits for random access requests information from the UE to perform cell re-selection on the lower priority cell, Cell 1.
- 5. If the UE responds on lower priority cell, Cell 1 during time duration T1 within 8 seconds from the beginning of time period T1, then count a success for the event "Re-select lower priority Cell 1". Otherwise count a fail for the event "Re-select lower priority Cell 1".
- 6. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 7. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 12.

- 7. The SS shall switch the power setting from T1 to T2 as specified in Table 4.2.4.5-2. During time duration T2, Cell 2 shall be powered OFF and the physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) shall be changed to ensure Cell 2 is not detected by the UE.
- 8. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.2.4.5-2.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection on the higher priority cell, Cell 2.
- 10. If the UE responds on higher priority cell, Cell 2 during time duration T3 within 68 seconds from the beginning of time period T3, then count a success for the event "Re-select higher priority Cell 2". Otherwise count a fail for the event "Re-select higher priority Cell 2".
- 11. If the UE has re-selected Cell 2 within T3, after the re-selection or when T3 expires, skip to step 13. Otherwise, if T3 expires and the UE has not yet re-selected Cell 2, continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 2. Set the parameters according to duration T0 in Table 4.2.4.5-1.
- 13. Repeat step 3-12 until a test verdict has been achieved.
 Each of the events "Re-select lower priority Cell 1" and "Re-select higher priority Cell 2" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

4.2.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

If both events pass, the test passes. If one event fails, the test fails.

Table 4.2.4.4.3-1: Common Exception messages for E-UTRAN FDD-TDD inter frequency cell reselection test case

Default Message Contents					
Common contents of system information	Table H.2.2-1				
blocks exceptions	Table H.2.2-2				
Default RRC messages and information	Table H.3.2-1				
elements contents exceptions	Table H.3.2-2				

4.2.4.5 Test requirement

Tables 4.2.4.4.1-1, 4.2.4.5-1 and 4.2.4.5-2 define the primary level settings including test tolerances for E-UTRAN FDD-TDD inter-frequency cell re-selection test case. Note that the time period for T0 is system implementation dependent.

Table 4.2.4.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-TDD inter frequency cell re-selection test case in AWGN

Parameter	Unit	Cell 1	Cell 2	
		T0		
E-UTRA RF Channel number		1	2	
BW _{channel}	MHz	10	10	
OCNG Patterns defined in		OP.2 FDD	OP.2	
D.1.2 (OP.2 FDD) and D.2.2			TDD	
(OP.2 TDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0	0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
Qrxlevmin	dBm	-140)	
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-99.1	0	
RSRP Note 3	dBm/15 KHz	-102.80	-83.20	
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	-3.70	15.90	
\hat{E}_s/N_{oc}	dB	-3.70	15.90	
Treselection _{EUTRAN}	S	0	0	
Snonintrasearch	dB	50	Not sent	
Thresh _{x, high}	dB	48	48	
Thresh _{serving, low}	dB	44	44	
Thresh _{x, low}	dB	50 50		
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 4.2.4.5-2: Cell Specific Test requirement Parameters for E-UTRAN FDD-TDD inter frequency cell re-selection test case in AWGN

Parameter	Unit		Cell 1			Cell 2	
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1			2	
number							
BW _{channel}	MHz		10			10	
OCNG Patterns defined in							
D.1.2 (OP.2 FDD) and D.2.2		(OP.2 FDD			OP.2 TDD)
(OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0			0	
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note 1}	dB						
OCNG_RB ^{Note 1}	dB						
Qrxlevmin	dBm		-140			-140	
Noc Note 2	dBm/15 kHz			-9	9.10		
RSRP Note 3	dBm/15 KHz	-83.20	-83.20	-83.20	-102.80	-infinity	-85.20
\hat{E}_{s}/I_{ot}	dB	15.90	15.90	15.90	-3.70	-infinity	13.90
\hat{E}_s/N_{oc}	dB	15.90 15.90 15.90			-3.70	-infinity	13.90
Treselection _{EUTRAN}	S	0				0	
Snonintrasearch	dB	50				Not sent	
Thresh _{x, high}	dB	48				48	
Thresh _{serving, low}	dB	44				44	
Thresh _{x, low}	dB	50				50	
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $\,N_{oc}\,$ to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell re-selection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1.

The cell re-selection delay to lower priority test requirement in this case is expressed as:

 $Cell \ re-selection \ delay \ to \ lower \ priority = T_{evaluate, E-UTRAN_Inter} + T_{SI-EUTRA}$

 $T_{evaluate,E\text{-}UTRAN_Inter} = 6.40 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.4

T_{SI-EUTRA} = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to lower priority shall be less than a total of 8 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

The cell re-selection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 2 and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to higher priority test requirement in this case is expressed as:

Cell re-selection delay to higher priority = Thigher priority search + Tevaluate, E-UTRAN Inter + TSI-EUTRAN

 $T_{higher\ priority\ search} = 60\ s$; as specified in TS 36.133 [4] clause 4.2.2

 $T_{evaluate,E-UTRAN\ Inter} = 6.40 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.4

 $T_{SI-EUTRA} = 1280 \text{ ms}$; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to higher priority shall be less than a total of 68 seconds in this test case (note: this gives a total of 67.68 seconds but the test allows 68 seconds).

For the test to pass, both events above shall pass.

The statistical pass/ fail decisions are done separately for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

4.2.5 E-UTRAN TDD - FDD cell re-selection inter frequency case

4.2.5.1 Test purpose

To verify that when the neighbour cell operates on a different carrier frequency and mode, compared to the current cell the UE is able to search and measure cells to meet the inter-frequency cell re-selection requirements.

4.2.5.2 Test applicability

This test applies to all types of E-UTRA UE supporting FDD and TDD release 9 and forward.

4.2.5.3 Minimum conformance requirements

The UE shall be able to identify new inter-frequency cells and perform RSRP or RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If $Srxlev > S_{nonIntraSearchP}$ and $Squal > S_{nonIntraSearchQ}$ then the UE shall search for inter-frequency layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in section 4.2.2.

If $Srxlev \leq S_{nonIntraSearchP}$ or $Squal \leq S_{nonIntraSearchQ}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell meets the reselection criteria defined in TS36.304 [6] within $K_{carrier} * T_{detect,EUTRAN_Inter}$ if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when $T_{reselection} = 0$ provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities.

The parameter K_{carrier} is the number of E-UTRA inter-frequency carriers indicated by the serving cell. An inter-frequency cell is considered to be detectable according to RSRP, RSRP $\hat{E}s/Iot$, SCH_RP and SCH $\hat{E}s/Iot$ defined in Annex I.1.2 for a corresponding Band.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,E-UTRAN_Inter}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure RSRP or RSRQ at least every $K_{carrier} * T_{measure, EUTRAN_Inter}$ (see table 4.2.5.3-1) for identified lower or equal priority inter-frequency cells. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated

as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRP or RSRQ measurements of each measured higher, lower and equal priority inter-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN_Inter}/2$.

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met reselection criterion defined TS 36.304 [6] within $K_{carrier} * T_{evaluate,E-UTRAN_Inter}$ when $T_{reselection} = 0$ as specified in table 4.2.5.3-1 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and inter-frequency cells.

If $T_{reselection}$ timer has a non zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the $T_{reselection}$ time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

DRX T_{detect,EUTRAN_Inter} Tmeasure,EUTRAN_Inter Tevaluate,Ecycle [s] (number of [s] (number UTRAN_Inter DRX cycles) DRX cycles) (number length [s] of DRX [s] cycles) 5.12 (16) 0.32 11.52 (36) 1.28(4)17.92 (28) 1.28(2)5.12 (8) 0.64 32(25) 1.28 (1) 1.28 6.4 (5) 2.56 58.88 (23) 2.56 (1) 7.68(3)

Table 4.2.5.3-1: T_{detect,EUTRAN_Inter}, T_{measure,EUTRAN_Inter} and T_{evaluate,E-UTRAN_Inter}

For higher priority cells, a UE may optionally use a shorter value for $T_{\text{measureE-UTRA_Inter}}$, which shall not be less than Max(0.64 s, one DRX cycle).

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.4 and A.4.2.5.

4.2.5.4 Test description

4.2.5.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 4.2.5.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.2.5.4.3.
- 5. There are two E-UTRA carriers and two cells specified in the test. One E-UTRA TDD Cell 1 is the neighbour cell on the TDD carrier frequency, One E-UTRA FDD Cell 2 is the cell on the FDD carrier frequency and is used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.2.5.4.1-1: General Test Parameters for E-UTRAN TDD-FDD inter frequency cell re-selection test case

	Parameter	Unit	Value	Comment						
Initial	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation						
condition				phase, so that reselection to cell 1 occurs during						
T1 end	Active cell		Cell1	the first T1 phase UE shall perform reselection to cell 1 during T1						
condition	Neighbour cell		Cell2	OE shall perform reselection to cell 1 during 11						
Condition	Neighbour ceil		Celiz							
Final	Active cell		Cell2	UE shall perform reselection to cell 2 during T3						
condition										
	TRA RF Channel		1	One TDD carrier frequency is used. And Cell 1 is						
Number				on RF channel number 1.						
	TRA RF Channel		2	One FDD carrier frequencies is used. And Cell 2						
Number				is on RF channel number 2.						
	t between cells		3 ms	Asynchronous cells						
	DD PRACH		53	As specified in table 5.7.1-3 in 3GPP TS 36.211						
configuration	on									
	ecial subframe configuration								6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-dow	vnlink configuration		1	As specified in table 4.2-2 in 3GPP TS 36.211						
E-UTRA F	E-UTRA FDD PRACH		4	As specified in table 5.7.1-2 in 3GPP TS 36.211						
configuration										
E-UTRA F	DD Access Barring	-	Not Sent	No additional delays in random access						
Information	•			procedure.						
E-UTRA T	-UTRA TDD Access Barring		Not Sent	No additional delays in random access						
Information	า			procedure.						
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.						
T1			15	T1 need to be defined so that cell re-selection						
				reaction time is taken into account.						
T2	T2		>7	During T2, cell 2 shall be powered off, and						
				during the off time the physical cell identity shall						
				be changed, The intention is to ensure that cell 2						
				has not been detected by the UE prior to the						
				start of period T3.						
T3	s 75		75	T3 need to be defined so that cell re-selection						
				reaction time is taken into account.						

4.2.5.4.2 Test procedure

The test scenario comprises of 1 E-UTRA TDD Cell 1 and 1 E-UTRA FDD Cell 2. The UE is requested to monitor the neighbouring cell on the E-UTRA FDD carrier. In the test there are three successive time periods, with time duration of T1, T2 and T3 respectively. Both Cell 1 and Cell 2 are already identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas and Cell 2 is of higher priority than Cell 1. Furthermore, UE has not registered with network for the tracking area containing Cell 1.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to duration T0 in Table 4.2.5.5-1.
- 3. Set the parameters according to duration T1 in Table 4.2.5.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 4. The SS waits for random access requests information from the UE to perform cell re-selection on the lower priority cell, Cell 1.
- 5. If the UE responds on lower priority cell, Cell 1 during time duration T1 within 8 seconds from the beginning of time period T1, then count a success for the event "Re-select lower priority Cell 1". Otherwise count a fail for the event "Re-select lower priority Cell 1".

- 6. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 7. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 12.
- 7. The SS shall switch the power setting from T1 to T2 as specified in Table 4.2.5.5-2. During time duration T2, Cell 2 shall be powered OFF and the physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) shall be changed to ensure Cell 2 is not detected by the UE.
- 8. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.2.5.5-2.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection on the higher priority cell, Cell 2.
- 10. If the UE responds on higher priority cell, Cell 2 during time duration T3 within 68 seconds from the beginning of time period T3, then count a success for the event "Re-select higher priority Cell 2". Otherwise count a fail for the event "Re-select higher priority Cell 2".
- 11. If the UE has re-selected Cell 2 within T3, after the re-selection or when T3 expires, skip to step 13. Otherwise, if T3 expires and the UE has not yet re-selected Cell 2, continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 2. Set the parameters according to duration T0 in Table 4.2.5.5-1.
- 13. Repeat step 3-12 until a test verdict has been achieved.
 Each of the events "Re-select lower priority Cell 1" and "Re-select higher priority Cell 2" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

 If both events pass, the test passes. If one event fails, the test fails.

4.2.5.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.2.5.4.3-1: Common Exception messages for E-UTRAN TDD-FDD inter frequency cell reselection test case

Default Message Contents					
Common contents of system information Table H.2.2-1					
blocks exceptions	Table H.2.2-2				
Default RRC messages and information	Table H.3.2-1				
elements contents exceptions	Table H.3.2-2				

4.2.5.5 Test requirement

Tables 4.2.5.4.1-1, 4.2.5.5-1 and 4.2.5.5-2 define the primary level settings including test tolerances for E-UTRAN TDD-FDD inter-frequency cell re-selection test case. Note that the time period for T0 is system implementation dependent.

Table 4.2.5.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD-FDD inter frequency cell re-selection test case

Parameter	Unit	Cell 1	Cell 2	
		T0		
E-UTRA RF Channel number		1	2	
BW _{channel}	MHz	10	10	
OCNG Patterns defined in		OP.2 TDD	OP.2	
D.1.2 (OP.2 FDD) and D.2.2			FDD	
(OP.2 TDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB		0	
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
Qrxlevmin	dBm	-140		
N_{oc} Note 2	dBm/15 kHz	-99.10		
RSRP Note 3	dBm/15 KHz	-102.80	-83.20	
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	-3.70	15.90	
\hat{E}_s/N_{oc}	dB	-3.70	15.90	
Treselection _{EUTRAN}	S	0	0	
Snonintrasearch	dB	50	Not sent	
Thresh _{x, high}	dB	48	48	
Thresh _{serving, low}	dB	44	44	
Thresh _{x, low}	dB	50	50	
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 4.2.5.5-2: Cell Specific Test requirement Parameters for E-UTRAN TDD-FDD inter frequency cell re-selection test case in AWGN

Parameter	arameter Unit Cell 1			Cell 2				
		T1	T2	T3	T1	T2	Т3	
E-UTRA RF Channel			1			2		
number								
BW _{channel}	MHz		10		10			
OCNG Patterns defined in								
D.1.2 (OP.2 FDD) and		OP.2 TDD		OP.2 FDD				
D.2.2 (OP.2 TDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB	0			0			
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA ^{Note 1}	dB							
OCNG_RB ^{Note 1}	dB							
Qrxlevmin	dBm	-140			-140			
N_{oc} Note 2	dBm/15 kHz	-99.10						
RSRP Note 3	dBm/15 KHz	-83.20	-83.20	-83.20	-102.80	-infinity	-85.20	
\hat{E}_{s}/I_{ot}	dB	15.90	15.90	15.90	-3.70	-infinity	13.90	
\hat{E}_s/N_{oc}	dB	15.90	15.90	15.90	-3.70	-infinity	13.90	
Treselection _{EUTRAN}	S	0		0				
Snonintrasearch	dB	50		Not sent				
Thresh _{x, high}	dB	48		48				
Thresh _{serving, low}	dB	44		44				
Thresh _{x, low}	dB	50		50				
Propagation Condition		AWGN						

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $\,N_{oc}\,$ to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell re-selection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1.

The cell re-selection delay to lower priority test requirement in this case is expressed as:

 $Cell \ re-selection \ delay \ to \ lower \ priority = T_{evaluate, E-UTRAN_Inter} + T_{SI-EUTRA}$

 $T_{evaluate,E\text{-}UTRAN_Inter} = 6.40 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.4

T_{SI-EUTRA} = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to lower priority shall be less than a total of 8 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

The cell re-selection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 2 and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to higher priority test requirement in this case is expressed as:

Cell re-selection delay to higher priority = $T_{higher_priority_search} + T_{evaluate,E-UTRAN_Inter} + T_{SI-EUTRAN}$

T_{higher priority search} = 60 s; as specified in TS 36.133 [4] clause 4.2.2

 $T_{evaluate,E-UTRAN\ Inter} = 6.40\ s$; as specified in TS 36.133 [4] clause 4.2.2.4

 $T_{SI-EUTRA} = 1280 \text{ ms}$; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to higher priority shall be less than a total of 68 seconds in this test case (note: this gives a total of 67.68 seconds but the test allows 68 seconds).

For the test to pass, both events above shall pass.

The statistical pass/ fail decisions are done separately for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

4.2.6 E-UTRAN TDD - TDD cell re-selection inter frequency case

4.2.6.1 Test purpose

To verify that when the neighbour cell operates on a different carrier frequency, compared to the current cell the UE is able to search and measure cells to meet the inter-frequency cell re-selection requirements.

4.2.6.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

4.2.6.3 Minimum conformance requirements

The cell re-selection delay shall be less than T_{evaluate,E-UTRAN Inter} + T_{SI-EUTRA} in RRC_IDLE state.

The UE shall be able to identify new inter-frequency cells and perform RSRP measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for inter-frequency layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in section 4.2.2 of TS 36.133 [4].

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below for a lower or equal priority inter-frequency layers.

The UE shall be able to evaluate whether a newly detectable lower or equal priority inter-frequency cell meets the reselection criteria defined in TS 36.304 [6] within $K_{carrier} * T_{detect,EUTRAN_Inter}$ (as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4) if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when Treselection_{EUTRAN} = 0 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for reselections based on absolute priorities. The parameter $K_{carrier}$ is the number of E-UTRA inter-frequency carriers indicated by the serving cell.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,EUTRAN_Inter}$. If, after it is found in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of re-selection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure RSRP at least every $K_{carrier} * T_{measure, EUTRAN_Inter}$ as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 for identified lower or equal priority inter-frequency cells. If the UE detects on an E-UTRA carrier a cell

whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRP measurements of each measured higher, lower and equal priority inter-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure, EUTRAN_Inter}/2$.

The UE shall not consider an E-UTRA neighbour cell in cell re-selection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met re-selection criterion defined in TS 36.304 [6] within $K_{carrier} * T_{evaluate,E-UTRAN_Inter}$ as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 when Treselection_{EUTRAN} = 0 provides that the re-selection criteria is met by a margin of at least 5dB for re-selection based on ranking or 6dB for re-selection based on absolute priorities. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and inter-frequency cells.

If Treselection_{EUTRAN} timer has a non-zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the Treselection_{EUTRAN} time. If this cell remains better ranked within this duration, then the UE shall re-select that cell.

The UE shall evaluate the inter-frequency cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds.

At inter-frequency cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target inter-frequency cell for paging reception. The interruption time shall not exceed $T_{SI\text{-}EUTRA} + 50$ ms. $T_{SI\text{-}EUTRA}$ is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks as defined in TS 36.331 [5] for a E-UTRAN cell.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.4 and A.4.2.6.

4.2.6.4 Test description

4.2.6.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (eNodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 4.2.6.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.2.6.4.3.
- 5. There are two E-UTRA TDD carriers and two cells specified in the test. Cell 2 is the cell used for registration with the power level set according to clause C.0 and C.1 for this test.

Table 4.2.6.4.1-1: General Test Parameters for E-UTRAN TDD-TDD inter frequency cell re-selection test case

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell2	UE shall be forced to cell 2 in the initialisation phase, so that reselection to cell 1 occurs during the first T1 phase
T1 end	Active cell		Cell1	UE shall perform reselection to cell 1 during T1
condition	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
E-UTRA RF	Channel Number		1, 2	Two TDD carrier frequencies are used.
Time offset	between cells	μS	3	Synchronous cells
				3μs or 92*Ts
Access Barring Information		-	Not Sent	No additional delays in random access
				procedure.
Special sub	frame configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211
Uplink-dowr	nlink configuration		1	As specified in table 4.2-2 in 3GPP TS 36.211
PRACH cor	nfiguration index		53	As specified in table 5.7.1-3 in 3GPP TS 36.211
DRX cycle I	ength	S	1.28	The value shall be used for all cells in the test.
T1		S	15	T1 need to be defined so that cell re-selection
				reaction time is taken into account.
T2		s	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
Т3		S	75	T3 need to be defined so that cell re-selection reaction time is taken into account.

4.2.6.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one E-UTRA TDD carrier. In the test there are three successive time periods, with time duration of T1, T2, and T3 respectively. Both Cell 1 and Cell 2 are already identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas and Cell 2 is of higher priority than Cell 1. Furthermore, UE has not registered with network for the tracking area containing Cell 1.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to duration T0 in Table 4.2.6.5-1
- 3. Set the parameters according to duration T1 in Table 4.2.6.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 4. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the lower priority cell, Cell 1.
- 5. If the UE responds on the lower priority cell, Cell 1, during time duration T1 within 8 seconds from the beginning of time period T1, then count a success for the event "Re-select lower priority Cell 1". Otherwise count a fail for the event "Re-select lower priority Cell 1".
- 6. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 7. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 12.
- 7. The SS shall switch the power setting from T1 to T2 as specified in Table 4.2.6.5-2. During time duration T2, Cell 2 shall be powered OFF and change Cell 2 physical cell identity to ((current cell 2 physical cell identity + 1) mod 14 + 2) to ensure Cell 2 is not detected by the UE.
- 8. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.2.6.5-2.

- 9. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the higher priority cell, Cell 2.
- 10. If the UE responds on higher priority cell, Cell 2, during time duration T3 within 68 seconds from the beginning of time period T3, then count a success for the event "Re-select higher priority Cell 2". Otherwise count a fail for the event "Re-select higher priority Cell 2".
- 11. If the UE has re-selected Cell 2 within T3, after the re-selection or when T3 expires, skip to step 13. Otherwise, if T3 expires and the UE has not yet re-selected Cell 2, continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 2. Set the parameters according to duration T0 in Table 4.2.6.5-1.
- 13. Repeat step 3-12 until a test verdict has been achieved.

Each of the events "Re-select lower priority Cell 1" and "Re-select higher priority Cell 2" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

If both events pass, the test passes. If one event fails, the test fails.

4.2.6.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.4.3.3 and 4.6.3 with the following exceptions:

Table 4.2.6.4.3-1: Common Exception messages for E-UTRAN TDD-TDD inter frequency cell reselection test case

Default Message Contents				
	Table H.2.2-1			
blocks exceptions	Table H.2.2-2			
Default RRC messages and information	Table H.3.2-2			
elements contents exceptions				

4.2.6.5 Test requirement

Tables 4.2.6.4.1-1, 4.2.6.5-1 and 4.2.6.5-2 defines the primary level settings including test tolerances for E-UTRAN TDD-TDD inter frequency cell re-selection test case. Note that the time period for T0 is system implementation dependent.

Table 4.2.6.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD-TDD inter frequency cell re-selection test case

Parameter	Unit	Cell 1	Cell 2
		T()
E-UTRA RF Channel number		1	2
BW _{channel}	MHz	10)
OCNG Patterns defined in		OP.2	TDD
D.2.2 (OP.2 TDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA ^{Note 1}	dB		
OCNG_RB ^{Note 1}	dB		

Qrxlevmin	dBm	-140	
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-99,	1
RSRP Note 3	dBm/15 KHz	-102.8	-83.2
\hat{E}_{s}/I_{ot}	dB	-3.70	15.90
\hat{E}_s/N_{oc}	dB	-3.70	15.90
Treselection _{EUTRAN}	S	0	0
Snonintrasearch	dB	50	Not sent
Thresh _{x, high}	dB	48	48
Thresh _{serving, low}	dB	44	44
Thresh _{x, low}	dB	50	50
Propagation Condition		AWG	SN

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 4.2.6.5-2: Cell Specific Test requirement Parameters for E-UTRAN TDD-TDD inter frequency cell re-selection test case

Parameter	Unit	Cell 1				Cell 2	
		T1	T2	Т3	T1	T2	T3
E-UTRA RF Channel number			1			2	
BW _{channel}	MHz		10			10	
OCNG Pattern defined in			OP.2 TDD			OP.2 TDD	
D.2.2 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0			0	
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note 1}	dB						
OCNG_RB ^{Note 1}	dB]					

Qrxlevmin	dBm		-140			-140	
N_{oc}	dBm/15 kHz	-99,1					
RSRP	dBm/15 KHz	-83.2	-83.2	-83.2	-102.8	-infinity	-85.2
\hat{E}_{s}/I_{ot}	dB	15.90	15.90	15.90	-3.70	-infinity	13.90
\hat{E}_s/N_{oc}	dB	15.90	15.90	15.90	-3.70	-infinity	13.90
Treselection _{EUTRAN}	S		0	•	0		
Snonintrasearch	dB		50		Not sent		
Thresh _{x, high}	dB	48 48					
Thresh _{serving, low}	dB		44			44	
Thresh _{x, low}	dB	50 50					
Propagation Condition		AWGN			•		

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell re-selection delay to higher priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 2 and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to higher priority test requirement in this case is expressed as:

 $Cell \ re-selection \ delay \ to \ higher \ priority = T_{higher_priority_search} + T_{evaluate,E-UTRAN_Inter} + T_{SI-EUTRAN_Inter} + T_{SI-EUTRAN_INTE$

T_{higher priority search} = 60 s; as specified in TS 36.133 [4] clause 4.2.2

 $T_{\text{evaluate,E-UTRAN Inter}} = 6.40 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.4

 $T_{SI-EUTRA} = 1280 \text{ ms}$; as specified in TS 36.133 [4] clause 4.2.2.7

The cell re-selection delay to higher priority shall be less than a total of 68 seconds in this test case (note: this gives a total of 67.68 seconds but the test allows 68 seconds).

The cell re-selection delay to lower priority is defined as the time from the beginning of time period T1, to the moment when the UE camps on Cell 1 and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1. The cell re-selection delay to lower priority test requirement in this case is expressed as:

Cell re-selection delay to lower priority = $T_{evaluate,E-UTRAN\ Inter} + T_{SI-EUTRA}$

 $T_{\text{evaluate.E-UTRAN Inter}} = 6.40 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.4

 $T_{SI-EUTRA} = 1280$ ms; as specified in TS 36.133 [4] clause 4.2.2.7

The cell re-selection delay to lower priority shall be less than a total of 8 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

For the test to pass, both events above shall pass.

The statistical pass/ fail decisions are done separately for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

4.2.7 E-UTRAN FDD – FDD Inter frequency case in the existence of nonallowed CSG cell

4.2.7.1 Test purpose

To verify that when the neighbour cell operates on a different carrier frequency and there is the interference from non-allowed CSG cell and the layers have equal priority, compared to the current cell the UE is able to search and measure cells to meet the inter-frequency cell re-selection requirements.

4.2.7.2 Test applicability

This test applies to all types of E-UTRA UE supporting FDD release 9 and forward.

4.2.7.3 Minimum conformance requirements

The cell re-selection delay shall be less than T_{evaluate,E-UTRAN Inter} + T_{SI-EUTRA} in RRC_IDLE state.

The UE shall be able to identify new inter-frequency cells and perform RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If $Srxlev > S_{nonIntraSearchP}$ and $Squal > S_{nonIntraSearchQ}$ then the UE shall search for inter-frequency layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher_priority_search} = (60 * N_{layers})$ seconds, where the parameter N_{layers} is the total number of configured higher priority E-UTRA carrier frequencies.

If $Srxlev \leq S_{nonIntraSearchP}$ or $Squal \leq S_{nonIntraSearchQ}$ then the UE shall search for and measure—inter-frequency layers of higher, equal or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below for lower or equal priority inter-frequency layers.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell meets the re-selection criteria defined in TS 36.304 [6] within $K_{carrier} * T_{detect,EUTRAN_Inter}$ (as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4) if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when Treselection_{EUTRAN} = 0 provides that the re-selection criteria is met by a margin of at least 5 dB for re-selection based on ranking or 6 dB for re-selection based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. The parameter $K_{carrier}$ is the number of E-UTRA inter-frequency carriers indicated by the serving cell.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,EUTRAN_Inter}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateFDD, Inter}$ + $T_{reselection_{EUTRAN}}$) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection. If the UE detects on an E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure RSRQ at least every $K_{carrier} * T_{measure,EUTRAN_Inter}$ DRX cycle as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 for identified lower or equal priority inter-frequency cells. If the UE detects on an E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRQ measurements of each measured higher, lower and equal priority inter-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN\ Inter}/2$.

The UE shall not consider an E-UTRA neighbour cell in cell re-selection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met re-selection criterion defined in TS 36.304~[6] within $K_{carrier} * T_{evaluate,E-UTRAN_Inter}$ as defined in table 4.2.2.4-1 of TS 36.133~[4] clause 4.2.2.4 when Treselection_{EUTRAN} = 0 provides that the re-selection criteria is met by a margin of at least 5 dB for re-selection based on ranking or 6 dB for re-selection based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities.

When evaluating cells for re-selection, the side conditions for RSRP and SCH apply to both serving and inter-frequency cells.

If Treselection_{EUTRAN} timer has a non-zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the Treselection_{EUTRAN} time. If this cell remains better ranked within this duration, then the UE shall re-select that cell.

The UE shall evaluate the inter-frequency cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds. When a non-zero value of Treselection_{EUTRAN} is used, the UE shall only perform re-selection on an evaluation which occurs simultaneously to, or later than the expiry of the Treselection_{EUTRAN} timer.

At inter-frequency cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target inter-frequency cell for paging reception. The interruption time shall not exceed $T_{SI-EUTRA} + 50$ ms. $T_{SI-EUTRA}$ is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks as defined in TS 36.331 [5] for a E-UTRAN cell.

For idle mode cell re-selection purposes, the UE shall be capable of monitoring at least:

- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers

In addition to the requirements defined in TS 36.133 [4] clause 4.2.2.9 a UE in RRC_IDLE state shall be capable of monitoring a total of at least 8 carrier frequency layers, which includes serving layer, comprising of any defined in TS 36.133 [4] clause 4.2.2.9 combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 cells), cdma2000 1x and HRPD layers.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.4 and A.4.2.7.

4.2.7.4 Test description

4.2.7.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

The UE's allowed CSG list is empty.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.27.
- 2. The general test parameter settings are set up according to Table 4.2.7.4-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.2.7.4.3.
- 5. There are two E-UTRA FDD carriers and two cells specified in the test and one non-allowed E-UTRA FDD CSG cell. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test and Cell 3 is the cell used for adding interference from non-allowed CSG cell.

Table 4.2.7.4-1: General test parameters for FDD-FDD inter frequency cell re-selection test case with non-allowed CSG cell

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation phase
Final condition	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
E-UTRA R	F Channel Number		1, 2	Two FDD carrier frequencies are used.
Time offset	t between cells	ms	3	Asynchronous cells
PRACH co	nfiguration		4	As specified in table 5.7.1-2 in TS 36.211
Access Ba	rring Information	-	Not Sent	No additional delays in random access procedure.
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1	-	S	15	T1 need to be defined so that the non-allowed CSG cell is identified.
T2		S	40	T2 need to be defined so that cell re-selection reaction time is taken into account.
T3		S	15	T3 need to be defined so that whether cell reselection would not occur is insured.

4.2.7.4.2 Test procedure

The test consists of one active cell, one neighbour cell and one non-allowed CSG cell. The UE is requested to monitor the neighbouring cell on one of the E-UTRA FDD carriers. In the test there are four successive time periods, with time duration of T0, T1, T2 and T3 respectively. Cell 1 is already identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas and Cell 3 is a non-allowed CSG cell. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2A and 7.2A.2. Set Cell 2 physical cell identity = initial cell 2 physical cell identity.
- 2. Set the parameters according to duration T0 in Table 4.2.7.5-1. If the UE is already camped in Cell 1, wait until T0 expires and skip to step 5.
- 3. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 1.
- 4. If the UE has re-selected Cell 1 within T0, after the re-selection or when T0 expires, continue with step 5. Otherwise, if T0 expires and the UE has not yet re-selected Cell 1, skip to step 12.
- 5. Set the parameters according to duration T1 in Table 4.2.7.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 6. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for one iteration of the test procedure loop.
- 7. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.2.7.5-2. T2 starts.
- 8. The SS waits for random access requests information from the UE to perform cell re-selection to a newly detectable cell, Cell 2.
- 9. If the UE has responded on the newly detected Cell 2 during time duration within 34 seconds from the beginning of time period T2 count a success for the event "Re-select newly detected Cell 2", and after the re-selection, continue with step 10.
 - Otherwise, if the UE has not re-selected Cell 2 count a fail for the event "Re-select newly detected Cell 2", and skip to step 12.
- 10. After the re-selection or when T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.2.7.5-2. T3 starts.

- 11. If the UE has not re-selected Cell 1 when T3 expires, count a success for the event "Hold out on Cell 2", and skip to step 13. Otherwise, if the UE responds on the known cell, Cell 1 during time duration T3, count a fail for the event "Hold out on Cell 2", and continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2A and 7.2A.2 in Cell 1.
- 13. Repeat step 2-12 until a test verdict has been achieved.

Each of the events "Re-select newly detected Cell 2" and "Hold out on Cell 2" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

If both events pass, the test passes. If one event fails, the test fails.

4.2.7.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.2.7.4.3-1: Common Exception messages for E-UTRAN FDD – FDD Inter frequency case in the existence of non-allowed CSG cell

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.3.2-1			
elements contents exceptions				

Table 4.2.7.4.3-2: SystemInformationBlockType1: E-UTRAN inter frequency cell re-selection case in the existence of non-allowed CSG cell

Derivation Path: TS 36.508 [7] clause 4.4.3.2,	Table 4.4.3.2-3 Syster	mInformationBlockType1	
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::=			
SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
csg-Indication	TRUE	Cell 3	
csg-Identity	Physical Cell ID of	Cell 3	
	the Cell 3		
}			
nonCriticalExtension SEQUENCE {			
nonCriticalExtension SEQUENCE {			
cellSelectionInfo-v920 SEQUENCE {			
q-QualMin-r9	-20 (-20dB)	Cell 1, 2, 3	
q-QualMinOffset-r9	Not present		
}			
}			
}			
}			

Table 4.2.7.4.3-3: SystemInformationBlockType3: E-UTRAN inter frequency cell re-selection case in the existence of non-allowed CSG cell

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3					
Information Element	Value/remark	Comment	Condition		
SystemInformationBlockType3 ::= SEQUENCE {					
intraFreqCellReselectionInfo SEQUENCE {					
lateNonCriticalExtension {					
s-IntraSearch-v920 SEQUENCE {}	Not present				
s-NonIntraSearch-v920 SEQUENCE {					
s-NonIntraSearchP-r9	25	Cell 1			
s-NonIntraSearchQ-r9	10	Cell 1			
}					
q-QualMin-r9	-20 (-20dB)	Cell 1, 2, 3			
threshServingLowQ-r9	Not present				
}					
}					

Table 4.2.7.4.3-4: SystemInformationBlockType4: E-UTRAN inter frequency cell re-selection case in the existence of non-allowed CSG cell

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table	4.4.3.3-3 SystemInformation	BlockType4	
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType4 ::= SEQUENCE {			
intraFreqNeighCellList SEQUENCE (SIZE			
(1maxCellIntra)) OF SEQUENCE {			
physCellId	Physical Cell ID of the Cell 3	Cell 1	
	Physical Cell ID of the Cell 1	Cell 3	
}			
csg-PhysCellIdRange SEQUENCE {			
start	Physical Cell ID of the cell on which this SIB is transmitted	Cell 3	
range	Not present		
}	_		
}			

Table 4.2.7.4.3-5: SystemInformationBlockType5: E-UTRAN inter frequency cell re-selection case in the existence of non-allowed CSG cell

Value/remark	Comment	Condition
Frequency of the Cell 2	Cell 1, 3	
Frequency of the Cell 1	Cell 2	
-70 (-140 dBm)	Cell 1, 2, 3	
	Cell 2	
Physical Cell ID of the		
Cell 1		
dB0		
-20 (-20dB)	Cell 1, 2, 3	
Not present		
<u> </u>		
	Frequency of the Cell 1 -70 (-140 dBm) Physical Cell ID of the Cell 1 dB0 -20 (-20dB)	Frequency of the Cell 1

Table 4.2.7.4.3-6: SystemInformationBlockType9: E-UTRAN inter frequency cell re-selection case in the existence of non-allowed CSG cell

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-8 SystemInformationBlockType9								
Information Element Value/remark Comment Cond								
SystemInformationBlockType9 ::= SEQUENCE {								
hnb-Name	"3gppTest"	Cell 3						
}								

4.2.7.5 Test requirement

Tables 4.2.7.4.1-1, 4.2.7.5-1 and 4.2.7.5-2 defines the primary level settings including test tolerances for E-UTRAN FDD - FDD Inter frequency case in the existence of non-allowed CSG cell test case. Note that the time period for T0 is system implementation dependent.

Table 4.2.7.5-1: Cell specific Test requirement parameters for FDD-FDD inter frequency cell reselection test case with non-allowed CSG cell

Parameter	Unit	Cell 1	Cell 2	Cell 3			
			T0				
E-UTRA RF Channel number		1	2	1			
BW _{channel}	MHz	10	10	10			
OCNG Patterns defined in D.1.2		OP.2 FDD	OP.2 FDD	OP.2 FDD			
PBCH_RA	dB	0	0	0			
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note 1}	dB						
OCNG_RB ^{Note 1}	dB						
Qrxlevmin	dBm	-140	-140	-140			
Qqualmin	dB	-20	-20	-20			
$N_{oc}^{ m Note~2}$	dBm/15	-98					
	kHz						
RSRP Note 3	dBm/15 kHz	-85.00	-101.00	-Infinity			
RSRQ Note 3	dB	-11.00	-15.56	-Infinity			
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	13.00	-3.00	-Infinity			
\hat{E}_s/N_{oc}	dB	13.00	-3.00	-Infinity			
Treselection	S	0	0	0			
SnonintrasearchQ	dB	10	Not sent	Not sent			
Propagation Condition	Propagation Condition AWGN						
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Interference from other cells and noise sources not specified in the test is							
assumed to be constant over subcarriers and time and shall be modelled as							

AWGN of appropriate power for $\,N_{oc}\,$ to be fulfilled.

RSRP and RSRQ and Es/lot levels have been derived from other parameters Note 3: for information purposes. They are not settable parameters themselves.

Table 4.2.7.5-2: Cell specific test parameters for FDD-FDD inter frequency cell re-selection test case with non-allowed CSG cell

Parameter	Unit	Cell 1			Cell 2			Cell 3(Non-allowed CSG cell)			
		T1	T2	T3	T1	T2	Т3	T1	T2	Т3	
E-UTRA RF Channel Number			1	•		2			1		
	NAL 1-		40			40			40		
BW _{channel}	MHz		10			10			10		
OCNG Patterns defined in D.1.2 (OP.2 FDD)		OP.2 FDD		OP.2 FDD			OP.2 FDD				
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PCFICH_RB	dB										
PHICH_RA	dB										
PHICH_RB	dB										
PDCCH_RA	dB		0			0			0		
PDCCH_RB	dB										
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA ^{Note 1}	dB										
OCNG_RB ^{Note}	dB										
Qrxlevmin	dBm		-140		-140			-140			
Qqualmin	dB			I		-20					
N_{oc} Note 2	dBm/15 kHz					-98					
RSRP Note 3	dBm/15 kHz	-90.20	-90.0	- 85.00	-Infinity	85.0 0	90.00	-90.00	-85.00	-60.00	
RSRQ Note 3	dB	-14.24	- 17.15	- 35.81	-Infinity	11.0 0	- 11.43	-14.04	-12.15	-10.81	
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	-0.84	-5.21	- 25.00	-Infinity	13.0 0	8.00	-0.47	4.36	24.79	
\hat{E}_s/N_{oc}	dB	7.80	8.00	13.00	-Infinity	13.0 0	8.00	8.00	13.00	38.00	
Treselection	S		0		0			0			
SnonintrasearchQ	dB		10		No	t sent			Not sen	t	
Propagation Condition					ecated and a	AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP and RSRQ levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell test requirement in this case is expressed as:

Cell re-selection delay to a newly detectable $cell = T_{evaluate, E-UTRAN_Inter} + T_{SI-EUTRAN}$

 $T_{\text{evaluate, E-UTRAN Inter}} = 32 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.4.

T_{SI-EUTRA}= 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.4.

The cell re-selection delay to a newly detectable cell shall be less than a total of 34 seconds in this test case (note: this gives a total of 33.28 s, but the test allows 34 seconds.)

The probability of re-selection from Cell 1 to Cell 2 during T2 observed during testing shall be at least 90%.

The probability of re-selection from Cell 2 to Cell 1 during T3 observed during testing shall be less than 10%.

For the test to pass, both events above shall pass with a confidence level of 95%.

4.2.8 E-UTRAN TDD – TDD Inter frequency case in the existence of nonallowed CSG cell

4.2.8.1 Test purpose

To verify that when the neighbour cell operates on a different carrier frequency and there is the interference from non-allowed CSG cell and the layers have equal priority, compared to the current cell the UE is able to search and measure cells to meet the inter-frequency cell re-selection requirements.

4.2.8.2 Test applicability

This test applies to all types of E-UTRA UE supporting TDD release 9 and forward.

4.2.8.3 Minimum conformance requirements

The cell re-selection delay shall be less than T_{evaluate,E-UTRAN_Inter} + T_{SI-EUTRA} in RRC_IDLE state.

The UE shall be able to identify new inter-frequency cells and perform RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If $Srxlev > S_{nonIntraSearchP}$ and $Squal > S_{nonIntraSearchQ}$ then the UE shall search for inter-frequency layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in section 4.2.2 of TS 36.133 [4].

If $Srxlev \leq S_{nonIntraSearchP}$ or $Squal \leq S_{nonIntraSearchQ}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below for a lower or equal priority inter-frequency layers.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell meets the re-selection criteria defined in TS 36.304 [6] within $K_{carrier} * T_{detect,EUTRAN_Inter}$ (as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4) if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when Treselection_{EUTRAN} = 0 provided that the reselection criteria is met by a margin of at least 5dB for reselections based on ranking or 6dB for reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. The parameter $K_{carrier}$ is the number of E-UTRA inter-frequency carriers indicated by the serving cell.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,EUTRAN_Inter}$. If, after it is found in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of re-selection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure RSRQ at least every $K_{carrier} * T_{measure,EUTRAN_Inter}$ as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 for identified lower or equal priority inter-frequency cells. If the UE detects on an E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRQ measurements of each measured higher, lower and equal priority inter-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN\ Inter}/2$.

The UE shall not consider an E-UTRA neighbour cell in cell re-selection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met re-selection criterion defined in TS 36.304 [6] within $K_{carrier} * T_{evaluate,E-UTRAN_Inter}$ as defined in table 4.2.2.4-1 of TS 36.133 [4] clause 4.2.2.4 when Treselection_{EUTRAN} = 0 provides that the re-selection criteria is met by a margin of at least 5dB for re-selection based on ranking or 6dB for re-selection based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities. When evaluating cells for reselection, the side conditions for RSRP and SCH apply to both serving and inter-frequency cells.

If Treselection_{EUTRAN} timer has a non-zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the Treselection_{EUTRAN} time. If this cell remains better ranked within this duration, then the UE shall re-select that cell.

The UE shall evaluate the inter-frequency cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds.

At inter-frequency cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target inter-frequency cell for paging reception. The interruption time shall not exceed $T_{SI-EUTRA} + 50$ ms. $T_{SI-EUTRA}$ is the time required for receiving all the relevant system information data according to the reception procedure and the RRC procedure delay of system information blocks as defined in TS 36.331 [5] for a E-UTRAN cell.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.4 and A.4.2.8.

4.2.8.4 Test description

4.2.8.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

The UE's allowed CSG list is empty.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.27.
- 2. The general test parameter settings are set up according to Table 4.2.8.4-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.2.8.4.3.
- 5. There are two E-UTRA TDD carriers and two cells specified in the test and one non-allowed E-UTRA TDD CSG cell. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test and Cell 3 is the cell used for adding interference from non-allowed CSG cell.

Table 4.2.8.4-1: General test parameters for TDD-TDD inter frequency cell re-selection test case with non-allowed CSG cell

	Parameter Unit		Value	Comment	
Initial	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation	
condition				phase	
Final	Active cell		Cell2	UE shall perform reselection to cell 2 during T2	
condition					
E-UTRA RI	F Channel Number		1, 2	Two TDD carrier frequencies are used.	
Time offset	between cells	μS	3	Synchronous cells	
Uplink-dow	nlink configuration		1	As specified in table 4.2-2 in 3GPP TS 36.211	
Special sub	Special subframe configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211	
PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211	
Access Bar	rring Information	-	Not Sent	No additional delays in random access	
3				procedure.	
DRX cycle length		S	1.28	The value shall be used for all cells in the test.	
T1	S		15	T1 need to be defined so that the non-allowed	
				CSG cell is identified.	
T2	•	S	40	T2 need to be defined so that cell re-selection	
				reaction time is taken into account.	
T3		S	15	T3 need to be defined so that whether cell re-	
			selection would not occur is insured.		

4.2.8.4.2 Test procedure

The test consists of one active cell, one neighbour cell and one now-allowed CSG cell. The UE is requested to monitor the neighbouring cell on one of the E-UTRA TDD carriers. In the test there are four successive time periods, with time duration of T0, T1, T2 and T3 respectively. Cell 1 already identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas and Cell 3 is a non-allowed CSG cell. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2A and 7.2A.2. Set Cell 2 physical cell identity = initial cell 2 physical cell identity.
- 2. Set the parameters according to duration T0 in Table 4.2.8.5-1. If the UE is already camped in Cell 1, wait until T0 expires and skip to step 5.
- 3. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 1.
- 4. If the UE has re-selected Cell 1 within T0, after the re-selection or when T0 expires, continue with step 5. Otherwise, if T0 expires and the UE has not yet re-selected Cell 1, skip to step 12.
- 5. Set the parameters according to duration T1 in Table 4.2.8.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 6. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for one iteration of the test procedure loop.
- 7. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.2.8.5-2. T2 starts.
- 8. The SS waits for random access requests information from the UE to perform cell re-selection to a newly detectable cell, Cell 2.
- 9. If the UE has responded on the newly detected Cell 2 during time duration within 34 seconds from the beginning of time period T2 count a success for the event "Re-select newly detected Cell 2", and after the re-selection, continue with step 10.
 - Otherwise, if the UE has not re-selected Cell 2 count a fail for the event "Re-select newly detected Cell 2", and skip to step 12.
- 10. After the re-selection or when T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 4.2.8.5-2. T3 starts.

- 11. If the UE has not re-selected Cell 1 when T3 expires, count a success for the event "Hold out on Cell 2", and skip to step 13. Otherwise, if the UE responds on the known cell, Cell 1 during time duration T3, count a fail for the event "Hold out on Cell 2", and continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 4.5.2A and 7.2A.2 in Cell 1.
- 13. Repeat step 2-12 until a test verdict has been achieved.

Each of the events "Re-select newly detected Cell 2" and "Hold out on Cell 2" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

If both events pass, the test passes. If one event fails, the test fails.

4.2.8.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.2.8.4.3-1: Common Exception messages for E-UTRAN TDD – TDD Inter frequency case in the existence of non-allowed CSG cell

Default Message Contents							
Common contents of system information							
blocks exceptions							
Default RRC messages and information	Table H.3.2-1						
elements contents exceptions							

Table 4.2.8.4.3-2: SystemInformationBlockType1: E-UTRAN TDD – TDD Inter frequency case in the existence of non-allowed CSG cell

Derivation Path: TS 36.508 [7] clause 4.4.3.2,	2, Table 4.4.3.2-3 SystemInformationBlockType1					
Information Element	Value/remark	Comment	Condition			
SystemInformationBlockType1 ::=						
SEQUENCE {						
cellAccessRelatedInfo SEQUENCE {						
csg-Indication	TRUE	Cell 3				
csg-Identity	Physical Cell ID of	Cell 3				
	the Cell 3					
}						
nonCriticalExtension SEQUENCE {						
nonCriticalExtension SEQUENCE {						
cellSelectionInfo-v920 SEQUENCE {						
q-QualMin-r9	-20 (-20dB)	Cell 1, 2, 3				
q-QualMinOffset-r9	Not present					
}						
}						
}						
}						

Table 4.2.8.4.3-3: SystemInformationBlockType3: E-UTRAN TDD – TDD Inter frequency case in the existence of non-allowed CSG cell

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-2 SystemInformationBlockType3								
Information Element	Value/remark	Comment	Condition					
SystemInformationBlockType3 ::= SEQUENCE {								
intraFreqCellReselectionInfo SEQUENCE {								
lateNonCriticalExtension {								
s-IntraSearch-v920 SEQUENCE {}	Not present							
s-NonIntraSearch-v920 SEQUENCE {								
s-NonIntraSearchP-r9	25	Cell 1						
s-NonIntraSearchQ-r9	10	Cell 1						
}								
q-QualMin-r9	-20 (-20dB)	Cell 1, 2, 3						
threshServingLowQ-r9	Not present							
}								
}								

Table 4.2.8.4.3-4: SystemInformationBlockType4: E-UTRAN TDD – TDD Inter frequency case in the existence of non-allowed CSG cell

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table	4.4.3.3-3 SystemInformation	BlockType4	
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType4 ::= SEQUENCE {			
intraFreqNeighCellList SEQUENCE (SIZE			
(1maxCellIntra)) OF SEQUENCE {			
physCellId	Physical Cell ID of the Cell 3	Cell 1	
	Physical Cell ID of the Cell 1	Cell 3	
}			
csg-PhysCellIdRange SEQUENCE {			
start	Physical Cell ID of the cell on which this SIB is transmitted	Cell 3	
range	Not present		
}			
}			

Table 4.2.8.4.3-5: SystemInformationBlockType5: E-UTRAN TDD – TDD Inter frequency case in the existence of non-allowed CSG cell

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4	Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-4 SystemInformationBlockType5								
Information Element	Value/remark	Comment	Condition						
SystemInformationBlockType5 ::= SEQUENCE {									
interFreqCarrierFreqList SEQUENCE (SIZE									
(1maxFreq)) OF SEQUENCE {									
dl-CarrierFreq	Frequency of the Cell 2	Cell 1, 3							
	Frequency of the Cell 1	Cell 2							
q-RxLevMin	-70 (-140 dBm)	Cell 1, 2, 3							
interFreqNeighCellList[n] SEQUENCE (SIZE		Cell 2							
(1maxCellInter)) OF SEQUENCE {									
physCellId	Physical Cell ID of the								
	Cell 1								
q-OffsetCell	dB0								
}									
q-QualMin-r9	-20 (-20dB)	Cell 1, 2, 3							
threshX-Q-r9 SEQUENCE {}	Not present								
}									
}									

Table 4.2.8.4.3-6: SystemInformationBlockType9: E-UTRAN TDD – TDD Inter frequency case in the existence of non-allowed CSG cell

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-8 SystemInformationBlockType9								
Information Element Value/remark Comment Condition								
SystemInformationBlockType9 ::= SEQUENCE {								
hnb-Name	"3gppTest"	Cell 3						
}								

4.2.8.5 Test requirement

Table 4.2.8.5-1 defines the primary level settings including test tolerances for E-UTRAN TDD – TDD Inter frequency case in the existence of non-allowed CSG cell test case. Note that the time period for T0 is system implementation dependent.

Table 4.2.8.5-1: Cell specific Test requirement parameters for FDD-FDD inter frequency cell reselection test case with non-allowed CSG cell

Parameter	Unit	Cell 1	Cell 2	Cell 3			
			T0				
E-UTRA RF Channel number		1	2	1			
BW _{channel}	MHz	10	10	10			
OCNG Patterns defined in D.1.2		OP.2 TDD	OP.2 TDD	OP.2 TDD			
PBCH_RA	dB	0	0	0			
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB						
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note 1}	dB						
OCNG_RB ^{Note 1}	dB						
Qrxlevmin	dBm	-140	-140	-140			
Qqualmin	dB	-20	-20	-20			
$N_{oc}^{ m Note 2}$	dBm/15		-98				
	kHz						
RSRP Note 3	dBm/15	-85.00	-101.00	-Infinity			
No. 10	kHz						
RSRQ Note 3	dB	-11.00	-15.56	-Infinity			
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	13.00	-3.00	-Infinity			
\hat{E}_s/N_{oc}	dB	13.00	-3.00	-Infinity			
Treselection	S	0	0	0			
SnonintrasearchQ	dB	10	Not sent	Not sent			
Propagation Condition			AWGN				
Propagation Condition AWGN							

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $\,N_{oc}\,$ to be fulfilled.

Note 3: RSRP and RSRQ and Es/lot levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 4.2.8.5-2: Cell specific test parameters for TDD-TDD inter frequency cell re-selection test case with non-allowed CSG cell

Parameter	Unit	Cell 1		Cell 2			Cell 3 (Non-allowed CSG cell)					
		T1	T2	Т3	T1	T2	Т3	(Non-ai	T2	T3		
E-UTRA RF Channel		11	1	13		2	13	- ' '	1	13		
Number			•			_			•			
BW _{channel}	MHz		10			10			10			
OCNG Pattern defined in				_					00.0 70.0	_		
A.3.2.2.2 (OP.2 TDD)			OP.2 TDI)		OP.2 TDD)		OP.2 TDI)		
PBCH_RÀ	dB											
PBCH_RB	dB											
PSS_RA	dB											
SSS_RA	dB											
PCFICH_RB	dB											
PHICH_RA	dB											
PHICH_RB	dB		0			0			0			
PDCCH_RA	dB											
PDCCH_RB	dB											
PDSCH_RA	dB											
PDSCH_RB	dB											
OCNG_RA ^{Note 1}	dB											
OCNG_RB ^{Note 1}	dB											
Qrxlevmin	dBm		-140		-140			-140				
Qqualmin	dB					-20						
N_{oc} Note 2	dBm/					-98						
	15kHz			_								
RSRP Note 3	dBm/	-90.20	-90.00	-85.00	-Infinity	-85.00	-90.00	-90.00	-85.00	-60.00		
NIA.2 17	15kHz											
RSRQ Note 3	dB	-14.24	-17.15	-35.81	-Infinity	-11.00	-11.43	-14.04	-12.15	-10.81		
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	-0.84	-5.21	-25.00	-Infinity	13.00	8.00	-0.47	4.36	24.79		
\hat{E}_s/N_{oc}	dB	7.80	8.00	13.00	-Infinity	13.00	8.00	8.00	13.00	38.00		
Treselection	S		0	·	0			0				
SnonintrasearchQ	dB	10			Not sent			Not sent				
Propagation Condition						AWGN						

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{\it oc}$ to be fulfilled.

Note 3: RSRP and RSRQ levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell test requirement in this case is expressed as:

 $Cell \ re-selection \ delay \ to \ a \ newly \ detectable \ cell = T_{evaluate, \ E-UTRAN_Intra} + T_{SI-EUTRAN_Intra} + T_{SI-EUT$

 $T_{evaluate,E-UTRAN_Inter} = 32 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.4.

 $T_{SI-EUTRA}$ = 1280 ms; as specified in TS 36.133 [4] clause 4.2.2.4.

The cell re-selection delay to a newly detectable cell shall be less than a total of 34 seconds in this test case (note: this gives a total of 33.28 s, but the test allows 34 seconds.)

The probability of re-selection from Cell 1 to Cell 2 during T2 observed during testing shall be at least 90%.

The probability of re-selection from Cell 2 to Cell 1 during T3 observed during testing shall be less than 10%.

For the test to pass, both events above shall pass with a confidence level of 95%.

4.3 E-UTRAN to UTRAN Cell Re-Selection

4.3.1 E-UTRAN FDD - UTRAN FDD cell re-selection

4.3.1.1 E-UTRA FDD - UTRAN FDD cell reselection: UTRA FDD is of higher priority

4.3.1.1.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA FDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of higher priority.

4.3.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD.

4.3.1.1.3 Minimum conformance requirements

When the measurement rules indicate that UTRA FDD cells are to be measured, the UE shall measure CPICH Ec/Io and CPICH RSCP of detected UTRA FDD cells in the neighbour frequency list at the minimum measurement rate. The parameter $N_{UTRA_carrier}$ is the number of carriers used in the neighbour frequency list. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured UTRA FDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for inter-RAT layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher_priority_search} = (60 * N_{layers})$ seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT layers shall be the same as that defined below for lower priority RATs.

The UE shall evaluate whether newly detectable UTRA FDD cells have met the re-selection criteria in TS 36.304 [6] within time $N_{\text{UTRA_carrier}} * T_{\text{detectUTRA_FDD}}$ (as defined in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1) when the $S_{\text{ServingCell}}$ of the E-UTRA serving cell is less than $S_{\text{nonintrasearch}}$ when Treselection $_{\text{RAT}} = 0$ provided that the re-selection criteria is met by a margin of at least 6 dB.

Cells which have been detected shall be measured at least every $N_{UTRA_carrier} * T_{measureUTRA_FDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA_FDD}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateUTRA_FDD}$ + Treselection_{RAT}) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA_carrier} * T_{evaluateUTRA_FDD}$ when $Treselection_{RAT} = 0$ as specified in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1 provided that the reselection criteria is met by a margin of at least 6dB.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.1 and A.4.3.1.1.

4.3.1.1.4 Test description

4.3.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.22.
- 2. The general test parameter settings are set up according to Table 4.3.1.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.3.1.1.4.3.
- 5. There is one E-UTRA FDD cell and one UTRA FDD cell specified in the test. Cell 1 is the cell used for registration according to TS 36.508 [7] clause 7.2A.2 with the power level set according to Annex C.0 and C.1.

Table 4.3.1.1.4.1-1: General test parameters for E-UTRA FDD- higher priority UTRA FDD inter RAT cell re-selection test case

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	UE is on cell 1 in the initialisation phase, so that reselection to cell 2 occurs during T2
T2 end	Active cell		Cell 2	UE shall perform reselection to cell 2 during T2
condition	Neighbour cell		Cell 1	
T3 end	Active cell		Cell 1	UE shall perform reselection to cell 1 during T3
condition	Neighbour cell		Cell 2	
E-UTRA PI	E-UTRA PRACH configuration		4	As specified in table 5.7.1-2 in TS 36.211 [9]
E_UTRA Access Barring		-	Not Sent	No additional delays in random access
Information				procedure.
DRX cycle	length	s	1.28	The value shall be used for all cells in the test.
T1		s	>20	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2		s	85	T2 needs to be defined so that cell re-selection reaction time is taken into account
T3		S	25	T3 needs to be defined so that cell re-selection reaction time is taken into account.

4.3.1.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. E-UTRA cell 1 is already identified by the UE prior to the start of the test. Before T1 the UE is camped on to cell 1. During T1, cell 2 shall be powered off, and during the off time the scrambling code shall be changed. At the start of T2 cell 2 becomes stronger than Thresh_{x_high}, the UE is expected to detect cell 2, send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Routing Area Update procedure on cell 2. At the start of T3 cell 2 becomes weaker than Thresh_{serving_low}, and the UE reselects to Cell 1.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Routing Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to duration T1 in Table 4.3.1.1.5-1 and 4.3.1.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. During T1, Cell 2 shall be powered off and the SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code -50) mod 200 + 100).
- 4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.3.1.1.5-1 and 4.3.1.1.5-2. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the higher priority cell, Cell 2.

- 5. If the UE responds on Cell 2 within 81s from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 6. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, continue with step 7. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, skip to step 10.
- 7. The SS shall switch the power setting from T2 to T3 as specified in Table 4.3.1.1.5-1 and 4.3.1.1.5-2.
- 8. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the lower priority cell, Cell 1.
- 9. If the UE has re-selected Cell 1 within T3, after the re-selection or when T3 expires, skip to step 11. Otherwise, if T3 expires and the UE has not yet re-selected Cell 1, continue with step 10.
- 10. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 11. Repeat step 2-10 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.3.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and TS 34.108 [24] clause 6.1.0b with the following exceptions:

Table 4.3.1.1.4.3-1: Common Exception messages

Default Message Contents				
Common contents of system information	Table H.2.3-1			
blocks exceptions	Table H.2.3-2			
·	Table H.2.3-13			
Default RRC messages and information	Table H.3.2-1			
elements contents exceptions				

Table 4.3.1.1.4.3-2: System Information Block type 19: Inter-RAT E-UTRAN FDD - UTRA FDD is of higher priority cell re-selection

Derivation Path: 36.508 [7] clause 4.4.4.1 Table 4.4.4.			Conditi
Information Element	Value/remark	Comment	Condition
SysInfoType19 ::= SEQUENCE {			
utra-PriorityInfoList SEQUENCE {			
utra-ServingCell SEQUENCE {			
priority	5		
s-PrioritySearch1	31 (62dB)		
s-PrioritySearch2	0	default value is 0	
threshServingLow	18 (36dB)		
}			
eutra-FrequencyAndPriorityInfoList SEQUENCE		n denotes the	
(SIZE (1maxNumEUTRAFreqs)) OF SEQUENCE		index of the entry	
earfcn		Downlink	
		EARFCN of Cell 1	
measurementBandwidth	50	Enumerated(6, 15,	
		25, 50, 75, 100)	
priority	4		
qRxLevMinEUTRA	-70 (-140 dBm)		
threshXhigh	2 (4 dB)		
threshXlow	25 (50 dB)		
eutra-blackListedCellList	Not present		
eutraDetection	TRUE		
}			
nonCriticalExtensions SEQUENCE {}	Not present		
}			

4.3.1.1.5 Test requirement

Tables 4.3.1.1.4-1, 4.3.1.1.5-1 and 4.3.1.1.5-2 define the primary level settings including test tolerances for inter-RAT cell re-selection E-UTRA FDD to UTRA FDD test case (UTRA is of higher priority).

Table 4.3.1.1.5-1: Cell specific Test Parameters for Cell 1(E-UTRA FDD)

Parameter	Unit	Cell 1		
		T1 T2 T		Т3
E-UTRA RF Channel			1	
number				
BW _{channel}	MHz	10		
OCNG Patterns defined in		(OP.2 FDD)
D.1.2 (OP.2 FDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB		0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB]		
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
Qqualmin for UTRA	dB	-20		
neighbour cell	uБ		-20	
Qrxlevmin for UTRA	dBm		-115	
neighbour cell	ubili		-113	
Qrxlevmin	dBm		-140	
N_{oc}	dBm/15 kHz		-98	
RSRP	dBm/15 KHz	-83.20	-83.20	-83.20
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	14.80	14.80	14.80
\hat{E}_s/N_{oc}	dB	14.80	14.80	14.80
Treselection _{EUTRAN}	S	0		
Snonintrasearch	dB	50		
Thresh _{x, high} (Note 2)	dB	40		
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that both solls are fully allocated				

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of Thresh_{x, high} which is included in

E-UTRA system information, and is a threshold for the UTRA

target cell

Table 4.3.1.1.5-2: Cell specific test parameters for Cell 2 (higher priority UTRA FDD)

Parameter	Unit	Ce	ell 2 (UTF	RA)
		T1	T2	Т3
UTRA RF Channel Number			Channel 2	2
CPICH_Ec/lor	dB		-10	
PCCPCH_Ec/lor	dB		-12	
SCH_Ec/lor	dB		-12	
PICH_Ec/lor	dB		-15	
OCNS_Ec/lor	dB		-0.941	
\hat{I}_{or}/I_{oc}	dB	-8	11.90	-5.70
I_{oc}	dBm/3,84 MHz		-70.10	
CPICH_Ec/Io	dB	- 8	-10.27	-16.74
CPICH_RSCP	dBm	8	-68.20	-85.80
Propagation Condition			AWGN	
Qqualmin	dB		-20	
Qrxlevmin	dBm	-115		
QrxlevminEUTRA	dBm		-140	
UE_TXPWR_MAX_RACH	dBm	21		
Treselection	S	0		
Sprioritysearch1	dB	62		
Sprioritysearch2	dB	0		
Thresh _{serving, low}	dB		36	
Thresh _{x, low} (Note 1)	dB		50	
Note 1: This refers to the value of Thresh _{x, low} which is included in				

Note 1: This refers to the value of Thresh_{x, low} which is included in UTRA system information, and is a threshold for the E-UTRA target cell.

The cell reselection delay to higher priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to higher priority shall be less than 81 s.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher_priority_search} + T_{evaluateUTRA_FDD} + T_{SI-UTRA}$

Where:

 $T_{higher_priority_search}$ See section 4.2.2 of TS 36.133 [4]; 60s is assumed in this test case

 $T_{evaluateUTRA-FDD}$ See Table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1

T_{SI-UTRA} Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 80.48 s for higher priority cell search, allow 81 s for higher priority cell reselection in the test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3.1.2 E-UTRAN FDD - UTRAN FDD cell re-selection: UTRA FDD is of lower priority

4.3.1.2.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA FDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of lower priority.

4.3.1.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD.

4.3.1.2.3 Minimum conformance requirements

When the measurement rules indicate that UTRA FDD cells are to be measured, the UE shall measure CPICH Ec/Io and CPICH RSCP of detected UTRA FDD cells in the neighbour frequency list at the minimum measurement rate. The parameter $N_{UTRA_carrier_FDD}$ is the number of carriers used in the neighbour frequency list. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured UTRA FDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for inter-RAT layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher_priority_search} = (60 * N_{layers})$ seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT layers shall be the same as that defined below for lower priority RATs.

The UE shall evaluate whether newly detectable UTRA FDD cells have met the re-selection criteria in TS 36.304 [6] within time $N_{UTRA_carrier_FDD} * T_{detectUTRA_FDD}$ (as defined in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1) when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$ when Treselection_{RAT} = 0 provided that the re-selection criteria is met by a margin of at least 6 dB.

Cells which have been detected shall be measured at least every $N_{UTRA_carrier} * T_{measureUTRA_FDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA_FDD}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of re-selection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA_carrier} * T_{evaluateUTRA_FDD}$ when $Treselection_{RAT} = 0$ as specified in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1 provided that the reselection criteria is met by a margin of at least 6dB.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.1 and A.4.3.1.2.

4.3.1.2.4 Test description

4.3.1.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.22.
- 2. The general test parameter settings are set up according to Table 4.3.1.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.3.1.2.4.3.
- 5. There is one E-UTRA FDD cell and one UTRA FDD cell specified in the test. Cell 1 is the cell used for registration according to TS 36.508 [7] clause 7.2A.2 with the power level set according to Annex C.0 and C.1.

Table 4.3.1.2.4.1-1: General test parameters for EUTRA FDD- lower priority UTRA FDD inter RAT cell re-selection test case

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	·
T2 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
condition	Neighbour cell		Cell1	
E-UTRA P	RACH configuration		4	As specified in table 5.7.1-2 in TS 36.211 [9]
E_UTRA A Information	ccess Barring	-	Not Sent	No additional delays in random access procedure.
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1		S	85	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S	25	T2 need to be defined so that cell re-selection reaction time is taken into account.

4.3.1.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one UTRA FDD carrier. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Both Cell 1 and Cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to Cell 1. Cell 2 is of lower priority than Cell 1. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Routing Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to T1 in Table 4.3.1.2.5-1 and 4.3.1.2.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts. If the UE is already camped in Cell 1, wait until T1expires and skip to step 5.
- 3. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 1.
- 4. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 5. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 9.
- 5. The SS shall switch the power setting from T1 to T2 as specified in Table 4.3.1.2.5-1 and 4.3.1.2.5-2.
- 6. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 2.
- 7. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, skip to step 10. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, continue with step 9.
- 9. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 10. Repeat step 2-9 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.3.1.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and TS 34.108 [24] clause 6.1.0b with the following exceptions:

Table 4.3.1.2.4.3-1: Common Exception messages

Default Message Contents				
Common contents of system information	Table H.2.3-5			
blocks exceptions	Table H.2.3-6			
·	Table H.2.3-13			
Default RRC messages and information	Table H.3.2-1			
elements contents exceptions				

Table 4.3.1.2.4.3-2: System Information Block type 19: Inter-RAT E-UTRAN FDD - UTRA FDD is of lower priority cell re-selection

Derivation Path: 36.508 [7] clause 4.4.4.1 Table 4.4.4.	1-1: System Information Bl	ock type 19	
Information Element	Value/remark	Comment	Condition
SysInfoType19 ::= SEQUENCE {			
utra-PriorityInfoList SEQUENCE {			
utra-ServingCell SEQUENCE {			
priority	3		
s-PrioritySearch1	21 (42dB)		
s-PrioritySearch2	0	default value is 0	
threshServingLow	0 (0dB)		
}			
eutra-FrequencyAndPriorityInfoList SEQUENCE		n denotes the	
(SIZE (1maxNumEUTRAFreqs)) OF SEQUENCE		index of the entry	
earfcn		Downlink	
		EARFCN of Cell 1	
measurementBandwidth	50	Enumerated(6, 15, 25, 50, 75, 100)	
priority	4	, , ,	
qRxLevMinEUTRA	-70 (-140 dBm)		
threshXhigh	24 (48 dB)		
threshXlow	1 (2 dB)	Default value	
eutra-blackListedCellList	Not present		
eutraDetection	TRUE		
}			
nonCriticalExtensions SEQUENCE {}	Not present		
}			

4.3.1.2.5 Test requirement

Tables 4.3.1.2.4.1-1, 4.3.1.2.5-1 and 4.3.1.2.5-2 define the primary level settings including test tolerances for E-UTRAN FDD- UTRAN FDD inter-RAT cell re-selection test case which UTRA is of lower priority.

Table 4.3.1.2.5-1: Cell specific test parameters for cell 1 (E-UTRA)

E-UTRA RF Channel number	Parameter	Parameter Unit Cell 1		Cell 1
number BW _{channel} MHz 10 OCNG Patterns defined in D.1.2 (OP.2 FDD) OP.2 FDD PBCH_RA dB OP.2 FDD PBCH_RA dB PBCH_RB BB PBCH_RB dB BB PBCH_RB BB PSS_RA dB BB OB OB OB PCFICH_RB dB DB OB OB				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	E-UTRA RF Channel		1	
OCNG Patterns defined in D.1.2 (OP.2 FDD) OP.2 FDD PBCH_RA dB PBCH_RB dB PSS_RA dB PSS_RA dB SSS_RA dB PCFICH_RB dB PHICH_RB dB PDCCH_RA dB PDCCH_RB dB PDSCH_RB dB PDSCH_RB dB OCNG_RANOIS 1 dB OCNG_RBNOIS 1 dB Qualmin for UTRA dB neighbour cell dBm Qrxlevmin for UTRA dBm neighbour cell dBm/15 kHz Qrxlevmin dBm Noc dBm/15 kHz RSRP dBm/15 kHz RSRP dB dB 13.90 -3.70 \hat{E}_s/N_{oc} dB Treselection _{EUTRAN} s Snonintrasearch dB Thresh _{serving} , low dB Thresh _{serving} , low Not sent	number			
OCNG Patterns defined in D.1.2 (OP.2 FDD) OP.2 FDD PBCH_RA dB PBCH_RB dB PSS_RA dB PSS_RA dB SSS_RA dB PCFICH_RB dB PHICH_RB dB PDCCH_RA dB PDCCH_RB dB PDSCH_RB dB PDSCH_RB dB OCNG_RANOIS 1 dB OCNG_RBNOIS 1 dB Qualmin for UTRA dB neighbour cell dBm Qrxlevmin for UTRA dBm neighbour cell dBm/15 kHz Qrxlevmin dBm Noc dBm/15 kHz RSRP dBm/15 kHz RSRP dB dB 13.90 -3.70 \hat{E}_s/N_{oc} dB Treselection _{EUTRAN} s Snonintrasearch dB Thresh _{serving} , low dB Thresh _{serving} , low Not sent	BW _{channel}	MHz		10
PBCH_RA dB PBCH_RB dB PSS_RA dB SSS_RA dB PCFICH_RB dB PHICH_RA dB PHICH_RB dB PDCCH_RA dB PDCCH_RB dB PDSCH_RA dB PDSCH_RB dB OCNG_RANote 1 dB OCNG_RBNote 1 dB Qqualmin for UTRA dB neighbour cell dBm Qrxlevmin for UTRA dBm neighbour cell dBm Qrxlevmin dBm Noc dBm/15 kHz -99.10 RSRP dBm/15 kHz \hat{E}_s/I_{ot} dB Treselectioneutran s Snonintrasearch dB Thresh _{serving, low} dB Thresh _{serving, low} (Not sent Thresh _{serving} , low (Not e)			OF	P.2 FDD
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	D.1.2 (OP.2 FDD)			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PBCH_RA	dB		
SSS_RA dB PCFICH_RB dB PHICH_RA dB PHICH_RB dB PDCCH_RA dB PDCCH_RB dB PDSCH_RA dB PDSCH_RB dB OCNG_RANote 1 dB OCNG_RBNote 1 dB Qqualmin for UTRA dB neighbour cell dBm Qrxlevmin for UTRA dBm neighbour cell dBm Qrxlevmin dBm Noc dBm/15 kHz -99.10 RSRP dBm/15 kHz \hat{E}_s/I_{ot} dB \hat{E}_s/N_{oc} dB Treselectioneutran s Snonintrasearch dB Thresh _{serving, low} dB Thresh _{serving, low} dB Thresh _{serving, low} dB 42	PBCH_RB	dB		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	PSS_RA	dB		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	SSS_RA	dB		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	PCFICH_RB	dB		
PDCCH_RA dB PDCCH_RB dB PDSCH_RA dB PDSCH_RB dB OCNG_RANote 1 dB OCNG_RBNote 1 dB OCNG_RBNote 1 dB OCNG_RBNote 1 dB OQualmin for UTRA neighbour cell dBm -115 Qrxlevmin for UTRA neighbour cell dBm -140 Qrxlevmin dBm -140 Noc dBm/15 kHz -99.10 RSRP dBm/15 KHz -85.20 -102.80 \hat{E}_s/I_{ot} dB 13.90 -3.70 \hat{E}_s/N_{oc} dB 13.90 -3.70 Treselectioneutran s 0 Snonintrasearch dB Not sent Thresh_serving, low dB 44 Thresh_serving, low dB 42	PHICH_RA	dB		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	PHICH_RB	dB		0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDCCH_RA	dB		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDCCH_RB	dB		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		dB		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PDSCH_RB	dB	1	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	OCNG_RA ^{Note 1}	dB]	
neighbour cell Qrxlevmin for UTRA neighbour cell Qrxlevmin for UTRA neighbour cell Qrxlevmin dBm -115	OCNG_RB ^{Note 1}	dB	7	
neighbour cell Qrxlevmin for UTRA neighbour cell	Qqualmin for UTRA	٩D	20	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	neighbour cell	uБ		-20
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Qrxlevmin for UTRA	dPm		115
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		ubili		-113
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Qrxlevmin	dBm		-140
$\begin{array}{c ccccc} \hat{E}_s/I_{ot} & \text{dB} & 13.90 & -3.70 \\ \hline \hat{E}_s/N_{oc} & \text{dB} & 13.90 & -3.70 \\ \hline \text{Treselection}_{\text{EUTRAN}} & \text{s} & 0 \\ \hline \text{Snonintrasearch} & \text{dB} & \text{Not sent} \\ \hline \text{Thresh}_{\text{serving, low}} & \text{dB} & 44 \\ \hline \text{Thresh}_{\text{x, low}} & (\text{Note 2}) & \text{dB} & 42 \\ \hline \end{array}$	N_{oc}	dBm/15 kHz	-	-99.10
E_s/I_{ot} dB 13.90 -3.70 Treselection _{EUTRAN} s 0 Snonintrasearch dB Not sent Thresh _{serving, low} dB 44 Thresh _{x, low} (Note 2) dB 42	RSRP	dBm/15 KHz	-85.20	-102.80
Treselection _{EUTRAN} s 0 Snonintrasearch dB Not sent Thresh _{serving, low} dB 44 Thresh _{x, low} (Note 2) dB 42	\hat{E}_s/I_{ot}	dB		
Treselection _{EUTRAN} s 0 Snonintrasearch dB Not sent Thresh _{serving, low} dB 44 Thresh _{x, low} (Note 2) dB 42	\hat{E}_s/N_{oc}	dB	13.90 -3.70	
Snonintrasearch dB Not sent Thresh _{serving, low} dB 44 Thresh _{x, low} (Note 2) dB 42		S		0
Thresh _{x, low} (Note 2) dB 42		dB	Not sent	
Thresh _{x, low} (Note 2) dB 42	Thresh _{serving, low}	dB	44	
Propagation Condition AM/CNI	Thresh _{x, low} (Note 2)	dB	42	
Propagation Condition AWGN	Propagation Condition		- A	AWGN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of Thresh_{x, low} which is included in E-UTRA system information, and is a threshold for the UTRA target cell.

Table 4.3.1.2.5-2: Cell specific test parameters for Cell 2(Lower priority UTRA FDD)

	T4	
	T1	T2
	Chan	nel 2
dB	-1	0
dB	-1	2
dB	-1	2
dB	-1	5
dB	-0.9)41
dB	13.80	13.80
dBm/3,84 MHz	-70	
dB	-10. 18	-10. 18
dBm	-66.20	-66.20
	AW	GN
dB	-2	0
dBm	-11	15
dBm	-14	10
dBm	21	
S	0	
dB	42	2
dB	0	
dB	48	
	dB dB dB dB dB dB dB dB dB dBm dBm dBm d	dB -1 dB -1 dB -1 dB -1 dB -0.9 dB 13.80 dBm/3,84 MHz -7 dB -10.18 dBm -66.20 AW dB dB -2 dBm -1 dBm -1 dBm 2 s 0 dB 4 dB 0 dB 4 dB

Note 1: This refers to the value of Thresh_{x, high} which is included in UTRA system information, and is a threshold for the E-UTRA target cell.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA_FDD} + T_{SI-UTRA}$

Where:

 $T_{evaluateUTRA-FDD}$ See Table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1

 $T_{SI\text{-}UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3.1.3 E-UTRAN FDD - UTRAN FDD cell re-selection in fading propagation conditions: UTRA FDD is of lower priority

4.3.1.3.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA FDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of lower priority. The E-UTRA cell is in fading propagation conditions and the UTRA cell is in AWGN propagation conditions.

4.3.1.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD.

4.3.1.3.3 Minimum conformance requirements

When the measurement rules indicate that UTRA FDD cells are to be measured, the UE shall measure CPICH Ec/Io and CPICH RSCP of detected UTRA FDD cells in the neighbour frequency list at the minimum measurement rate. The parameter $N_{UTRA_carrier_FDD}$ is the number of carriers used in the neighbour frequency list. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured UTRA FDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for inter-RAT layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher_priority_search} = (60 * N_{layers})$ seconds, where the parameters N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT layers shall be the same as that defined below for lower priority RATs.

The UE shall evaluate whether newly detectable UTRA FDD cells have met the re-selection criteria in TS 36.304 [6] within time $N_{UTRA_carrier_FDD} * T_{detectUTRA_FDD}$ (as defined in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1) when the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ when Treselection_{RAT} = 0 provided that the re-selection criteria is met by a margin of at least 6 dB.

Cells which have been detected shall be measured at least every $N_{UTRA_carrier} * T_{measureUTRA_FDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA_FDD}$. If, after it detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of re-selection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA_carrier} * T_{evaluateUTRA_FDD}$ when $Treselection_{RAT} = 0$ as specified in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1 provided that the reselection criteria is met by a margin of at least 6dB.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.1 and A.4.3.1.3.

4.3.1.3.4 Test description

4.3.1.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.26.
- 2. The general test parameter settings are set up according to Table 4.3.1.3.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.3.1.3.4.3.
- 5. There is one E-UTRA FDD cell and one UTRA FDD cell specified in the test. Cell 1 is the cell used for registration according to TS 36.508 [7] clause 7.2A.2 with the power level set according to Annex C.0 and C.1.

Table 4.3.1.3.4.1-1: General test parameters for EUTRA FDD- lower priority UTRA FDD inter RAT cell re-selection test case in fading conditions

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN Cell.
T1 end condition			Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test.
	Neighbour cell		Cell2	
T3 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
condition	Neighbour cell		Cell1	
E-UTRA P	RACH configuration		4	As specified in table 5.7.1-2 in TS 36.211 [9]
	E_UTRA Access Barring Information		Not Sent	No additional delays in random access procedure.
DRX cycle length		S	1.28	The value shall be used for all cells in the test.
T1		S	<85	T1 need to be defined so that cell re-selection reaction time is taken into account. T1 is terminated when the UE starts to send preambles to cell 1
T2		s	64	The start of T2 is defined as the time when the UE starts to send PRACH preambles to cell 1
Т3		S	<25	T3 need to be defined so that cell re-selection reaction time is taken into account. T3 is terminated when the UE starts to send preambles to cell 2
T4		S	64	The start of T4 is defined as the time when the UE starts to send PRACH preambles to cell 2

4.3.1.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one UTRA FDD carrier. In the test there are four successive time periods, with time duration of T1, T2, T3 and T4 respectively. Both Cell 1 and Cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to Cell 1. Cell 2 is of lower priority than Cell 1. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2. Time duration T2 and T4 are not used for cell re-selection in the test.

In the following test procedure, "UE responds on Cell 1" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure" and "UE responds on Cell 2" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Routing Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to duration T0 in Table 4.3.1.3.5-1 and 4.3.1.3.5-2.
- 3. Set the parameters according to T2 in Table 4.3.1.3.5-3 and 4.3.1.3.5-4. Propagation conditions are set according to Annex B clauses B.1.1 and B.2.2. T2 starts.
- 4. The SS monitors for possible random access request information from the UE to perform cell re-selection on Cell 2
- 5. If the UE responds on Cell 2 within T2, then count a fail for the event "Hold out on Cell 1" and skip to step 10. Otherwise, count a success for the event "Hold out on Cell 1" and after T2 expires continue with step 6.
- 6. The SS shall switch the power setting from T2 to T3 as specified in Table 4.3.1.3.5-3 and 4.3.1.3.5-4.
- 7. The SS waits for random access request information from the UE to perform cell re-selection on Cell 2.
- 8. If the UE responds on Cell 2 during time duration T3 within 21 seconds from the beginning of time period T3, then count a success for the event "Re-select lower priority Cell 2".

 Otherwise, count a fail for the event "Re-select lower priority Cell 2".

- 9. If the UE responds on Cell 2 within T3, at the moment of the request-reception continue with step 10. Otherwise, after T3 expires skip to step 17.
- 10. The SS shall switch the power setting from T3 to T4 as specified in Table 4.3.1.3.5-3 and 4.3.1.3.5-4.
- 11. The SS monitors for possible random access request information from the UE to perform cell re-selection on Cell 1.
- 12. If the UE responds on Cell 1 within T4, then count a fail for the event "Hold out on Cell 2" and skip to step 17. Otherwise, count a success for the event "Hold out on Cell 2" and after T4 expires continue with step 13.
- 13. The SS shall switch the power setting from T4 to T1 as specified in Table 4.3.1.3.5-3 and 4.3.1.3.5-4.
- 14. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 1.
- 15. If the UE responds on Cell 1 within T1, at the moment of the request-reception skip to step 17. Otherwise, after T1 expires continue with step 16.
- 16. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1. Set the parameters according to duration T0 in Table 4.3.1.3.5-1 and 4.3.1.3.5-2.
- 17. Repeat step 3-16 until a test verdict has been achieved.

Each of the events "Hold out on Cell 1", "Re-select lower priority Cell 2" and "Hold out on Cell 2" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

If both events pass, the test passes. If one event fails, the test fails.

4.3.1.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and TS 34.108 [24] clause 6.1.0b with the following exceptions:

Table 4.3.1.3.4.3-1: Common Exception messages

Default Message Contents				
Common contents of system information	Table H.2.3-5			
blocks exceptions	Table H.2.3-6			
	Table H.2.3-13			
Default RRC messages and information	Table H.3.2-1			
elements contents exceptions				

Table 4.3.1.3.4.3-2: System Information Block type 19: Inter-RAT E-UTRAN FDD - UTRA FDD is of lower priority cell re-selection in fading conditions

Derivation Path: 36.508 [7] clause 4.4.4.1 Table 4.4.4	4.1-1: System Information E	Block type 19	
Information Element	Value/remark	Comment	Condition
SysInfoType19 ::= SEQUENCE {			
utra-PriorityInfoList SEQUENCE {			
utra-ServingCell SEQUENCE {			
priority	3		
s-PrioritySearch1	21 (42dB)		
s-PrioritySearch2	0	default value is 0	
threshServingLow	0 (0dB)		
}			
eutra-FrequencyAndPriorityInfoList SEQUENCE		n denotes the	
(SIZE (1maxNumEUTRAFreqs)) OF SEQUENCE		index of the entry	
earfcn		Downlink EARFCN of Cell 1	
measurementBandwidth	50	Enumerated(6, 15, 25, 50, 75, 100)	
priority	4		
qRxLevMinEUTRA	-70 (-140 dBm)		
threshXhigh	22 (44 dB)		
threshXlow	1 (2 dB)	Default value	
eutra-blackListedCellList	Not present		
eutraDetection	TRUE		
}			
nonCriticalExtensions SEQUENCE {}	Not present		
}			

4.3.1.3.5 Test requirement

Tables 4.3.1.3.4.1-1, 4.3.1.3.5-1, 4.3.1.3.5-2, 4.3.1.3.5-3 and 4.3.1.3.5-4 define the primary level settings including test tolerances for E-UTRAN FDD- UTRAN FDD inter-RAT cell re-selection test case which UTRA is of lower priority. Note that the time period for T0 is system implementation dependent.

Table 4.3.1.3.5-1: Cell specific test parameters for Cell 1 (Lower priority E-UTRA FDD)

Parameter	Unit	Cell 1
		T0
E-UTRA RF Channel number		1
BW _{channel}	MHz	10
OCNG Patterns defined in		OP.2 FDD
D.1.2 (OP.2 FDD)		
PSS_RA	dB	0
SSS_RA	dB	0
PCFICH_RB	dB	0
PHICH_RA	dB	0
PHICH_RB	dB	0
PDCCH_RA	dB	0
PDCCH_RB	dB	0
PDSCH_RA	dB	0
PDSCH_RB	dB	0
OCNG_RA ^{Note 1}	dB	0
OCNG_RB ^{Note 1}	dB	0
Qqualmin for UTRA	dB	-20
neighbour cell	uБ	-20
Qrxlevmin for UTRA	dBm	-115
neighbour cell	-	
Qrxlevmin	dBm	-140
N_{oc}	dBm/15	-104
	kHz	
RSRP	dBm/15 KHz	-82
\hat{E}_{s}/I_{ot}	dB	22
\hat{E}_s/N_{oc}	dB	22
Treselection _{EUTRAN}	S	0
Snonintrasearch	dB	Not sent
Thresh _{serving, low}	dB	44
Thresh _{x, low} (Note 2)	dB	42
Propagation Condition		AWGN

Note 1: OCNG shall be used such that both cells are fully allocated

and a constant total transmitted power spectral density is achieved for all OFDM symbols.

This refers to the value of Thresh_{x, low} which is included in E-UTRA system information, and is a threshold for the UTRA Note 2: target cell.

Table 4.3.1.3.5-2: Cell specific test parameters for Cell 2 (Lower priority UTRA FDD)

Parameter	Unit	Cell 2 (UTRA) T0
UTRA RF Channel Number		Channel 2
CPICH_Ec/lor	dB	-10
PCCPCH_Ec/lor	dB	-12
SCH_Ec/lor	dB	-12
PICH_Ec/lor	dB	-15
OCNS_Ec/lor	dB	-0.941
\hat{I}_{or}/I_{oc}	dB	13.80
I_{oc}	dBm/3,84 MHz	-70
CPICH_Ec/lo	dB	-10.18
CPICH_RSCP	dBm	-66.20
Propagation Condition		AWGN
Qqualmin	dB	-20
Qrxlevmin	dBm	-115
QrxlevminEUTRA	dBm	-140
UE_TXPWR_MAX_RACH	dBm	21
Treselection	S	0
Sprioritysearch1	dB	42
Sprioritysearch2	dB	0
Thresh _{x, high} (Note 1)	dB	44

Note 1: This refers to the value of Thresh_{x, high} which is included in UTRA system information, and is a threshold for the E-UTRA target cell

Table 4.3.1.3.5-3: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit	Cell 1			
		T1	T2	T3	T4
E-UTRA RF Channel				1	
number					
BW _{channel}	MHz	10			
OCNG Patterns defined in			OF	2.2 FDD	
D.1.2 (OP.2 FDD)					
PSS_RA	dB			0	
SSS_RA	dB			0	
PCFICH_RB	dB			0	
PHICH_RA	dB			0	
PHICH_RB	dB			0	
PDCCH_RA	dB			0	
PDCCH_RB	dB			0	
PDSCH_RA	dB	0			
PDSCH_RB	dB			0	
OCNG_RA ^{Note 1}	dB		0		
OCNG_RB ^{Note 1}	dB	0			
Qqualmin for UTRA	dB	-20			
neighbour cell	uБ			-20	
Qrxlevmin for UTRA	dBm	-115			
neighbour cell		-115			
Qrxlevmin	dBm	-140			
N_{oc}	dBm/15 kHz	-104			
RSRP	dBm/15 KHz	-82	-82	-107	-107
\hat{E}_s/I_{ot}	dB	22	22	-3	-3
\hat{E}_s/N_{oc}	dB	22	22	-3	-3
Treselection _{EUTRAN}	S	0			
Snonintrasearch	dB	Not sent			
Thresh _{serving, low}	dB	44			
Thresh _{x, low} (Note 2)	dB	42			
Propagation Condition		ETU70			

OCNG shall be used such that both cells are fully allocated and a constant total to Note 1:

spectral density is achieved for all OFDM symbols.

This refers to the value of Thresh_{x, low} which is included in E-UTRA system inform threshold for the UTRA target cell. Note 2:

Table 4.3.1.3.5-4: Cell specific test parameters for Cell 2 (Lower priority UTRA FDD)

Parameter	Unit	Cell 2 (UTRA)			
		T1	T2	T3	T4
UTRA RF Channel Number		Channel 2			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
OCNS_Ec/lor	dB	-0.941			
\hat{I}_{or}/I_{oc}	dB	13.80	13.80	13.80	13.80
I_{oc}	dBm/3,84 MHz	-70			
CPICH_Ec/lo	dB	-10.18	-10.18	-10.18	-10.18
CPICH_RSCP	dBm	-66.20	-66.20	-66.20	-66.20
Propagation Condition		AWGN			
Qqualmin	dB	-20			
Qrxlevmin	dBm	-115			
QrxlevminEUTRA	dBm	-140			
UE_TXPWR_MAX_RACH	dBm	21			
Treselection	S	0			
Sprioritysearch1	dB	42			
Sprioritysearch2	dB	0			
Thresh _{x, high} (Note 1)	dB	44			
Note 1: This refers to the value of Thresh _{x, high} which is included in UTRA system					

information, and is a threshold for the E-UTRA target cell

The probability of re-selection from Cell 1 to Cell 2 during T2 observed during testing shall be less than 10%.

The probability of re-selection from Cell 2 to Cell 1 during T4 observed during testing shall be less than 10%.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 2 and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on Cell 2. In order to evaluate re-selection delay, the SS first needs to verify that the UE is camped on Cell 1 at the start of T3.

The cell re-selection delay to lower priority shall be less than 21 s.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA\ FDD} + T_{SI-UTRA}$

Where:

T_{evaluateUTRA-FDD} See Table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1

T_{SI-UTRA} Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for lower priority cell reselection, allow 21 s.

For the test to pass, all the events above shall pass.

The statistical pass/ fail decisions are done separated for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

4.3.2 E-UTRAN FDD - UTRAN TDD cell re-selection

4.3.2.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRAN TDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA cell is of lower priority.

4.3.2.2 Test applicability

This test applies to all types of release 8 and forward E-UTRA FDD UEs that support release 9 and forward UTRA TDD.

4.3.2.3 Minimum conformance requirements

4.3.2.3.1 3.84Mcps TDD option

There are no requirements so this is not tested.

4.3.2.3.2 1.28Mcps TDD option

When the measurement rules indicate that UTRA TDD cells are to be measured, the UE shall measure P-CCPCH RSCP of detected UTRA TDD cells in the neighbour frequency list at the minimum measurement rate specified in this section. The parameter $N_{UTRA_carrier_TDD}$ is the number of carriers in the neighbour frequency list. The UE shall filter P-CCPCH RSCP measurements of each measured UTRA TDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period. P-CCPCH RSCP of UTRAN TDD cells shall not be filtered over a longer period than that specified in TS 36.133 [4] table 4.2.2.5.2-1.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for inter-RAT layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in section 36.133[4] clauses 4.2.2.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher, equal or lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT layers shall be the same as that defined below for lower priority RATs.

The UE shall evaluate whether newly detectable UTRA TDD cells have met the reselection criteria in TS 36.304 within time ($N_{UTRA_carrier_TDD}$) * $T_{detectUTRA_TDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells on the same frequency layer) is less than $S_{nonintrasearch}$ when $T_{reselection} = 0$ provided that the reselection criteria is met by a margin of at least 6dB.

Cells which have been detected shall be measured at least every $(N_{UTRA_carrier_TDD}) * T_{measureUTRA_TDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA TDD cells are found by the higher priority search, they shall be measured at least every $T_{measure,UTRA_TDD}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

For a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA TDD cell has met reselection criterion defined in TS 36.304[6] within $N_{UTRA_carrier_TDD}$ * $T_{evaluateUTRA_TDD}$ when $T_{reselection} = 0$ provided that the reselection criteria is met by a margin of at least 6 dB.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.2 and A.4.3.2.

4.3.2.3.3 7.68Mcps TDD option

There are no requirements so this is not tested.

4.3.2.4 Test description

4.3.2.4.1 3.84Mcps TDD option

There are no requirements so this is not tested.

4.3.2.4.2 1.28Mcps TDD option

4.3.2.4.2.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.22.
- 2. The general test parameter settings are set up according to Table 4.3.2.4.2.1-1.
- 3. Propagation conditions are set according to Annex B clause B. 0.
- 4. Message contents are as defined in clause 4.3.2.4.2.3.
- 5. There is one E-UTRA FDD cell and one UTRA TDD cell specified in the test. Cell 1 is the cell used for registration according to TS 36.508 [7] clause 7.2A.2 with the power level set according to Annex C.0 and C.1.

Table 4.3.2.4.2.1-1: General test parameters for E-UTRA FDD to UTRA (1.28 Mcps TDD OPTION) Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRA FDD cell
T1 end Active cell condition			Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test.
	Neighbour cell		Cell2	1.28 Mcps TDD OPTION cell
T2 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
condition	Neighbour cell		Cell1	E-UTRA FDD cell
CP length of ce	CP length of cell 1		normal	
E-UTRA PRACH			4	As specified in table 5.7.1-2 in TS 36.211
configuration				
Time offset between cells			3 ms	Asynchronous cells 3ms or 92160*Ts
Access Barring	Information	-	Not sent	No additional delays in random access procedure.
Treselection		S	0	
DRX cycle leng	ıth	S	1,28	
HCS			Not	
			used	
T1		S	85	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S	25	

4.3.2.4.2.2 Test procedure

The test consists of one active cell and one neighbour cell. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Both Cell 1 and Cell 2 are already identified by the UE prior to the test. Cell 1 and Cell 2 belong to different tracking areas. The UTRA TDD layer is configured at a lower priority than the E-UTRA FDD layer.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS 36.304.

In the following test procedure "UE responds" means "UE starts transmitting the SYNCH-UL sequence in the UpPTS for sending RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to T1 in Table 4.3.2.5.2-1 and 4.3.2.5.2-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts. If the UE is already camped in Cell 1, wait until T1expires and skip to step 5.

- 3. The SS waits for random access requests information from the UE to perform cell re-selection on the higher priority cell, Cell 1.
- 4. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 5. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 9.
- 5. The SS shall switch the power setting from T1 to T2 as specified in Table 4.3.2.5.2-1 and 4.3.2.5.2-2.
- 6. The SS waits for random access requests information from the UE to perform cell re-selection on the lower priority cell, Cell 2.
- 7. If the UE responds on lower priority cell, Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, skip to step 10. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, continue with step 9.
- 9. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.3.2.4.2.3 Message contents

Message contents are according TS 36.508 [7] clause 4.6 and TS 34.108 [24] clause 6.1.0b with the following exceptions:

Table 4.3.2.4.2.3-1: Common Exception messages

Default Message Contents						
Common contents of system information	Table H.2.3-7					
blocks exceptions	Table H.2.3-8					
·	Table H.2.3-14					
Default RRC messages and information	Table H.3.2-1					
elements contents exceptions						

Table 4.3.2.4.2.3-2: System Information Block type 19: E-UTRA FDD- lower priority UTRA TDD inter RAT cell re-selection test case

Derivation Path: 36.508 clause 4.4.4.1 Table 4.4.4.1-1	: System Information Block	type 19	
Information Element	Value/remark	Comment	Condition
SysInfoType19 ::= SEQUENCE {			
utra-PriorityInfoList SEQUENCE {			
utra-ServingCell SEQUENCE {			
priority	3		
s-PrioritySearch1	0 (0dB)		
s-PrioritySearch2	Not present	default value is 0	
threshServingLow	0 (0dB)		
}			
eutra-FrequencyAndPriorityInfoList SEQUENCE		n denotes the	
(SIZE (1maxNumEUTRAFreqs)) OF SEQUENCE		index of the entry	
earfcn		Downlink EARFCN of Cell 1	
measurementBandwidth	50	Enumerated(6, 15, 25, 50, 75, 100)	
priority	4		
qRxLevMinEUTRA	-70 (-140 dBm)		
threshXhigh	23 (46 dB)		
threshXlow	1 (2 dB)	Default value	
eutra-blackListedCellList	Not present		
eutraDetection	TRUE		
}			
nonCriticalExtensions SEQUENCE {}	Not present		
}			

4.3.2.4.3 7.68 Mcps TDD option

There are no requirements so this is not tested.

4.3.2.5 Test requirement

4.3.2.5.1 3.84Mcps TDD option

There are no requirements so this is not tested.

4.3.2.5.2 1.28Mcps TDD option

Tables 4.3.2.4.2-1, 4.3.2.5.2-1 and 4.3.2.5.2-2 defines the primary level settings including test tolerances for E-UTRAN FDD to UTRA TDD cell re-selection test case.

Table 4.3.2.5.2-1: Cell specific test parameters for cell re-selection E-UTRA FDD to UTRA TDD test case (cell 1)

Parameter	Unit	Ce	II 1	
		T1	T2	
E-UTRA RF Channel		,	1	
Number				
BW _{channel}	MHz	1	0	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RB	dB			
SSS_RB	dB			
PCFICH_PA	dB			
PHICH_PA	dB			
PHICH_PB	dB	0	0	
PDCCH_PA	dB			
PDCCH_PB	dB			
PDSCH_PA	dB			
PDSCH_PB	dB			
OCNG_RA ^{Note1}	dB			
OCNG_RB ^{Note1}	dB			
Q _{rxlevmin}	dBm/15kHz	-140	-140	
N_{oc}	dBm/15kHz	-6	98	
RSRP	dBm/15kHz	-87	-101	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	11	-3	
Snonintrasearch	dB	Not	sent	
Thresh _{serving, low}	dB	46 (-9	4dBm)	
Thresh _{x, low} (Note2)	dB	24 (-79	9dBm)	
Propagation Condition		AW	'GN	
Note 1: OCNG shall be used such that cell is fully allocated and a				

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of Threshx, low which is included in E-UTRA system information, and is a threshold for the UTRA TDD target cell.

Table 4.3.2.5.2-2: Cell specific test parameters for cell re-selection E-UTRA FDD to UTRA TDD test case (cell 2)

Parameter	Unit		Cell 2 (UTRA)		
Timeslot Number		0		Dwl	PTS
		T1	T2	T1	T2
UTRA RF Channel Number (Note1)			Chan	nel 2	
PCCPCH_Ec/lor	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
OCNS_Ec/lor	dB	-3	-3		
\hat{I}_{or}/I_{oc}	dB	11	11	11	11
I_{oc}	dBm/1.28 MHz		-8	0	
PCCPCH RSCP	dBm	-72	-72	n.a.	n.a.
Propagation Condition			AW	GN	
Q _{rxlevmin}	dBm		-10)3	
Qoffset1 _{s,n}	dB		C1, C	2: 0	
Qhyst1 _s	dB		0)	
Thresh _{x, high} (Note2)	dB		46 (-94	ldBm)	

Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note 2: This refers to the value of Thresh_{x, high} which is included in UTRA system information, and is a threshold for the E-UTRA target cell.

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA_TDD} + T_{SI-UTRA}$

Where:

T_{evaluateUTRA TDD} 19.2s, as specified in TS 36.133 [4] table 4.2.2.5.2-1

T_{SI-UTRA} Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s, allow 21 s for lower priority cell reselection in the test case.

4.3.2.5.3 7.68 Mcps TDD option

There are no requirements so this is not tested.

4.3.3 E-UTRAN TDD - UTRAN FDD cell re-selection

4.3.3.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA FDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of lower priority.

4.3.3.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA FDD.

4.3.3.3 Minimum conformance requirements

When the measurement rules indicate that UTRA FDD cells are to be measured, the UE shall measure CPICH Ec/Io and CPICH RSCP of detected UTRA FDD cells in the neighbour frequency list at the minimum measurement rate. The parameter $N_{UTRA_carrier_FDD}$ is the number of carriers in the neighbour frequency list. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured UTRA FDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for inter-RAT layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher_priority_search} = (60 * N_{layers})$ seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT layers shall be the same as that defined below for lower priority RATs.

The UE shall evaluate whether newly detectable UTRA FDD cells have met the re-selection criteria in TS 36.304 [6] within time $N_{UTRA_carrier_FDD}$ * $T_{detectUTRA_FDD}$ (as defined in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1) when the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ when Treselection_{RAT} = 0 provided that the re-selection criteria is met by a margin of at least 6 dB.

Cells which have been detected shall be measured at least every $N_{UTRA_carrier} * T_{measureUTRA_FDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA FDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA_FDD}$. If re-selection to any higher priority cell is not triggered within ($T_{evaluateUTRA_FDD}$ + Treselection_{RAT}) after it is found in a higher priority search, the UE is not required to continue making measurements of the cell to evaluate the ongoing possibility of re-selection.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA FDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA_carrier} * T_{evaluateUTRA_FDD}$ as defined in table 4.2.2.5.1-1 of TS 36.133 [4] clause 4.2.2.5.1 when Treselection_{RAT} = 0.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.1 and A.4.3.3.

4.3.3.4 Test description

4.3.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.22.
- 2. The general test parameter settings are set up according to Table 4.3.3.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.3.3.4.3.
- 5. There is one E-UTRA TDD cell and one UTRA FDD cell specified in the test. Cell 1 is the cell used for registration according to TS 36.508 [7] clause 7.2A.2 with the power level set according to Annex C.0 and C.1.

Table 4.3.3.4.1-1: General test parameters for EUTRA TDD- lower priority UTRA FDD inter RAT cell reselection test case

	Parameter		Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	
T2 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
condition	Neighbour cell		Cell1	
E-UTRA	PRACH configuration		53	As specified in table 5.7.1-2 in TS 36.211
Uplink-do	ownlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
E_UT	RA Access Barring Information	-	Not Sent	No additional delays in random access procedure.
D	DRX cycle length		1.28	The value shall be used for all cells in the test.
T1		S	85	T1 need to be defined so that cell re-selection reaction time is taken into account.
	T2		25	T2 need to be defined so that cell re-selection reaction time is taken into account.

4.3.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one UTRA FDD carrier. In the test there are two successive time periods, with time duration of T1 and T2 respectively.

Both Cell 1 and Cell 2 are already identified by the UE prior to the start of the test. Cell 2 is of lower priority than Cell 1.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to T1 in Table 4.3.3.5-1 and 4.3.3.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts. If the UE is already camped in Cell 1, wait until T1 expires and skip to step 5.
- 3. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 1.
- 4. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 5. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 9.
- 5. The SS shall switch the power setting from T1 to T2 as specified in Table 4.3.3.5-1 and 4.3.3.5-2.
- 6. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 2.
- 7. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, skip to step 10. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, continue with step 9.
- 9. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 10. Repeat step 2-9 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.3.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and TS 34.108 [24] clause 6.1.0b with the following exceptions:

Table 4.3.3.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information Table H.2.3-5					
blocks exceptions	Table H.2.3-6				
•	Table H.2.3-13				
Default RRC messages and information	Table H.3.2-2				
elements contents exceptions					

Table 4.3.3.4.3-2: System Information Block type 19: EUTRA TDD- lower priority UTRA FDD inter RAT cell re-selection test case

Derivation Path: 36.508 clause 4.4.4.1 Table 4.4.4.1-1	: System Information Block	type 19	
Information Element	Value/remark	Comment	Condition
SysInfoType19 ::= SEQUENCE {			
utra-PriorityInfoList SEQUENCE {			
utra-ServingCell SEQUENCE {			
priority	3		
s-PrioritySearch1	21 (42dB)		
s-PrioritySearch2	0	default value is 0	
threshServingLow	0 (0dB)		
}			
eutra-FrequencyAndPriorityInfoList SEQUENCE		n denotes the	
(SIZE (1maxNumEUTRAFreqs)) OF SEQUENCE		index of the entry	
earfcn		Downlink EARFCN of Cell 1	
measurementBandwidth	50	Enumerated(6, 15, 25, 50, 75, 100)	
priority	4	·	
qRxLevMinEUTRA	-70 (-140 dBm)		
threshXhigh	24 (48 dB)		
threshXlow	1 (2 dB)	Default value	
eutra-blackListedCellList	Not present		
eutraDetection	TRUE		
}			
nonCriticalExtensions SEQUENCE {}	Not present		
}			

4.3.3.5 Test requirement

Tables 4.3.3.4.1-1, 4.3.3.5-1 and 4.3.3.5-2 define the primary level settings including test tolerances for E-UTRAN TDD- UTRAN FDD intra frequency cell re-selection test case which UTRA is of lower priority.

Table 4.3.3.5-1: Cell specific test parameters for Cell 1(E-UTRA TDD)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel			1
number			
BW _{channel}	MHz		10
OCNG Patterns defined in		OF	P.2 TDD
D.2.1 (OP.2 TDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB	1	
PDSCH_RB	dB	1	
OCNG_RA ^{Note 1}	dB	1	
OCNG_RB ^{Note 1}	dB		

Qqualmin for UTRA neighbour cell	dB	-20	
Qrxlevmin for UTRA neighbour cell	dBm	-115	
Qrxlevmin	dBm		-140
N_{oc}	dBm/15 kHz		-99.10
RSRP	dBm/15 KHz	-85.20	-102.80
\hat{E}_s/I_{ot}	dB	13.90	-3.70
\hat{E}_s/N_{oc}	dB	13.90	-3.70
Treselection _{EUTRAN}	S		0
Snonintrasearch	dB	N	ot sent
Thresh _{serving, low}	dB	44	
Thresh _{x, low} (Note 2)	dB		42
Propagation Condition		ļ ,	AWGN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of Thresh_{x, low} which is included in E-UTRA system information, and is a threshold for the UTRA target cell.

Table 4.3.3.5-2: Cell specific test parameters for Cell 2(Lower priority UTRA FDD)

Parameter	Unit	Cell 2 (UTRA)	
		T1	T2	
UTRA RF Channel Number		Channel 2		
CPICH_Ec/lor	dB	-1	0	
PCCPCH_Ec/lor	dB	-1	2	
SCH_Ec/lor	dB	-1	2	
PICH_Ec/lor	dB	-1	5	
OCNS_Ec/lor	dB	-0.9	941	
\hat{I}_{or}/I_{oc}	dB	13.80	13.80	
I_{oc}	dBm/3,84 MHz	-7	0	
CPICH_Ec/lo	dB	-10.18	-10.18	
CPICH_RSCP	dBm	-66.20	-66.20	
Propagation Condition		AW	GN	
Qqualmin	dB	-2	0	
Qrxlevmin	dBm	-11	15	
QrxlevminEUTRA	dBm	-140		
UE_TXPWR_MAX_RACH	dBm	21		
Treselection	S	0		
Sprioritysearch1	dB	42		
Sprioritysearch2	dB	0		
Thresh _{x, high} (Note 1)	dB	4	-	
Note: This refers to the value of Thresh _{x, high} which is included in UTRA system information, and is a threshold for the E-UTRA target cell.				

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to lower priority test requirement in this case is expressed as:

Cell re-selection delay to lower priority = $T_{evaluateUTRA_FDD} + T_{SI-EUTRA}$

 $T_{evaluateUTRA\ FDD} = 19.2\ s$; as specified in TS 36.133 [4] clause 4.2.2.5

 $T_{SI-EUTRA} = 1280 \text{ ms}$; as specified in TS 36.133 [4] clause 4.2.2.4

The cell re-selection delay to lower priority shall be less than a total of 21 seconds in this test case (note: this gives a total of 20.48 seconds but the test allows 21 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3.4 E-UTRAN TDD - UTRAN TDD cell re-selection

4.3.4.1 E-UTRA TDD - UTRAN TDD cell re-selection: UTRA is of higher priority

4.3.4.1.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA TDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of higher priority.

4.3.4.1.2 Test applicability

This test applies to all types of release 8 and forward E-UTRA TDD UEs that support release 9 and forward UTRA TDD.

4.3.4.1.3 Minimum conformance requirements

When the measurement rules indicate that UTRA TDD cells are to be measured, the UE shall measure P-CCPCH RSCP of detected UTRA TDD cells in the neighbour frequency list at the minimum measurement rate. The parameter $N_{UTRA_carrier_TDD}$ is the number of carriers in the neighbour frequency list. The UE shall filter P-CCPCH RSCP measurements of each measured UTRA TDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for inter-RAT layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher_priority_search} = (60 * N_{layers})$ seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher, or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT layers shall be the same as that defined below for lower priority RATs.

The UE shall evaluate whether newly detectable UTRA TDD cells have met the re-selection criteria in TS 36.304 [6] within time ($N_{UTRA_carrier_TDD}$) * $T_{detectUTRA_TDD}$ (as defined in table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.2) when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$ when Treselection_{RAT} = 0 provided that the reselection criteria is met by a margin of at least 6dB.

Cells which have been detected shall be measured at least every $(N_{UTRA_carrier_TDD}) * T_{measureUTRA_TDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA TDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA_TDD}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of re-selection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA TDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA_carrier_TDD} * T_{evaluateUTRA_TDD}$ when Treselection_{RAT} = 0.as specified in table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.2 provided that the reselection criteria is met by a margin of at least 6dB.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.2 and A.4.3.4.1.

4.3.4.1.4 Test description

4.3.4.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B/eNodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.22.
- 2. The general test parameter settings are set up according to Table 4.3.4.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.3.4.1.4.3.
- 5. There is one E-UTRA TDD cell and one UTRA TDD cell specified in the test. Cell 1 is the cell used for registration according to TS 36.508 [7] clause 7.2A.2 with the power level set according to Annex C.0 and C.1.

Table 4.3.4.1.4.1-1: General test parameters for E-UTRAN to UTRAN (1.28 Mcps TDD OPTION) Cell Reselection

Par	Parameter		Value	Comment
Initial	Active cell		Cell 1	UE is on cell 1 in the initialisation phase, so that reselection to cell 2
condition				occurs during the first T2 phase
T2 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
condition	Neighbour cell		Cell1	
T3 end	Active cell		Cell1	UE shall perform reselection to cell 1 during T3
condition	Neighbour cell		Cell2	
Uplink-down configuration			1	As specified in table 4.2.2 in TS 36.211 [9]
Special subf configuration			6	As specified in table 4.2.1 in TS 36.211 [9]
PRACH con	figuration of cell		53	As specified in table 5.7.1-3 in TS 36.211 [9]
CP length of cell 1			Normal	
Time offset between cells			3 ms	Asynchronous cells 3ms or 92160*Ts
Access Barring Information		-	Not sent	No additional delays in random access procedure.
Treselection		S	0	
DRX cycle le	ength	S	1,28	
HCS			Not used	
T1		S	>20	During T1, cell 2 shall be powered off, and during the off time the primary scrambling code shall be changed, The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2		S	85	T2 needs to be defined so that cell re-selection reaction time is taken into account.
Т3		S	25	T3 needs to be defined so that cell re-selection reaction time is taken into account.

4.3.4.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. E-UTRA cell 1 is already identified by the UE prior to the start of the test. Before T1 the UE is camped on to cell 1. During T1, cell 2 shall be powered off, and during the off time the cell id shall

be changed. At starting T2 cell 2 becomes stronger than Thresh_{x_high}, the UE is expected to detect cell 2, send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2. At the start of T3, cell 2 becomes weaker than Thresh_{serving low}, and the UE reselects to Cell 1.

In the following test procedure "UE responds" means "UE starts transmitting the SYNCH-UL sequence in the UpPTS for sending RRC CONNECTION REQUEST message to perform a Routing Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to duration T1 in Table 4.3.4.1.5-1 and 4.3.4.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. During T1, cell 2 shall be powered off and the SS shall set Cell 2 cell parameter id = (current cell 2 cell parameter id +4) mod 16.
- 4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.3.4.1.5-1 and 4.3.4.1.5-2. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the higher priority cell, Cell 2.
- 5. If the UE responds on Cell 2 within 81s from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 6. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, continue with step 7. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, skip to step 10.
- 7. The SS shall switch the power setting from T2 to T3 as specified in Table 4.3.4.1.5-1 and 4.3.4.1.5-2.
- 8. The SS waits for random access requests information from the UE to perform cell re-selection procedure on the lower priority cell, Cell 1.
- 9. If the UE has re-selected Cell 1 within T3, after the re-selection or when T3 expires, skip to step 11. Otherwise, if T3 expires and the UE has not yet re-selected Cell 1, continue with step 10.
- 10. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 11. Repeat step 2-10 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.3.4.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and TS 34.108 [24] clause 6.1.0b with the following exceptions:

Table 4.3.4.1.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information	Table H.2.3-3				
blocks exceptions	Table H.2.3-4				
·	Table H.2.3-14				
Default RRC messages and information	Table H.3.2-2				
elements contents exceptions					

Table 4.3.4.1.4.3-2: System Information Block type 19: E-UTRA TDD- higher priority UTRA TDD inter RAT cell re-selection test case

Derivation Path: 36.508 clause 4.4.4.1 Table 4.4.4.1-1:	System Information Block	type 19	
Information Element	Value/remark	Comment	Condition
SysInfoType19 ::= SEQUENCE {			
utra-PriorityInfoList SEQUENCE {			
utra-ServingCell SEQUENCE {			
priority	5		
s-PrioritySearch1	0 (0dB)		
s-PrioritySearch2	Not present	default value is 0	
threshServingLow	12 (24dB)		
}			
eutra-FrequencyAndPriorityInfoList SEQUENCE (SIZE (1maxNumEUTRAFreqs)) OF SEQUENCE		n denotes the index of the entry	
earfcn		Downlink EARFCN of Cell 1	
measurementBandwidth	50	Enumerated(6, 15, 25, 50, 75, 100)	
priority	4		
qRxLevMinEUTRA	-70 (-140 dBm)		
threshXhigh	2 (4 dB)		
threshXlow	23 (46 dB)	Default value	
eutra-blackListedCellList	Not present		
eutraDetection	TRUE		
}			
nonCriticalExtensions SEQUENCE {}	Not present		
}			

4.3.4.1.5 Test requirement

Tables 4.3.4.1.4-1, 4.3.4.1.5-1 and 4.3.4.1.5-2 define the primary level settings including test tolerances for cell reselection E-UTRA TDD to UTRA TDD test case (UTRA is of higher priority).

Table 4.3.4.1.5-1: Cell specific test requirement parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 1)

Parameter	Unit	Cell 1		
		T1	T2	Т3
E-UTRA RF Channel			1	
Number				
BW _{channel}	MHz		10	
OCNG Patterns defined			OP.2 TDD	
in D.2.2 (OP.2 TDD)	-			ı
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0	0	0
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
Q _{rxlevmin}	dBm	-140	-140	-140
N_{oc}	dBm/15kHz	-98		
RSRP	dBm/15kHz	-87	-87	-87
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	11	11	11
Thresh _{x, high} (Note2)	dB	24(-79dBm)		
Snonintrasearch	dB	46		
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of Thresh_{x, high} which is included in E-UTRA system information, and is a threshold for the UTRA target cell.

Table 4.3.4.1.5-2: Cell specific test requirement parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit			Cell 2 (L	JTRA)		
Timeslot Number		0 DwPTS			3		
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number (Note1)				Chann	nel 2		
PCCPCH_Ec/lor	dB	-3	-3	-3			
DwPCH_Ec/lor	dB				0	0	0
OCNS_Ec/lor	dB	-3	-3	-3			
\hat{I}_{or}/I_{oc}	dB	-inf	11	-3	-inf	11	-3
I_{oc}	dBm/1.28 MHz			-80)		
PCCPCH RSCP	dBm	-inf	-72	-86		n.a.	
Propagation Condition		AWGN					
Q _{rxlevmin}	dBm			-10	3		
Qoffset _{s,n}	dB	C1, C2: 0					
Qhyst _s	dB	0					
Snonintrasearch	dB	Not sent					
Thresh _{serving, low}	dB	24 (-79dBm)					
Thresh _{x, low} (Note2)	dB	dB 46 (-94dBm)					

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note 2: This refers to the value of Threshx, low which is included in UTRA system information, and is a threshold for the E-UTRA target cell.

The cell reselection delay to higher priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2.

The cell re-selection delay to higher priority shall be less than 81 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to higher priority cell can be expressed as: $T_{higher_priority_search} + T_{evaluateUTRA_TDD} + T_{SI_UTRA}$,

Where:

 $T_{higher_priority_search}$ 60s, See TS 36.133 [4] section 4.2.2.5

T_{evaluateUTRA TDD} 19.2s, See TS 36.133 [4] Table 4.2.2.5.2-1

T_{SLUTRA} Maximum repetition period of relevant system info blocks that need to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 80.48 s, allow 81 s for higher priority cell reselection in the test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3.4.2 E-UTRAN TDD - UTRAN TDD cell re-selection: UTRA is of lower priority

4.3.4.2.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA TDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of lower priority.

4.3.4.2.2 Test applicability

This test applies to all types of release 8 and forward E-UTRA TDD UEs that support release 9 and forward UTRA TDD.

4.3.4.2.3 Minimum conformance requirements

When the measurement rules indicate that UTRA TDD cells are to be measured, the UE shall measure P-CCPCH RSCP of detected UTRA TDD cells in the neighbour frequency list at the minimum measurement rate. The parameter $N_{UTRA_carrier_TDD}$ is the number of carriers in the neighbour frequency list. The UE shall filter P-CCPCH RSCP measurements of each measured UTRA TDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

If the $S_{ServingCell}$ of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for inter-RAT layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher_priority_search} = (60 * N_{layers})$ seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall search for and measure inter-RAT layers of higher, or lower priority in preparation for possible re-selection. In this scenario, the minimum rate at which the UE is required to search for and measure such layers is not reduced and shall be the same as that defined below for lower priority RATs.

The UE shall evaluate whether newly detectable UTRA TDD cells have met the re-selection criteria in TS 36.304 [6] within time $(N_{UTRA_carrier_TDD}) * T_{detectUTRA_TDD}$ (as defined in table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.2) when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$ when Treselection $_{RAT} = 0$ provided that the reselection criteria is met by a margin of at least 6dB.

Cells which have been detected shall be measured at least every $(N_{UTRA_carrier_TDD}) * T_{measureUTRA_TDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA TDD cells are found by the higher priority search, they shall be measured at least every $T_{measureUTRA_TDD}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of re-selection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

For a cell that has been already detected, but that has not been re-selected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA TDD cell has met re-selection criterion defined in TS 36.304 [6] within $N_{UTRA_carrier_TDD} * T_{evaluateUTRA_TDD}$ when Treselection_{RAT} = 0 as specified in table 4.2.2.5.2-1of TS36.133 [4] provided that the reselection criteria is met by a margin of at least 6dB.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.2 and A.4.3.4.2.

4.3.4.2.4 Test description

4.3.4.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B/eNodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.22.
- 2. The general test parameter settings are set up according to Table 4.3.4.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.3.4.2.4.3.

5. There is one E-UTRA TDD cell and one UTRA TDD cell specified in the test. Cell 1 is the cell used for registration according to TS 36.508 [7] clause 7.2A.2 with the power level set according to Annex C.0 and C.1.

Table 4.3.4.2.4.1-1: General test parameters for E-UTRAN to UTRAN (1.28 Mcps TDD OPTION) Cell Reselection

Parai	Parameter		Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN TDD Cell
T1 end	Active cell		Cell1	UE shall perform reselection to cell 1 during T1 for
condition				subsequent iterations of the test.
	Neighbour cell		Cell2	1.28 Mcps TDD OPTION cell
T2 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T2
condition	Neighbour cell		Cell1	E-UTRA TDD cell
Uplink-downlink cell 1	configuration of		1	As specified in table 4.2.2 in TS 36.211 [9]
Special subframe	Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211 [9]
of cell 1				
PRACH configur	PRACH configuration of cell 1		53	As specified in table 5.7.1-3 in TS 36.211 [9]
CP length of cell	1		Normal	
Time offset betw	een cells		3 ms	Asynchronous cells
				3ms or 92160*Ts
Access Barring I	nformation	-	Not sent	No additional delays in random access procedure.
Treselection		s	0	
DRX cycle length	า	S	1,28	
HCS			Not	
			used	
T1		S	85	
T2	·	S	25	

4.3.4.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one UTRA TDD carrier. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Both Cell 1 and Cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to Cell 1. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2.

In the following test procedure "UE responds" means "UE starts transmitting the SYNCH-UL sequence in the UpPTS for sending RRC CONNECTION REQUEST message to perform a Routing Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to T1 in Table 4.3.4.2.5-1 and 4.3.4.2.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts. If the UE is already camped in Cell 1, wait until T1 expires and skip to step 5
- 3. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 1.
- 4. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 5. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 9.
- 5. The SS shall switch the power setting from T1 to T2 as specified in Table 4.3.4.2.5-1 and 4.3.4.2.5-2.
- 6. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 2.
- 7. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, skip to step 10. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, continue with step 9.
- 9. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 10. Repeat step 2-9 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.3.4.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and TS 34.108 [24] clause 6.1.0b with the following exceptions:

Table 4.3.4.2.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information Table H.2.3-7					
blocks exceptions	Table H.2.3-8				
,	Table H.2.3-14				
Default RRC messages and information	Table H.3.2-2				
elements contents exceptions					

Table 4.3.4.2.4.3-2: System Information Block type 19: E-UTRA FDD- lower priority UTRA TDD inter RAT cell re-selection test case

Derivation Path: 36.508 clause 4.4.4.1 Table 4.4.4.1-1	: System Information Block	type 19	
Information Element	Value/remark	Comment	Condition
SysInfoType19 ::= SEQUENCE {			
utra-PriorityInfoList SEQUENCE {			
utra-ServingCell SEQUENCE {			
priority	3		
s-PrioritySearch1	0 (0dB)		
s-PrioritySearch2	Not present	default value is 0	
threshServingLow	0 (0dB)		
}			
eutra-FrequencyAndPriorityInfoList SEQUENCE		n denotes the	
(SIZE (1maxNumEUTRAFreqs)) OF SEQUENCE		index of the entry	
earfcn		Downlink	
		EARFCN of Cell 1	
measurementBandwidth	50	Enumerated(6, 15,	
		25, 50, 75, 100)	
priority	4		
qRxLevMinEUTRA	-70 (-140 dBm)		
threshXhigh	23 (46 dB)		
threshXlow	1 (2 dB)	Default value	
eutra-blackListedCellList	Not present		
eutraDetection	TRUE		
}			
nonCriticalExtensions SEQUENCE {}	Not present		
}			

4.3.4.2.5 Test requirement

Tables 4.3.4.2.4.1-1, 4.3.4.2.5-1 and 4.3.4.2.5-2 define the primary level settings including test tolerances for E-UTRAN TDD- UTRAN TDD intra frequency cell re-selection test case which UTRA is of lower priority.

Table 4.3.4.2.5-1: Cell specific test requirement parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel		1	
Number			
BW _{channel}	MHz	10)
OCNG Patterns defined in		OP.2	TDD
D.2.2 (OP.2 TDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA(Note1)	dB		
OCNG_RB(Note1)	dB		
Q _{rxlevmin}	dBm	-140	-140
N_{oc}	dBm/15kHz	-98	
RSRP	dBm/15kHz	-87	-101
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	11	-3
Snonintrasearch	dB	Not sent	
Thresh _{serving, low}	dB	46 (-94dBm)	
Thresh _{x, low (Note2)}	dB	24 (-79dBm)	
Propagation Condition		ÀWGN	
Note 1: OCNC shall be used such that sall is fully allocated and a			

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of Threshx, low which is included in E-UTRA system information, and is a threshold for the UTRA target cell

Table 4.3.4.2.5-2: Cell specific test requirement parameters for cell re-selection E-UTRA TDD to UTRA TDD test case (cell 2)

Parameter	Unit		Cell 2	(UTRA)
Timeslot Number		()	DwF	PTS
		T1	T2	T1	T2
UTRA RF Channel Number (Note1)			Cha	nnel 2	
PCCPCH_Ec/lor	dB	-3	-3		
DwPCH_Ec/lor	dB			0	0
OCNS_Ec/lor	dB	-3	-3		
$ \hat{I}_{or}/I_{oc} $	dB	11	11	11	11
I_{oc}	dBm/1.28 MHz		-80		
PCCPCH RSCP	dBm	-72	-72	n.a.	n.a.
Propagation Condition			A۷	VGN	
Q _{rxlevmin}	dBm	-103			
Qoffset _{s,n}	dB	C1, C2: 0			
Qhyst _s	dB	0			
Thresh _{x, high} (Note2)	dB		46 (-9	4dBm)	

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note 2: This refers to the value of Thresh_{x, high} which is included in UTRA system information and is a threshold for the E-UTRA target cell.

The cell re-selection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2 and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message to perform a Routing Area Update procedure on Cell 2.

The cell re-selection delay to lower priority shall be less than 21 s.

NOTE: The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateUTRA_TDD} + T_{SI_UTRA}$,

Where:

T_{evaluateUTRA TDD} 19.2s, See Table 4.2.2.5.2-1 of TS 36.133 [4] clause 4.2.2.5.1

T_{SI_UTRA} Maximum repetition period of relevant system info blocks that needs to be received by the UE

to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 20.48 s, allow 21 s for lower priority cell reselection in the test case. For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.3.4.3 EUTRA TDD-UTRA TDD cell reselection in fading propagation conditions: UTRA TDD is of lower priority

4.3.4.3.1 Test purpose

To verify that the UE is able to search and measure neighbouring UTRA TDD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the UTRA is of lower priority. The E-UTRA cell is in fading propagation conditions and the UTRA cell is in AWGN propagation conditions.

4.3.4.3.2 Test applicability

This test applies to all types of release 8 and forward E-UTRA TDD UEs that support release 9 and forward UTRA TDD.

4.3.4.3.3 Minimum conformance requirements

When the measurement rules indicate that UTRA TDD cells are to be measured, the UE shall measure P-CCPCH RSCP of detected UTRA TDD cells in the neighbour frequency list at the minimum measurement rate specified in this section. The parameter $N_{UTRA_carrier_TDD}$ is the number of carriers in the neighbour frequency list. The UE shall filter P-CCPCH RSCP measurements of each measured UTRA TDD cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period. P-CCPCH RSCP of UTRAN TDD cells shall not be filtered over a longer period than that specified in table 4.3.4.3.3-1.

The UE shall evaluate whether newly detectable UTRA TDD cells have met the reselection criteria in TS 36.304 [6] within time $(N_{UTRA_carrier_TDD}) * T_{detectUTRA_TDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$ when $T_{reselection} = 0$ provided that the reselection criteria is met by a margin of at least 6dB.

Cells which have been detected shall be measured at least every $(N_{UTRA_carrier_TDD}) * T_{measureUTRA_TDD}$ when the $S_{ServingCell}$ of the E-UTRA serving cell is less than $S_{nonintrasearch}$.

When higher priority UTRA TDD cells are found by the higher priority search, they shall be measured at least every $T_{measure,UTRA_TDD}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

For a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified UTRA TDD cell has met reselection criterion defined in TS 36.304 [6] within $N_{UTRA_carrier_TDD}$ * $T_{evaluateUTRA_TDD}$ when $T_{reselection} = 0$ as specified in table 4.3.4.3.3-1 provided that the reselection criteria is met by a margin of at least 6dB.

Table 4.3.4.3.3-1: T_{detectUTRA_TDD}, T_{measureUTRA_TDD} and T_{evaluateUTRA_TDD}

DRX cycle length [s]	T _{detectUTRA_TDD}	T _{measureUTRA_TDD} [s] (number of DRX cycles)	T _{evaluateUTRA_TDD} [s] (number of DRX cycles)	of
0.32		5.12 (16)	15.36 (48)	
0.64	30	5.12 (8)	15.36 (24)	
1.28		6.4(5)	19.2 (15)	
2.56	60	7.68 (3)	23.04 (9)	

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.2 and A.4.3.4.3.

4.3.4.3.4 Test description

4.3.4.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.26.
- 2. The general test parameter settings are set up according to Table 4.3.4.3.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.3.4.3.4.3.
- 5. There is one E-UTRA TDD cell and one UTRA TDD cell specified in the test. Cell 1 is the cell used for registration according to TS 36.508 [7] clause 7.2A.2 with the power level set according to Annex C.0 and C.1.

Table 4.3.4.3.4.1-1: General test parameters for EUTRA TDD- lower priority UTRA TDD inter RAT cell re-selection test case in fading conditions

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell1	E-UTRAN cell
T1 end condition	Active cells		Cell1	UE shall perform reselection to cell 1 during T1 for subsequent iterations of the test
	Neighbour cell		Cell2	
T3 end	Active cell		Cell2	UE shall perform reselection to cell 2 during T3
condition	Neighbour cell		Cell1	
E-UTRA P	RACH configuration		53	As specified in table 5.7.1-3 in TS 36.211 [9]
Uplink-dov cell 1	nlink configuration of		1	As specified in table 4.2.2 in TS 36.211 [9]
Special sul cell 1	bframe configuration of		6	As specified in table 4.2.1 in TS 36.211 [9]
E_UTRA A	ccess Barring	-	Not Sent	No additional delays in random access procedure.
DRX cycle	length	S	1.28	The value shall be used for all cells in the test.
T1		S	<85	T1 need to be defined so that cell re-selection reaction time is taken into account. T1 is terminated when the UE starts to send preambles to cell 1
T2		S	64	The start of T2 is defined as the time when the UE starts to send PRACH preambles to cell 1
ТЗ		S	<25	T3 need to be defined so that cell re-selection reaction time is taken into account. T3 is terminated when the UE starts to send PRACH preambles to cell 2
T4		S	64	The start of T4 is defined as the time when the UE starts to send PRACH preambles to cell 2

4.3.4.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one UTRA TDD carrier. In the test there are four successive time periods, with time duration of T1, T2, T3 and T4 respectively. Both E-UTRA Cell 1 and UTRA Cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to Cell 1. Cell 2 is of lower priority than Cell 1. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2. Time duration T2 and T4 are not used for cell re-selection in the test.

In the following test procedure, "UE responds on Cell 1" means "UE starts transmitting the SYNCH-UL sequence in the UpPTS for sending RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure" and "UE responds on Cell 2" means "UE starts transmitting the SYNCH-UL sequence in the UpPTS for sending RRC CONNECTION REQUEST message to perform a Routing Area Update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to duration T0 in Table 4.3.4.3.5-1 and 4.3.4.3.5-2.
- 3. Set the parameters according to T2 in Table 4.3.4.3.5-3 and 4.3.4.3.5-4. Propagation conditions are set according to Annex B clause B.1.1 and B.2.2. T2 starts.
- 4. The SS monitors for possible random access request information from the UE to perform cell re-selection on Cell 2.
- 5. If the UE responds on Cell 2 within T2, then count a fail for the event "Hold out on Cell 1" and skip to step 10. Otherwise, count a success for the event "Hold out on Cell 1" and after T2 expires continue with step 6.
- 6. The SS shall switch the power setting from T2 to T3 as specified in Table 4.3.4.3.5-3 and 4.3.4.3.5-4.
- 7. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 2.

- 8. If the UE responds on Cell 2 during time duration T3 within 21 seconds from the beginning of time period T3, then count a success for the event "Re-select lower priority Cell 2".

 Otherwise, count a fail for the event "Re-select lower priority Cell 2".
- 9. If the UE responds on Cell 2 within T3, at the moment of the request-reception continue with step 10. Otherwise, after T3 expires skip to step 17.
- 10. The SS shall switch the power setting from T3 to T4 as specified in Table 4.3.4.3.5-3 and 4.3.4.3.5-4.
- 11. The SS monitors for possible random access request information from the UE to perform cell re-selection on Cell 1.
- 12. If the UE responds on Cell 1 within T4, then count a fail for the event "Hold out on Cell 2" and skip to step 17. Otherwise, count a success for the event "Hold out on Cell 2" and after T4 expires continue with step 13.
- 13. The SS shall switch the power setting from T4 to T1 as specified in Table 4.3.4.3.5-3 and 4.3.4.3.5-4.
- 14. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 1.
- 15. If the UE responds on Cell 1 within T1, at the moment of the request-reception skip to step 17. Otherwise, after T1 expires continue with step 16.
- 16. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1. Set the parameters according to duration T0 in Table 4.3.4.3.5-1 and 4.3.4.3.5-2.
- 17. Repeat step 3-16 until a test verdict has been achieved.

Each of the events "Hold out on Cell 1", "Re-select lower priority Cell 2" and "Hold out on Cell 2" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

If both events pass, the test passes. If one event fails, the test fails.

4.3.4.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and TS 34.108 [24] clause 6.1.0b with the following exceptions:

Table 4.3.4.3.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information Table H.2.3-5					
blocks exceptions	Table H.2.3-8				
Default RRC messages and information	Table H.3.2-2				
elements contents exceptions					

Table 4.3.4.3.4.3-2: System Information Block type 3 (1.28 Mcps TDD): Inter-RAT E-UTRA TDD - UTRA TDD is of lower priority cell re-selection

Derivation Path: 34.108 clause 6.1.0b					
Information Element	Value/remark	Comment	Condition		
- SIB4 Indicator	TRUE				
- Cell identity	0000 0000 0000 0000				
	0000 0000 0001B				
- Cell selection and re-selection info					
- Mapping info	Not present				
- Cell selection and reselection quality measure	(no data)				
- CHOICE mode	TDD				
- Sintrasearch	10 dB				
- Sintersearch	10 dB				
- SsearchHCS	Not present				
- RAT List	Not present				
- Qrxlevmin	-103 dBm				
- Qhyst1s	0 dB				
- Treselections	0 seconds				
- HCS Serving cell information	Not present				

- Maximum allowed UL TX power	21dBm		
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Table 4.3.4.3.4.3-3: System Information Block type 19: Inter-RAT E-UTRA TDD - UTRA TDD is of lower priority cell re-selection

Derivation Path: 36.508 clause 4.4.4.1 Table 4.4.4.1-1: Information Element	Value/remark	Comment	Condition
SysInfoType19 ::= SEQUENCE {	Valuojiomaik	Commone	Condition
utra-PriorityInfoList SEQUENCE {			
utra-ServingCell SEQUENCE {			
priority	3		
s-PrioritySearch1	0 (0dB)		
s-PrioritySearch2	Not present	default value is 0	
threshServingLow	0 (0dB)		
}			
eutra-FrequencyAndPriorityInfoList SEQUENCE		n denotes the	
(SIZE (1maxNumEUTRAFreqs)) OF SEQUENCE		index of the entry	
earfcn		Downlink EARFCN of Cell 1	
measurementBandwidth	50	Enumerated(6, 15, 25, 50, 75, 100)	
priority	4	, , , ,	
gRxLevMinEUTRA	-70 (-140 dBm)		
threshXhigh	22 (44 dB)		
threshXlow	1 (2 dB)	Default value	
eutra-blackListedCellList	Not present		
eutraDetection	TRUE		
}			
nonCriticalExtensions SEQUENCE {}	Not present		

4.3.4.3.5 Test requirement

Tables 4.3.4.3.4.1-1, 4.3.4.3.5-1, 4.3.4.3.5-2, 4.3.4.3.5-3 and 4.3.4.3.5-4 define the primary level settings including test tolerances for E-UTRA TDD- UTRA TDD inter-RAT cell re-selection test case which UTRA is of lower priority.

Table 4.3.4.3.5-1: Cell specific test parameters for Cell 1 (E-UTRA TDD)

Parameter	Unit	Cell 1
		T0
E-UTRA RF Channel number		1
BW _{channel}	MHz	10
OCNG Patterns defined in		OP.2 TDD
D.2.2 (OP.2 TDD)		
PSS_RA	dB	0
SSS_RA	dB	0
PCFICH_RB	dB	0
PHICH_RA	dB	0
PHICH_RB	dB	0
PDCCH_RA	dB	0
PDCCH_RB	dB	0
PDSCH_RA	dB	0
PDSCH_RB	dB	0
OCNG_RA ^{Note 1}	dB	0
OCNG_RB ^{Note 1}	dB	0
Qrxlevmin for UTRA	dBm	-103
neighbour cell	UDIII	-103
Qrxlevmin	dBm	-140
N_{oc}	dBm/15	-104
	kHz	
RSRP	dBm/15 kHz	-82
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	22
\hat{E}_s/N_{oc}	dB	22
Treselection _{EUTRAN}	S	0
Snonintrasearch	dB	Not sent
Thresh _{serving, low}	dB	44
Thresh _{x, low} (Note 2)	dB	24
Propagation Condition		AWGN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of Thresh_{x, low} which is included in E-UTRA system information, and is a threshold for the UTRA target cell.

Table 4.3.4.3.5-2: Cell specific test parameters for Cell 2 (UTRA TDD)

Parameter	Unit	Cell 2 (UTRA)
		T0
Timeslot Number		0
UTRA RF Channel Number		Channel 2
(Note 1)		Charmer 2
PCCPCH_Ec/lor	dB	-3
DwPCH_Ec/lor	dB	
OCNS_Ec/lor	dB	-3
\hat{I}_{or}/I_{oc}	dB	13
I_{oc}	dBm/1.28 MHz	-80
PCCPCH RSCP	dBm	-70
Propagation Condition		AWGN
Qrxlevmin	dBm	-103
QrxlevminEUTRA	dBm	-140
UE_TXPWR_MAX_RACH	dBm	21
Treselection	S	0
Thresh _{x, high} (Note 2)	dB	44

In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's Note1: channel number.

This refers to the value of Thresh_{x, high} which is included in UTRA system information, and is a threshold for the E-UTRA target cell Note 2:

Table 4.3.4.3.5-3: Cell specific test parameters for cell 1 (E-UTRA)

Parameter	Unit	Cell 1			
		T1	T1 T2 T3		
E-UTRA RF Channel				1	
number					
BW _{channel}	MHz		1	0	
OCNG Patterns defined in			OP.2	TDD	
D.2.2 (OP.2 TDD)					
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB		()	
PDCCH_RB	dB	7			
PDSCH_RA	dB	7			
PDSCH_RB	dB	7			
OCNG_RA ^{Note 1}	dB]			
OCNG_RB ^{Note 1}	dB	<u>] </u>			
Qrxlevmin for UTRA	dBm		-1	03	
neighbour cell					
Qrxlevmin	dBm			40	
N_{oc}	dBm/15 kHz		-1	04	
RSRP	dBm/15 KHz	-82	-82	-107	-107
\hat{E}_{s}/I_{ot}	dB				-3
\hat{E}_s/N_{oc}	dB	22 22 -3 -3			-3
Treselection _{EUTRAN}	S	0			
Snonintrasearch	dB		Not	sent	
Thresh (Note 2)	dB		4	4	
Thresh _{x, low} (Note 2)	dB	24			
Propagation Condition		ETU70			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of Thresh_{x, low} which is included in E-UTRA system information, and is a threshold for the UTRA target cell.

Table 4.3.4.3.5-4: Cell specific test parameters for cell 2 (UTRA)

Parameter	Unit	Cell 2 (UTRA)							
Timeslot Number		0				Dwl	PTS		
		T1	T2	T3	T4	T1	T2	T3	T4
UTRA RF Channel Number (Note1)					Char	nnel 2			
PCCPCH_Ec/lor	dB		-:	3					
DwPCH_Ec/lor	dB						()	
OCNS_Ec/lor	dB		-	3					
\hat{I}_{or}/I_{oc}	dB	13	13	13	13	13	13	13	13
I_{oc} dBm/1.28 MHz			-80						
PCCPCH RSCP	dBm	- 70	-70	-70	-70	n.a.	n.a.	n.a.	n.a.
Propagation Condition					AW	/GN			
Qrxlevmin	dBm				-1	03			
Qrxlevmin _{EUTRA}	dBm				-1	40			
UE_TXPWR_MAX_RACH	dBm				2	21			
Treselection	S	0							
Thresh _{x, high} (Note2)	dB	44							
Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.									
Note2: This refers to the value of 7	Γhresh _{x, high} which is i	include	d in UT	RA sys	stem in	format	ion, an	d is a	

threshold for the E-UTRA target cell

The probability of reselection from cell 1 to cell 2 during T2 observed during testing shall be less than 10%

The probability of reselection from cell 2 to cell 1 during T4 observed during testing shall be less than 10%

The cell reselection delay to lower priority is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send the SYNCH-UL sequence in the UpPTS for sending the RRC CONNECTION REQUEST message on cell 2. In order to evaluate reselection delay, the system simulator first needs to verify that the UE is camped on cell 1 at the start of T3

The cell re-selection delay to lower priority cell can be expressed as:

Cell re-selection delay to lower priority = $T_{evaluateUTRA\ TDD} + T_{SI-UTRA}$

 $T_{evaluateUTRA\ TDD}$ 19.2s, as specified in TS 36.133 [4] Table 4.2.2.5.2-1

 $T_{SI\text{-}UTRA}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

The cell re-selection delay to lower priority shall be less than a total of 21 seconds in this test case (note: this gives a total of 20.48 seconds but the test allows 21 seconds).

For the test to pass, all the events above shall pass.

The statistical pass/fail decisions are done separated for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

4.4 E-UTRAN to GSM Cell Re-Selection

4.4.1 E-UTRAN FDD - GSM cell re-selection

4.4.1.1 Test purpose

To verify that the UE is able to search and measure neighbouring GSM cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements.

4.4.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support GSM.

4.4.1.3 Minimum conformance requirements

The cell re-selection delay shall be less than 4 * $T_{measure,\;GSM}$ + T_{BCCH} in RRC_IDLE state.

When the measurement rules defined in TS 36.304 [6] indicates that E-UTRAN inter-frequencies or inter-RAT frequency cells are to be measured, the UE shall measure the signal level of the GSM BCCH carriers if the GSM BCCH carriers are indicated in the measurement control system information of the serving cell, GSM BCCH carriers of lower priority than the serving cell shall be measured at least every $T_{measure,GSM}$ as defined in table 4.2.2.5.3-1 of TS 36.133 [4] clause 4.2.2.5.3.

When higher priority GSM BCCH carriers are found by the higher priority search, they shall be measured at least every $T_{\text{measure,GSM}}$, and the UE shall decode the BSIC of the GSM BCCH carrier. If, after detecting a cell in a higher priority search, it is determined that re-selection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of re-selection, or to continuously verify the BSIC of the GSM BCCH carrier every 30s.

However, the minimum measurement filtering requirements specified shall still be met by the UE before it makes any determination that it may stop measuring the cell.

The UE shall maintain a running average of 4 measurements for each GSM BCCH carrier. The measurement samples for each cell shall be as far as possible uniformly distributed over the averaging period.

If continuous GSM measurements are required by the measurement rules in TS 36.304 [6], the UE shall attempt to verify the BSIC at least every 30 seconds for each of the 4 strongest GSM BCCH carriers. If a change of BSIC is detected for one GSM cell then that GSM BCCH carrier shall be treated as a new GSM neighbour cell. If the UE detects on a BCCH carrier a BSIC which is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform BSIC re-confirmation for that cell.

The UE shall not consider the GSM BCCH carrier in cell re-selection, if the UE cannot demodulate the BSIC of that GSM BCCH carrier. Additionally, the UE shall not consider a GSM neighbour cell in cell re-selection, if it is indicated as not allowed in the measurement control system information of the serving cell.

The UE shall evaluate the inter-RAT cell re-selection criteria as defined in TS 36.304 [6] at least every DRX cycle. The DRX cycle length is 1.28 seconds. When a non-zero value of Treselection_{EUTRAN} is used, the UE shall only perform reselection on an evaluation which occurs simultaneously to, or later than the expiry of the Treselection_{EUTRAN} timer.

At inter-RAT cell re-selection, the UE shall monitor the downlink of serving cell for paging reception until the UE is capable to start monitoring downlink channels for paging reception of the target inter-frequency cell. For E-UTRAN to GSM cell re-selection the interruption time must not exceed $T_{BCCH} + 50$ ms. T_{BCCH} is the maximum time allowed to read BCCH data from a GSM cell as defined in TS 45.008 [15] clause 6.2.

For idle mode cell re-selection purposes, the UE shall be capable of monitoring at least:

- Depending on UE capability, 3 FDD E-UTRA inter-frequency carriers, and
- Depending on UE capability, 32 GSM carriers

In addition to the requirements defined in TS 36.133 [4] clause 4.2.2.9 a UE in RRC_IDLE state shall be capable of monitoring a total of at least 8 carrier frequency layers, which includes serving layer, comprising of any defined in TS 36.133 [4] clause 4.2.2.9 combination of E-UTRA FDD, E-UTRA TDD, UTRA FDD, UTRA TDD, GSM (one GSM layer corresponds to 32 cells), cdma2000 1x and HRPD layers.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.3 and A.4.4.1.

4.4.1.4 Test description

4.4.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 4.4.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B. 0.
- 4. Message contents are as defined in clause 4.4.1.4.3.
- 5. There is one E-UTRA FDD cell and one GSM cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Unit **Parameter** Value Comment Initial Active cell Cell1 UE shall be forced to cell 1 in the initialisation condition phase and shall be able to detect and monitor the 4 strongest GSM BCCH carriers in T1. Cell 1 is an E-UTRA FDD cell. Final Neighbour cell Cell2 UE shall perform reselection to cell 2 during T2. Cell 2 is a GSM cell. condition E-UTRA RF Channel Number 1 E-UTRA FDD carrier frequency **GSM ARFCN** 12 GSM BCCH carriers are used PRACH configuration As specified in table 5.7.1-2 in TS 36.211 [9] Access Barring Information Not Sent No additional delays in random access procedure. CP length of cell 1 Normal DRX cycle length 1.28 The value shall be used for all cells in the test. s 35 T1 need to be defined so that cell re-selection reaction time is taken into account. T2 35 T2 need to be defined so that the higher layer s search periodicity and cell re-selection reaction time are taken into account.

Table 4.4.1.4.1-1: General Test Parameters for E-UTRAN FDD - GSM cell re-selection test case

4.4.1.4.2 Test procedure

Propagation channel

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cells on one E-UTRA FDD carrier and twelve GSM cells. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Cell 1 (E-UTRA FDD cell) and Cell 2 (GSM cell) shall belong to different Location Areas. During initialization before the start of the test, the UE is camped on Cell 1. By the end of T1, the UE has identified BSIC on the GSM BCCH carrier of Cell 2 but the signal levels do not meet the re-selection criterion during T1. At the start of T2, the signal levels change such that Cell 2 meets the re-selection criterion. The GSM layer is configured at a lower priority than the serving E-UTRA FDD layer.

AWGN

In the following test procedure "UE responds" means "UE starts transmitting RR Channel Request message for location update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to T1 in Table's 4.4.1.5-1 and 4.4.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts. If the UE is already camped in Cell 1, wait until T1 expires and skip to step 5.
- 3. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 1.
- 4. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 5. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 9.
- 5. The SS shall switch the power setting from T1 to T2 as specified in Table's 4.4.1.5-1 and 4.4.1.5-2.
- 6. The SS waits for location update information from the UE to perform cell re-selection on Cell 2.
- 7. If the UE responds on Cell 2 during time duration T2 within 27.9 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, skip to step 10. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, continue with step 9.
- 9. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 10. Repeat step 2-9 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.4.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.4.1.4.3-1: Common Exception messages for E-UTRAN FDD - GSM cell re-selection test case

Default Message Contents					
Common contents of system information	Table H.2.3-9				
blocks exceptions	Table H.2.3-10				
Default RRC messages and information	Table H.3.2-1				
elements contents exceptions					

All GSM cell messages indicated shall use the same content as described in the default message content in TS 45.008 [15] clause 9 for Rel-4 and later releases, with the exceptions above and as specified in Tables 4.4.1.5-1 and 4.4.1.5-2.

4.4.1.5 Test requirement

Tables 4.4.1.4.1-1, 4.4.1.5-1 and 4.4.1.5-2 defines the primary level settings including test tolerances for E-UTRAN FDD to GSM cell re-selection test case.

Table 4.4.1.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Ce	II 1		
		T1	T2		
E-UTRA RF Channel number		•			
BW _{channel}	MHz	1	0		
OCNG Patterns defined in		OP.2	FDD		
D.1.2 (OP.2 FDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	()		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				
Qrxlevmin	dBm	-1-	40		
N_{oc}	dBm/15 kHz	-99.10			
RSRP	dBm/15 KHz	-89.20	-102.80		
\hat{E}_{s}/I_{ot}	dB	9.90	-3.70		
\hat{E}_s/N_{oc}	dB	9.90	-3.70		
Treselection _{EUTRAN}	S	Ō			
Snonintrasearch	dB	Not	sent		
Thresh _{serving, low}	dB	44			
TITIESTI _{X, low}	dB		4		
Note 1: OCNG shall be used	such that both	cells are fully a	llocated and a		
constant total transmitted power spectral density is achieved for					
all OFDM symbols.					
information, and is a threshold for GSM target cell.					

Table 4.4.1.5-2: Cell Specific Test requirement Parameters for Cell 2 GSM cell

Parameter	Unit	Cell 2 ((GSM)
Parameter	Onit	T1	T2
Absolute RF Channel		ARFO	NI 1
Number		AINI	JIN 1
RXLEV	dBm	-90.00	-75.00
RXLEV_ACCESS_MIN	dBm	-10)5
MS_TXPWR_MAX_CCH	dBm	24	4

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay test requirement in this case is expressed as:

Cell re-selection delay = $4 * T_{measureGSM} + T_{BCCH}$

 $T_{\text{measureGSM}} = 6.40 \text{ s}$; as specified in TS 36.133 [4] clause 4.2.2.3

 T_{BCCH} = 1.9 s; maximum time allowed to read the BCCH data from GSM cell, when being synchronized to a BCCH carrier; as specified in TS 45.008 [15] clause 6.2

The cell re-selection delay shall be less than a total of 27.9 seconds in this test case (note: this gives a total of 26 seconds for the $T_{measureGSM}$ calculation plus 1.9 s for T_{BCCH} but the test allows 27.9 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.4.2 E-UTRAN TDD - GSM cell re-selection

4.4.2.1 Test purpose

To verify that the UE is able to search and measure neighbouring GSM cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements.

4.4.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support GSM.

4.4.2.3 Minimum conformance requirements

If the $S_{ServingCell}$ of the E-UTRA serving cell (or other cells on the same frequency layer) is greater than $S_{nonintrasearch}$ then:

- The UE may not search for, or measure GSM cells if the priority of GSM is equal to, or lower than the serving cell.
- The UE shall search for and measure GSM cells if the priority of GSM is higher than the serving cell. The minimum rate at which the UE is required to search for and measure such layers may be reduced in this scenario to maintain UE battery life.

If the $S_{ServingCell}$ of the E-UTRA serving cell is less than or equal to $S_{nonintrasearch}$ then the UE shall measure, according to the measurement rules defined in TS 36.304 [6] at least every $T_{measure,GSM}$ as defined in table 4.2.2.5.3-1 of TS 36.133 [4] clause 4.2.2.5.3:

- If a detailed neighbour cell list is provided, the signal level of the GSM BCCH carrier of each GSM neighbour cell indicated in the measurement control system information of the serving cell; or
- If only BCCH carriers are provided, the signal level of the GSM BCCH carriers indicated in the measurement control system information of the serving cell

If the RSRP of the E-UTRA serving cell is greater than $S_{nonintrasearch}$ then the UE shall search for GSM BCCH carrier at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in TS 36.133 [4] clause 4.2.2 as $T_{higher_priority_search} = (60 * N_{layers})$ seconds, where the parameter N_{layers} is the total number of configured higher priority carrier frequencies. When

higher priority GSM BCCH carriers are found by the higher priority search, they shall be measured at least every $T_{measure,GSM}$, and the UE shall decode the BSIC of the GSM BCCH carrier. If re-selection to any higher priority cell is not triggered within (4 * $T_{measure,GSM}$ + Treselection_{RAT}) after it has been found in a higher priority search, the UE is not required to continue make measurements of the BCCH carrier to evaluate the ongoing possibility of re-selection, or to continuously verify the BSIC of the GSM BCCH carrier every 30s.

The UE shall maintain a running average of 4 measurements for each GSM BCCH carrier. The measurement samples for each cell shall be as far as possible uniformly distributed over the averaging period.

If continuous GSM measurements are required by the measurement rules in TS 36.304 [6], the UE shall attempt to verify the BSIC at least every 30 seconds for each of the 4 strongest GSM BCCH carriers. If a change of BSIC is detected for one GSM cell then that GSM BCCH carrier shall be treated as a new GSM neighbour cell. If the UE detects on a BCCH carrier a BSIC which is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform BSIC re-confirmation for that cell.

The UE shall not consider the GSM BCCH carrier in cell re-selection, if the UE cannot demodulate the BSIC of that GSM BCCH carrier. Additionally, the UE shall not consider a GSM neighbour cell in cell re-selection, if it is indicated as not allowed in the measurement control system information of the serving cell.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.3 and A.4.4.2.

4.4.2.4 Test description

4.4.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 4.4.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.4.2.4.3.
- 5. There is one E-UTRA TDD cell and one GSM cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.4.2.4.1-1: General test parameters for E-UTRA TDD GSM cell re-selection test case

Para	meter	Unit	Value Comment	
Initial condition	Active cell		Cell1	UE shall be forced to cell 1 in the initialisation phase and shall be able to detect and monitor the 4 strongest GSM BCCH carriers in T1. Cell 1 is an E-UTRA TDD cell.
Final condition	Neighbour cell		Cell2	UE shall perform reselection to cell 2 during T2. Cell 2 is a GSM cell.
E-UTRA RF Ch	nannel Number		1	1 E-UTRA TDD carrier frequency
GSM ARFCN			1	12 GSM BCCH carriers are used
Uplink-downlin of cell 1	k configuration		1	As specified in table 4.2.2 in TS 36.211
Special subfrar configuration for			6	As specified in table 4.2.1 in TS 36.211
PRACH config 1	uration for cell		53	As specified in table 5.7.1-3 in TS 36.211
CP length of ce	ell 1		Normal	
Access Barring	Information		Not Sent	No additional delays in random access procedure.
DRX cycle leng	RX cycle length		1.28	The value shall be used for all cells in the test.
Propagation channel			AWGN	
T1		S	35	T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		S	35	T2 need to be defined so that the higher layer search periodicity and cell re-selection reaction time are taken into account.

4.4.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one E-UTRA TDD carrier and twelve GSM cells. In the test there are two successive time periods, with time duration of T1 and T2 respectively. Cell 1 (E-UTRA TDD cell) and Cell 2 (GSM cell) belong to different Location Areas. By the end of T1, the UE has identified BSIC on the GSM BCCH carrier of Cell 2 but the signal levels do not meet the re-selection criterion. At the start of T2, the signal levels change such that Cell 2 meets the re-selection criterion. The GSM layer is configured at a lower priority than the serving E-UTRA TDD layer.

In the following test procedure "UE responds" means "UE starts transmitting RR Channel Request message for location update procedure".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to T1 in Table's 4.4.2.5-1 and 4.4.2.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts. If the UE is already camped in Cell 1, wait until T1 expires and skip to step 5.
- 3. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 1.
- 4. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 5. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 9.
- 5. The SS shall switch the power setting from T1 to T2 as specified in Table's 4.4.2.5-1 and 4.4.2.5-2.
- 6. The SS waits for location update information from the UE to perform cell re-selection on Cell 2.
- 7. If the UE responds on Cell 2 during time duration T2 within 27.9 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, skip to step 10. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, continue with step 9.
- 9. Switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 10. Repeat step 2-9 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.4.2.4.3 Message contents

Message contents are according to TS 36.508 [4] clause 4.6 with the following exceptions:

Table 4.4.2.4.3-1: Common Exception messages for E-UTRAN TDD - GSM cell re-selection test case

Default Message Contents					
Common contents of system information	Table H.2.3-9				
blocks exceptions	Table H.2.3-10				
Default RRC messages and information	Table H.3.2-2				
elements contents exceptions					

All GSM cell messages indicated shall use the same content as described in the default message content in TS 45.008 [15] clause 9 for Rel-4 and later releases, with the exceptions above and as specified in Tables 4.4.2.5-1 and 4.4.2.5-2.

4.4.2.5 Test requirement

Tables 4.4.2.4.1-1, 4.4.2.5-1 and 4.4.2.5-2 defines the primary level settings including test tolerances for E-UTRAN TDD to GSM cell re-selection test case.

Table 4.4.2.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN TDD cell

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel			1
number			
BW _{channel}	MHz	10	
OCNG Patterns defined in		OP.2 TDD	
D.2.2 (OP.2 TDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB	0	
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA ^{Note 1}	dB		
OCNG_RB ^{Note 1}	dB		
Q _{rxlevmin}	dBm	-140	
N_{oc}	dBm/15 kHz	-99.10	
RSRP	dBm/15 KHz	-89.20	-102.80
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	9.90	-3.70
\hat{E}_s/N_{oc}	dB	9.90	-3.70
TreselectionEUTRAN	S	Ö	
Snonintrasearch	dB	Not sent	
Thresh _{serving, low}	dB	44	
Thresh _{x, low} (Note 2)	dB	24 n cells are fully allocated and a	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to Thresh_{x, low} which is included in E-UTRA system information, and is a threshold for GSM target cell.

Table 4.4.2.5-2: Cell Specific Test requirement Parameters for Cell 2 GSM cell

Parameter	Unit	Cell 2 (GSM)	
Farameter	Oilit	T1	T2
Absolute RF Channel Number		ARF	CN 1
RXLEV	dBm	-90.00	-75.00
RXLEV_ACCESS_MIN	dBm	-105	
MS_TXPWR_MAX_CCH	dBm	24	

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RR Channel Request message for location update to Cell 2.

The cell re-selection delay test requirement in this case is expressed as:

Cell re-selection delay = $4 * TmeasureGSM + T_{BCCH}$

TmeasureGSM = 6.4 s; as specified in TS 36.133 [4] Table 4.2.2.5.3-1 in clause 4.2.2.5.3

 $T_{BCCH} = 1.9$ s; the maximum time allowed to read the BCCH data, when being synchronized to a BCCH carrier as specified in TS 45.008 [15] clause 6.2

This gives a total of 25.6 s + T_{BCCH} , allow 26 s + T_{BCCH} in the test case.

The cell re-selection delay shall be less than a total of 27.9 seconds in this test case (note: this gives a total of 26 seconds for the $T_{measureGSM}$ calculation plus 1.9 s for T_{BCCH} but the test allows 27.9 seconds).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.5 E-UTRAN to HRPD Cell Re-Selection

4.5.1 E-UTRAN FDD - HRPD Cell re-selection

4.5.1.1 E-UTRAN FDD - HRPD Cell Reselection: HRPD is of Lower Priority

4.5.1.1.1 Test purpose

To verify that the UE is able to search and measure neighbouring HRPD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements.

4.5.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support HRPD.

4.5.1.1.3 Minimum conformance requirements

In order to perform measurement and cell reselection to HRPD cell, the UE shall acquire the timing of HRPD cells.

When the measurement rules indicate that HRPD cells are to be measured, the UE shall measure CDMA2000 HRPD Pilot Strength of HRPD cells in the neighbour cell list at the minimum measurement rate specified in this section.

The parameter 'Number of HRPD Neighbour Frequency', which is transmitted on E-UTRAN BCCH, is the number of carriers used for all HRPD cells in the neighbour cell list.

When the RSRP of the E-UTRA serving cell (or other cells on the same frequency layer) is lower than 'HRPD Start Measuring E-UTRAN Rx Power Strength Threshold' and HRPD is of lower priority than the currently selected E-UTRAN frequency layer, the UE shall measure CDMA2000 HRPD Pilot Strength of the HRPD cells at least every (Number of HRPD Neighbour Frequency)*T_{measureHRPD}. In case HRPD is of higher priority than the currently selected E-

UTRAN frequency layer the UE shall measure HRPD cells at least every (Number of HRPD Neighbour Frequency)* $T_{higher_priority_search}T_{higher_priority_search}T_{higher_priority_search}T_{higher_priority_measure}$ is defined in section 4.2.2 of TS 36.133 [4].

The UE shall be capable of evaluating that the HRPD cell has met cell reselection criterion defined in TS 36.304 [6] within $T_{\text{evaluateHRPD}}$.

Table 4.2.2.5.4-1 of TS 36.133 [4] clause 4.2.2.5.4 gives values of TmeasureHRPD and TevaluateHRPD

4.5.1.1.4 Test description

4.5.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] Clause 4.3.1.

- Connect the SS (nodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508[7] Annex A Figure A.22
- 2. The general test parameter settings are set up according to Table 4.5.1.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.5.1.1.4.3
- 5. There is one E-UTRA FDD cell and one HRPD cell specified in the test. Cell 1(E-UTRA FDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table4.5.1.1.4.1-1: General Test Parameters for E-UTRAN FDD - lower priority HRPD Cell Re-selection

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbour cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell is selecting during T2
DRX cycle length		S	1.28	
E-UTRA FDD RF	Channel Number		1	Only one FDD carrier frequency is used.
E-UTRA FDD Cha	nnel Bandwidth (BW _{channel})	MHz	10	
HRPD RF Channe	l Number		1	Only one HRPD carrier frequency is used.
E-UTRA FDD PRA	ACH configuration		4	As specified in table 5.7.1-2 in TS 36.211
E_UTRA FDD Acc	ess Barring Information	-	Not Sent	No additional delays in random access procedure.
T1		S	30	
T2		S	30	

4.5.1.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one HRPD cell. In the test there are two successive time periods, with time duration of T1 and T2 respectively.

Both E-UTRAN FDD cell 1 and HRPD cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell 2 is of lower priority than cell 1. Cell 1 and Cell 2 belong to different tracking areas.

In the following test procedure "UE responds" means "UE starts transmitting access probe preambles on the Access Channel".

1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.

- 2. Set the parameters according to T1 in Tables 4.5.1.1.5-1 and 4.5.1.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts
- 3. When T1 expires the SS shall switch the power setting from T1 to T2 as specified in Tables 4.5.1.1.5-1 and 4.5.1.1.5-2.
- 4. The SS waits for probe preambles on the Access Channel on cell 2 from the UE to perform cell re-selection on Cell 2.
- 5. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 6. After T2 expires, switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 7. Repeat steps 2-6 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.5.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and 4.4.7.1 with the following exceptions:

Table 4.5.1.1.4.3-1: Common Exception messages

Default Message Contents		
	Table H.2.3-11	
blocks exceptions	Table H.2.3-12	
Default RRC messages and information	Table H.3.2-1	
elements contents exceptions		

4.5.1.1.5 Test requirement

Tables 4.5.1.1.5-1 and 4.5.1.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD - HRPD cell re-selection test (HRPD cell is of lower priority).

Table 4.5.1.1.5-1: Cell Specific Test Parameters for E-UTRAN FDD (Cell # 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
BW _{channel}	MHz	10	
OCNG Patterns defined in D.1.2 (OP.2		OP.2 F	DD
FDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA ^{Note 1}	dB		
OCNG_RB ^{Note 1}	dB		

dBm/15 kHz	-9	9.1
dBm/15 KHz	-89.2 -102.8	
dB	9.9 -3.7	
dB	9.9	-3.7
S	0	
dB	Not sent	
-		1
dBm	-140	
dB	0	
dB	0	
dB	50.8 37.2	
dB	44	
	AWGN	
	dBm/15 KHz dB dB S dB - dBm dB dB dB dB dB dB dB	dBm/15 KHz -89.2 dB 9.9 dB 9.9 S 0.9 dB Not - 0.9 dB Not - 0.9 dB 0.0 dB

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 4.5.1.1.5-2: Cell Specific Test Parameters for HRPD (cell # 2)

Parameter	Unit	Се	II 2
		T1	T2
HRPD RF Channel Number		•	1
$\frac{\text{Control E}_{\text{b}}}{\text{N}_{\text{t}}} \text{(38.4 kbps)}$	dB	2	1
$\frac{\text{Control E}_{\text{b}}}{\text{N}_{\text{t}}} $ (76.8 kbps)	dB	1	8
\hat{I}_{or}/I_{oc}	dB	0	0
I_{oc}	dBm/ 1.2288 MHz	-5	55
CDMA2000 HRPD Pilot Strength	dB	-3	-3
Propagation Condition		AW	GN
S _{nonServingCell,x}		-6	
Treselection	S	0	
hrpd-CellReselectionPriority	-	0	
Thresh _{x, low}		-1	4

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateHRPD} + T_{SI\text{-}HRPD}$

Where:

T_{evaluatHRPD} 19.2 s for 1.28 s DRX cycle as specified in TS 36.133 [4] Clause 4.2.2.5 Table 4.2.2.5.4-1

 $T_{SI\text{-HRPD}}$ Maximum repetition period of relevant system information blocks that need to be received by

the UE to camp on cell 2; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for the lower priority cell reselection, allow 21 s in the test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.5.2 E-UTRAN TDD - HRPD Cell re-selection

4.5.2.1 E-UTRAN TDD - HRPD Cell Reselection: HRPD is of Lower Priority

4.5.2.1.1 Test purpose

To verify that the UE is able to search and measure neighbouring HRPD cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements.

4.5.2.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 9 and forward that support HRPD.

4.5.2.1.3 Minimum conformance requirements

In order to perform measurement and cell reselection to HRPD cell, the UE shall acquire the timing of HRPD cells.

When the measurement rules indicate that HRPD cells are to be measured, the UE shall measure CDMA2000 HRPD Pilot Strength of HRPD cells in the neighbour cell list at the minimum measurement rate specified in this section.

The parameter 'Number of HRPD Neighbour Frequency', which is transmitted on E-UTRAN BCCH, is the number of carriers used for all HRPD cells in the neighbour cell list.

When the RSRP of the E-UTRA serving cell (or other cells on the same frequency layer) is lower than 'HRPD Start Measuring E-UTRAN Rx Power Strength Threshold' and HRPD is of lower priority than the currently selected E-UTRAN frequency layer, the UE shall measure CDMA2000 HRPD Pilot Strength of the HRPD cells at least every (Number of HRPD Neighbour Frequency)*T_{measureHRPD}. In case HRPD is of higher priority than the currently selected E-UTRAN frequency layer the UE shall measure HRPD cells at least every (Number of HRPD Neighbour Frequency)*T_{higher_priority_search}T_{higher_priority_measure}. The parameter T_{higher_priority_search} T_{higher_priority_measure} is defined in section 4.2.2 of TS 36.133 [4].

The UE shall be capable of evaluating that the HRPD cell has met cell reselection criterion defined in TS 36.304 [6] within $T_{\text{evaluateHRPD}}$.

Table 4.2.2.5.4-1 of TS 36.133 [4] clause 4.2.2.5.4 gives values of $T_{measureHRPD}$ and $T_{evaluateHRPD}$

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.4 and A.4.5.2.1.

4.5.2.1.4 Test description

4.5.2.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] Clause 4.3.1.

- 1. Connect the SS (nodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508[7] Annex A Figure A.22
- 2. The general test parameter settings are set up according to Table 4.5.2.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.5.2.1.4.3
- 5. There is one E-UTRA TDD cell and one HRPD cell specified in the test. Cell 1(E-UTRA TDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.5.2.1.4.1-1: General Test Parameters for E-UTRAN TDD - lower priority HRPD Cell Reselection

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbour cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell is selecting during T2
Uplink-downlink co	onfiguration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe	configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
CP length of cell 1			Normal	
DRX cycle length		S	1.28	
E-UTRA TDD RF	Channel Number		1	Only one TDD carrier frequency is used.
E-UTRA TDD Cha	nnel Bandwidth (BW _{channel})	MHz	10	
HRPD RF Channe	el Number		1	Only one HRPD carrier frequency is used.
E-UTRA TDD PRA	ACH configuration of cell 1		53	As specified in table 4.7.1-3 in TS 36.211
E_UTRA TDD Acc	cess Barring Information	-	Not Sent	No additional delays in random access procedure.
T1		S	30	
T2	<u> </u>	S	30	

4.5.2.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one HRPD cell. In the test there are two successive time periods, with time duration of T1 and T2 respectively.

Both E-UTRAN TDD cell 1 and HRPD cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell2 is of lower priority than Cell 1. Cell 1 and Cell 2 belong to different tracking areas.

In the following test procedure "UE responds" means "UE starts transmitting access probe preambles on the Access Channel".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 2. Set the parameters according to T1 in Tables 4.5.2.1.5-1 and 4.5.2.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts
- 3. When T1 expires the SS shall switch the power setting from T1 to T2 as specified in Tables 4.5.2.1.5-1 and 4.5.1.1.5-2.
- 4. The SS waits for probe preambles on the Access Channel on cell 2 from the UE to perform cell re-selection on Cell 2.
- 5. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 6. After T2 expires, switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 7. Repeat steps 2-6 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.5.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and 4.4.7.1 with the following exceptions:

Table 4.5.2.1.4.3-1: Common Exception messages

Default Message Contents		
Common contents of system information	Table H.2.3-11	
blocks exceptions	Table H.2.3-12	
Default RRC messages and information	Table H.3.2-2	
elements contents exceptions		

4.5.2.1.5 Test requirement

Tables 4.5.2.1.5-1 and 4.5.2.1.5-2 define the primary level settings including test tolerances for E-UTRAN TDD - HRPD cell re-selection test (HRPD cell is of lower priority).

Table 4.5.2.1.1-2: Cell Specific Test Parameters for E-UTRAN TDD (Cell # 1)

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel number		1	
BW _{channel}	MHz	10	
OCNG Patterns defined in D.2.2 (OP.2		OP.2	TDD
TDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA ^{Note 1}	dB		
OCNG_RB ^{Note 1}	dB		
N_{oc}	dBm/15 kHz	-99.	.1
RSRP	dBm/15 KHz	-89.2	-102.8
\hat{E}_{s}/I_{ot}	dB	9.9	-3.7
\hat{E}_s/N_{oc}	dB	9.9	-3.7
Treselection _{EUTRAN}	S	0	
Snonintrasearch	dB	Not s	ent
cellReselectionPriority	-	1	
Qrxlevmin	dBm	-140	
Qrxlevminoffset	dB	0	
Pcompensation	dB	0	
SservingCell	dB	50.8	37.2
Thresh _{serving, low}	dB	44	
Propagation Condition		AWGN	
Note 1: OCNG shall be used such that	t both cells are ful	ly allocated and a consta	nt total transmitted

Parameter Unit Cell 2 T2 **T1** HRPD RF Channel Number Control E_b (38.4 kbps) dΒ 21 Control E_b (76.8 kbps) dB 18 dΒ \hat{I}_{or}/I_{oc} 0 0 dBm/ 1.2288 -55 MHz CDMA2000 HRPD Pilot Strength dΒ -3 -3 **Propagation Condition** AWGN SnonServingCell,x -6 Treselection 0 s hrpd-CellReselectionPriority 0 Thresh_{x, low} -14

Table 4.5.2.1.1-3: Cell Specific Test Parameters for HRPD (cell # 2)

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluateHRPD} + T_{SI-HRPD}$

Where:

T _{evaluat} HRPD	19.2 s for 1.28 s DRX cycle as specified in TS 36.133 [4] Clause 4.2.2.5 Table 4.2.2.5.4-1
$T_{SI\text{-HRPD}}$	Maximum repetition period of relevant system information blocks that need to be received by

the UE to camp on cell 2; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for the lower priority cell reselection, allow 21 s in the test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.6 E-UTRAN to cdma2000 1xRTT Cell Re-Selection

4.6.1 E-UTRAN FDD - cdma2000 1xRTT Cell re-selection

4.6.1.1 E-UTRAN FDD - cdma2000 1x Cell Reselection: cdma2000 1X is of Lower Priority

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The intra-frequency cell reselection criteria related to scaling of measurement rules parameters need to be specified when parameters are finalized
- The intra-frequency cell reselection criteria related to exact scaling parameters for different mobility states are undefined
- Measurement bandwidth (current assumption is 6RB) is undefined
- The "out of service" criteria is undefined
- The transmission scheme (1Tx or 2Tx) undefined
- The Message contents are undefined
- The Test system uncertainties applicable to this test are undefined
- Test tolerances have not yet been applied to the wanted and interfering signal levels

4.6.1.1.1 Test purpose

To verify that the UE is able to search and measure neighbouring cdma2000 1xRTT cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the cdma2000 1x is of lower priority.

4.6.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support cdma2000 1xRTT.

4.6.1.1.3 Minimum conformance requirements

In order to perform measurement and cell reselection to cdma2000 1X cell, the UE shall acquire the timing of cdma2000 1X cells.

When the measurement rules indicate that cdma2000 1X cells are to be measured, the UE shall measure cdma2000 1x RTT Pilot Strength of cdma2000 1X cells in the neighbour cell list at the minimum measurement rate specified in this section

The parameter 'Number of CDMA2000 1X Neighbour Frequency', which is transmitted on E-UTRAN BCCH, is the number of carriers used for all cdma2000 1X cells in the neighbour cell list.

When the RSRP of the E-UTRA serving cell (or other cells on the same frequency layer) is lower than 'CDMA2000 1X Start Measuring E-UTRAN Rx Power Strength Threshold' and cdma2000 1X is of lower priority than the currently selected E-UTRAN frequency layer, the UE shall measure Pilot Ec/Io of the CDMA2000 1X cells at least every (Number of CDMA2000 1X Neighbour Frequency)*T_{measureCDMA2000 1X}. In case cdma2000 1X is of higher priority than the currently selected E-UTRAN frequency layer, the UE shall measure cdma2000 1X cells at least every (Number of CDMA2000 1X Neighbour Frequency)* T_{higher_priority_search}T_{higher_priority_measure}. The parameter T_{higher_priority_search} T_{higher_priority_measure} is defined in section 4.2.2 of TS 36.133 [4].

The UE shall be capable of evaluating that the cdma2000 1X cell has met cell reselection criterion defined in TS 36.304 [6] within $T_{\text{evaluateCDMA2000 1X}}$.

Table 4.2.2.5.5-1 of TS 36.133 [4] clause 4.2.2.5.5 gives values of T_{measureCDMA2000 1X} and T_{evaluateCDMA2000 1X}.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.5 and A.4.6.1.1.

4.6.1.1.4 Test description

4.6.1.1.4.1 Initial conditions

Test Environment: Normal as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] Clause 4.3.1.

- Connect the SS (nodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508
 Annex A Figure A.22
- 2. The general test parameter settings are set up according to Table 4.6.1.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.6.1.1.4.3
- 5. There is one E-UTRA FDD cell and one CDMA2000 1xRTT cell specified in the test. Cell 1(E-UTRA FDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.6.1.1.4.1-1: General Test Parameters for E-UTRAN FDD - lower priority cdma2000 1X Cell Reselection

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbour cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell is selecting during T2
DRX cycle length		S	1.28	
E-UTRA FDD RF	Channel Number		1	Only one FDD carrier frequency is used.
E-UTRA FDD Cha	annel Bandwidth (BW _{channel})	MHz	10	
cdma2000 1X RF	Channel Number		1	Only one cdma2000 1X carrier frequency is used.
E-UTRA FDD PR	ACH configuration		4	As specified in table 5.7.1-2 in TS 36.211 [9]
E_UTRA FDD Ac	cess Barring Information	-	Not Sent	No additional delays in random access procedure.
T1		S	30	
T2		S	30	

4.6.1.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one CDMA200 1xRTT cell. In the test there are two successive time periods, with time duration of T1 and T2 respectively.

Both E-UTRAN FDD cell 1 and CDMA2000 1xRTT cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell2 is of lower priority than cell 1. Cell 1 and Cell 2 belong to different tracking areas.

In the following test procedure "UE responds" means "UE starts transmitting access probe preambles on the Access Channel".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 2. Set the parameters according to T1 in Tables 4.6.1.1.5-1 and 4.6.1.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Tables 4.6.1.1.5-1 and 4.6.1.1.5-2.
- 4. The SS waits for access probe preambles on the Access Channel on cell 2 from the UE to perform cell reselection on Cell 2.
- 5. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 6. After T2 expires, switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 7. Repeat steps 2-6 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.6.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.6.1.1.4.3-1: Common Exception messages

Default Message Contents		
Common contents of system information	Table H.2.3-15	
blocks exceptions	Table H.2.3-16	
Default RRC messages and information	Table H.3.2-1	
elements contents exceptions		

4.6.1.1.5 Test requirements

Tables 4.6.1.1.5-1 and 4.6.1.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD - cdma2000 1xRTT cell re-selection test (cdma2000 1x cell is of lower priority).

Table 4.6.1.1.5-1: Cell Specific Test Parameters for E-UTRAN FDD (Cell # 1)

E-UTRA RF Channel number		T1	TO		
E-UTRA RF Channel number		• •	T2		
		1			
BW _{channel}	MHz	1	0		
OCNG Patterns defined in D.1.2 (OP.2		OP.2	FDD		
FDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	C)		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB	7			
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				
$N_{_{OC}}^{}$ Note 2	dBm/15 kHz	-9	8		
RSRP Note 3	dBm/15 KHz	-89+ TT	-100+ TT		
\hat{E}_s/I_{ot}	dB	9+ TT	-2+ TT		
\hat{E}_s/N_{oc}	dB	9	-2		
Treselection _{EUTRAN}	S	C)		
Snonintrasearch	dB	Not :	sent		
cellReselectionPriority	-	1			
Qrxlevmin	dBm	-14	40		
Qrxlevminoffset	dB	()		
Pcompensation	dB	()		
SservingCell	dB	51	40		
Thresh _{serving, low}	dB	4	3		
Propagation Condition		AW	GN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $\,N_{oc}\,$ to be fulfilled.

Unit Cell 2 Parameter T1 T2 cdma2000 1X RF Channel Number Pilot E_c dB [-7] I_{or} Sync E_c dB [-16] I_{or} Paging E_c (4.8 kbps) dΒ [-12] I_{or} \hat{I}_{or}/I_{oc} dB [0] + TT[0] + TTdBm/ 1.2288 -55 MHz CDMA2000 1xRTT Pilot Strength dΒ [-10] + TT [-10] + TT **Propagation Condition** AWGN [-20]SnonServingCell,x Treselection S 0 oneXRTT-CellReselectionPriority 0 [-28] Thresh_{x, low}

Table 4.6.1.1.5-2: Cell Specific Test Parameters for cdma2000 1X (cell # 2)

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluatecdma2000~1X} + T_{SI-cdma2000~1X}$

Where:

 $T_{evaluatcdma2000 \ 1X}$ = 19.2 s for 1.28 s DRX cycle as specified in TS 36.133 [4] Clause 4.2.2.5 Table 4.2.2.5.5-1

T_{SI-cdma2000 1X} Maximum repetition period of relevant system information blocks that need to be received by the UE to camp on cell 2; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for the lower priority cell reselection, allow 21 s in the test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.6.2 E-UTRAN TDD - cdma2000 1xRTT Cell re-selection

4.6.2.1 E-UTRAN TDD - cdma2000 1x Cell Reselection: cdma2000 1X is of Lower Priority

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- Test tolerances have not yet been applied to the wanted and interfering signal levels

4.6.2.1.1 Test purpose

To verify that the UE is able to search and measure neighbouring cdma2000 1xRTT cells and compare to the E-UTRA serving cell to meet the inter-RAT cell re-selection requirements when the cdma2000 1x is of lower priority.

4.6.2.1.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 9 and forward that support cdma2000 1xRTT.

4.6.2.1.3 Minimum conformance requirements

In order to perform measurement and cell reselection to cdma2000 1X cell, the UE shall acquire the timing of cdma2000 1X cells.

When the measurement rules indicate that cdma2000 1X cells are to be measured, the UE shall measure cdma2000 1x RTT Pilot Strength of cdma2000 1X cells in the neighbour cell list at the minimum measurement rate specified in this section.

The parameter 'Number of CDMA2000 1X Neighbour Frequency', which is transmitted on E-UTRAN BCCH, is the number of carriers used for all cdma2000 1X cells in the neighbour cell list.

When the RSRP of the E-UTRA serving cell (or other cells on the same frequency layer) is lower than 'CDMA2000 1X Start Measuring E-UTRAN Rx Power Strength Threshold' and cdma2000 1X is of lower priority than the currently selected E-UTRAN frequency layer, the UE shall measure Pilot Ec/Io of the CDMA2000 1X cells at least every (Number of CDMA2000 1X Neighbour Frequency)* $T_{\text{measureCDMA2000 1X}}$. In case cdma2000 1X is of higher priority than the currently selected E-UTRAN frequency layer, the UE shall measure cdma2000 1X cells at least every (Number of CDMA2000 1X Neighbour Frequency)* $T_{\text{higher_proirity_measure}}$. The parameter $T_{\text{higher_proirity_search}}$ $T_{\text{higher_priority_measure}}$ is defined in section 4.2.2 of TS 36.133 [4].

The UE shall be capable of evaluating that the cdma2000 1X cell has met cell reselection criterion defined in TS 36.304 [6] within $T_{\text{evaluateCDMA2000 1X}}$.

Table 4.2.2.5.5-1 of TS 36.133 [4] clause 4.2.2.5.5 gives values of $T_{measureCDMA2000~1X}$ and $T_{evaluateCDMA2000~1X}$.

The normative reference for this requirement is TS 36.133 [4] clause 4.2.2.5.5 and A.4.6.2.1.

4.6.2.1.4 Test description

4.6.2.1.4.1 Initial conditions

Test Environment: Normal as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] Clause 4.3.1.

- 1. Connect the SS (nodeB emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.22
- 2. The general test parameter settings are set up according to Table 4.6.2.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 4.6.2.1.4.3.
- 5. There is one E-UTRA TDD cell and one CDMA2000 1xRTT cell specified in the test. Cell 1(E-UTRA TDD cell) is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 4.6.2.1.4.1-1: General Test Parameters for E-UTRAN TDD - lower priority cdma2000 1X Cell Reselection

	Parameter	Unit	Value	Comment
Initial condition	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbour cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell is selecting during T2
DRX cycle length		S	1.28	
E-UTRA TDD RF Channel Number			1	Only one TDD carrier frequency is used.
E-UTRA TDD Cha	nnel Bandwidth (BW _{channel})	MHz	10	
cdma2000 1X RF Channel Number			1	Only one cdma2000 1X carrier frequency is used.
E-UTRA TDD PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211
Uplink-downlink configuration of cell 1			1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211
E_UTRA TDD Access Barring Information		-	Not Sent	No additional delays in random access procedure.
T1		S	30	
T2		S	30	

4.6.2.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one CDMA200 1xRTT cell. In the test there are two successive time periods, with time duration of T1 and T2 respectively.

Both E-UTRAN TDD cell 1 and CDMA2000 1xRTT cell 2 are already identified by the UE prior to the start of the test. At T1 the UE is camped on to cell 1. Cell2 is of lower priority than cell 1. Cell 1 and Cell 2 belong to different tracking areas.

In the following test procedure "UE responds" means "UE starts transmitting access probe preambles on the Access Channel".

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 2. Set the parameters according to T1 in Tables 4.6.2.1.5-1 and 4.6.2.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Tables 4.6.2.1.5-1 and 4.6.2.1.5-2.
- 4. The SS waits for access probe preambles on the Access Channel on cell 2 from the UE to perform cell reselection on Cell 2.
- 5. If the UE responds on Cell 2 during time duration T2 within 21 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 6. After T2 expires, switch off and on the UE and ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2 in Cell 1.
- 7. Repeat steps 2-6 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

4.6.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 4.6.2.1.4.3-1: Common Exception messages

Default Message Contents						
Common contents of system information	Table H.2.3-15					
blocks exceptions	Table H.2.3-16					
Default RRC messages and information	Table H.3.2-2					
elements contents exceptions						

4.6.2.1.5 Test requirements

Tables 4.6.2.1.5-1 and 4.6.2.1.5-2 define the primary level settings including test tolerances for E-UTRAN TDD - cdma2000 1xRTT cell re-selection test (cdma2000 1x cell is of lower priority).

Table 4.6.2.1.5-1: Cell Specific Test Parameters for E-UTRAN TDD (Cell # 1)

Parameter	Unit	Cel	l 1		
		T1	T2		
E-UTRA RF Channel number		1			
BW _{channel}	MHz	10			
OCNG Patterns defined in D.2.2 (OP.2		OP.2	TDD		
TDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG RA ^{Note 1}	dB	7			
OCNG_RB ^{Note 1}	dB				
$N_{oc}^{$	dBm/15 kHz	-9	8		
RSRP Note 3	dBm/15 KHz	-89+TT	-102+TT		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	9+TT	-4+TT		
\hat{E}_s/N_{oc}	dB	9	-4		
Treselection _{EUTRAN}	S	0			
Snonintrasearch	dB	Not s	sent		
cellReselectionPriority	-	1			
Qrxlevmin	dBm	-14	10		
Qrxlevminoffset	dB	0			
Pcompensation	dB	0			
S _{ServingCell}	dB	51	38		
Thresh _{serving, low}	dB	44			
Propagation Condition		AWGN			

Note 1: CNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Parameter Unit Cell 2 T1 T2 cdma2000 1X RF Channel Number Pilot E_c dB [-7] I_{or} Sync E_c dB [-16] I_{or} Paging E_c (4.8 kbps) dΒ [-12] I_{or} \hat{I}_{or}/I_{oc} dB [0] + TT[0] + TTdBm/ 1.2288 -55 MHz CDMA2000 1xRTT Pilot Strength [-10] + TT [-10] + TT dΒ **Propagation Condition** AWGN $S_{nonServingCell,x}$ [-20] Treselection S 0 oneXRTT-CellReselectionPriority 0 [-28] Thresh_{x, low}

Table 4.6.2.1.5-2: Cell Specific Test Parameters for cdma2000 1X (cell # 2)

The cell reselection delay to lower priority is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2 and starts to send access probe preambles on the Access Channel on cell 2.

The cell re-selection delay to the lower priority cell 2 shall be less than 21 s.

The cell re-selection delay to lower priority cell can be expressed as: $T_{evaluatecdma2000~1X} + T_{SI-cdma2000~1X}$

Where:

 $T_{evaluatcdma2000 \ 1X}$ = 19.2 s for 1.28 s DRX cycle as specified in TS 36.133 [4] Clause 4.2.2.5 Table 4.2.2.5.5-1

T_{SI-cdma2000 1X} Maximum repetition period of relevant system information blocks that need to be received by

the UE to camp on cell 2; 1280 ms is assumed in this test case.

This gives a total of 20.48 s for the lower priority cell reselection, allow 21 s in the test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5 E-UTRAN RRC_CONNECTED State Mobility

When the UE is in RRC_CONNECTED state on a cell, network-controlled UE-assisted handovers are performed. The UE makes measurements of attributes of the serving and neighbour cells to enable the handover process. This process allows the UE to transfer a connection between the UE and current cell to target cell.

SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to Annex A1. The SS sends downlink MAC padding bits on the DL RMC.

Due to the undefined UE behaviour regarding the sending of HARQ-ACK after receiving a RRC message triggering an handover (acc. 3GPP TS 36.331 [5] Subclause 5.3.5.4), the SS behaviour when waiting for the appropriate HARQ acknowledgement should be as follows:

- Reception of an HARQ-ACK will cause no HARQ delay exclusion (acc. subclause 3A.1).
- Reception of an HARQ-NACK will cause HARQ retransmission and HARQ delay exclusion (acc. subclause 3A.1).
- UE-DTX (as observed by SS) will cause HARQ retransmission, but no HARQ delay exclusion (acc. subclause 3A.1).

Uplink for E-UTRA cell(s) is configured according to Annex A.3.

5.1 E-UTRAN Handover

5.1.1 E-UTRAN FDD-FDD Handover intra frequency case

5.1.1.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an intra-frequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

5.1.1.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receive a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

D_{handover} equals the maximum RRC procedure delay defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.1.2.1.2.

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When intra-frequency handover is commanded, the interruption time shall be less than T_{interrupt}. The T_{interrupt} equation is defined as:

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where:

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{search} = 0$ ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then $T_{search} = 80$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is know if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in TS 36.133 [4] clause 8.1.2.2.1 for intra-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.1.2.1 and A.5.1.1

5.1.1.4 Test description

5.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.20.
- 2. The general test parameter settings are set up according to Table 5.1.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.1.1.4.3.
- 5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.1.4.1-1: General Test Parameters for E-UTRAN FDD-FDD intra frequency handover test case

i	Parameter	Unit	Value	Comment
PDSCH par	PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in clause A.1.1
PCFICH/PD	CCH/PHICH		DL Reference Measurement	As specified in clause A.2.1
parameters			Channel R.6 FDD	
Initial	Active cell		Cell 1	
conditions	Neighbouring cell		Cell 2	
Final	Active cell		Cell 2	
condition				
E-UTRA RF	Channel Number		1	Only one FDD carrier frequency is used.
Channel Ba	ndwidth (BW _{channel})	MHz	10	
A3-Offset		dB	0	
Hysteresis		dB	0	
Time To Tri	gger	ms	0	
Filter coeffic	cient		0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barr	ring Information	-	Not Sent	No additional delays in random access procedure.
PRACH cor	nfiguration		4	As specified in table 5.7.1-2 in TS 36.211[9]
Time offset	between cells	ms	3	Asynchronous cells 3ms or 92160*Ts
T1		S	5	
T2		S	≤5	
T3		S	1	

5.1.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. T3 is defined as the end of the last TTI containing the RRC message implying handover.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 5.1.1.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.1.1.5-1.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3.

- 7. SS shall transmit an RRCConnectionReconfiguration message defined in Table H.3.2-3 implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC Connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power setting from T2 to T3 as specified in Table 5.1.1.1.5-1.
- $9. \ \ The \ UE \ shall \ transmit \ RRCConnection Reconfiguration Complete \ message.$
- 10. If the UE transmits the uplink PRACH channel to Cell 2 less than 50 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 11. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 13. Repeat step 2-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.1.1.4.3-1: Common Exception messages for E-UTRAN FDD-FDD intra frequency handover test requirement

Default Message Contents					
Common contents of system information					
blocks exceptions					
Default RRC messages and information	Table H.3.1-1				
elements contents exceptions	Table H.3.1-2				
·	Table H.3.1-7				
	Table H.3.2-1				
	Table H.3.2-3				

Table 5.1.1.4.3-2: ReportConfigEUTRA-A3: Additional E-UTRAN FDD-FDD intra frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3					
Information Element	Value/remark	Comment	Condition		
ReportConfigEUTRA-A3 ::= SEQUENCE {					
triggerType CHOICE {					
event SEQUENCE {					
eventId CHOICE {					
eventA3 SEQUENCE {					
a3-Offset	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)			
reportOnLeave	FALSE				
}					
}					
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)			
timeToTrigger	0 (0 ms)				
}					
}					

Table 5.1.1.4.3-3: MeasResults: Additional E-UTRAN FDD-FDD intra frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCellsCHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
}			
}			

Table 5.1.1.4.3-4: MeasResultListEUTRA: Additional E-UTRAN FDD-FDD intra frequency handover test requirement

Information Element	Value/remark	Comment	Condition
MeasResultListEUTRA::= SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId		
measResult SEQUENCE {			
rsrpResult		Set according to specific test INTEGER(097)	
rsrqResult		Set according to specific test INTEGER(034)	

Table 5.1.1.4.3-5: RACH-ConfigCommon-DEFAULT: Additional E-UTRAN FDD-FDD intra frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT							
Information Element	Value/remark	Comment	Condition				
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {							
powerRampingParameters SEQUENCE {							
preambleInitialReceivedTargetPower	dBm-90						
}							
}							

5.1.1.5 Test requirement

Tables 5.1.1.4.1-1 and 5.1.1.5-1 define the primary level settings including test tolerances for E-UTRAN FDD-FDD intra frequency handover test case.

Table 5.1.1.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD intra frequency handover test case

Parameter	Unit		Cell 1			Cell 2		
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1		1			
Number								
BW _{channel}	MHz		10			10		
OCNG Patterns defined		OP.1 FDD	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD	
in D.1.1 (OP.1 FDD)								
and in D.1.2 (OP.2								
FDD)								
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB		0			0		
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA ^{Note 1}	dB							
OCNG_RB ^{Note 1}	dB							
$\hat{E}_{\scriptscriptstyle{\mathrm{s}}}/I_{\scriptscriptstyle{\mathrm{ot}}}$	dB	8	-3.8	-3.8	-Infinity	2.86	2.86	
N_{oc} Note 2	dBm/15 KHz	-98						
\hat{E}_s/N_{oc}	dB	8	8	8	- Infinity	11.5	11.5	
RSRP Note 3	dBm/15 KHz	-90	-90	-90	- Infinity	-86.5	-86.5	
Propagation Condition			•	P	WGN		•	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{ac} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the PRACH to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

Handover delay D_{handover} = maximum RRC procedure delay + T_{interrupt}

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

 $T_{\text{search}} = 0$, since Cell 2 is known prior to the test

 T_{IU} = 15 ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

Maximum RRC procedure delay = 15 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 50 ms in this test case (note: this gives a total of 15 ms for maximum RRC procedure delay plus 35 ms for $T_{interrunt}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.2 E-UTRAN TDD-TDD Handover intra frequency case

5.1.2.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an intra-frequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

5.1.2.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying handover, the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

 $D_{handover}$ equals the maximum RRC procedure delay defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.2.2.4.2.

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When intra-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$. The $T_{interrupt}$ equation is defined as:

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where:

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{search} = 0$ ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then $T_{search} = 80$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in new cell. T_{IU} can be up to 30ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is know if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in TS 36.133 [4] clause 8.1.2.2.2 for intra-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.2.2.4 and A.5.1.2.

5.1.2.4 Test description

5.1.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.20.
- 2. The general test parameter settings are set up according to Table 5.1.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.1.2.4.3.
- 5. There is one E-UTRA TDD carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.2.4.1-1: General Test Parameters for E-UTRAN TDD/TDD Intra Frequency Handover case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in Annex A.1.2
PCFICH/PDCCHP	PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in Annex A.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chani	nel Number		1	Only one TDD carrier frequency is used.
Channel Bandwidt	h (BW _{channel})	MHz	10	
A3-Offset	, , , , , , , , , , , , , , , , , , , ,	dB	0	
Hysteresis		dB	0	
Time To Trigger		ms	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
CP length			Normal	
Access Barring Inf	ormation	-	Not Sent	No additional delays in random access procedure.
Special subframe	configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink co	onfiguration		1	As specified in table 4.2-2 in TS 36.211
PRACH configurat	ion index		53	As specified in table 5.7.1-3 in TS 36.211
Time offset between	en cells	μS	3	Synchronous cells
				3μs or 92*Ts
T1		S	5	
T2		S	≤5	
T3		S	1	

5.1.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. The start of T3 is defined as the end of the last TTI containing the RRC message implying handover.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 5.1.2.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.1.2.5-1.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3.

- 7. SS shall transmit an RRCConnectionReconfiguration message defined in Table H.3.2-3 implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC Connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.1.2.1.5-1.
- 9. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 10. If the UE transmits the uplink PRACH channel to Cell 2 less than 50ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 11. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 13. Repeat step 2-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.1.2.4.3-1: Common Exception messages for E-UTRAN TDD-TDD intra frequency handover test requirement

Default Message Contents			
Common contents of system information			
blocks exceptions			
Default RRC messages and information	Table H.3.1-1		
elements contents exceptions	Table H.3.1-2		
·	Table H.3.1-7		
	Table H.3.2-2		
	Table H.3.2-3		

Table 5.1.2.4.3-2: ReportConfigEUTRA-A3: Additional E-UTRAN TDD-TDD intra frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	Value/remark	Comment	Condition
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 5.1.2.4.3-3: MeasResults: Additional E-UTRAN TDD-TDD intra frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResults::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
}			
}			

Table 5.1.2.4.3-4: MeasResultListEUTRA: Additional E-UTRAN TDD-TDD intra frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResultListEUTRA::= SEQUENCE (SIZE (1maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId of the Cell 2		
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
}			

Table 5.1.2.4.3-5: RACH-ConfigCommon-DEFAULT: Additional E-UTRAN TDD-TDD intra frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT				
Information Element	Value/remark	Comment	Condition	
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {				
powerRampingParameters SEQUENCE {				
preambleInitialReceivedTargetPower	dBm-98			
}				

5.1.2.5 Test requirement

Tables 5.1.2.4.1-1 and 5.1.2.5-1 define the primary level settings including test tolerances for E-UTRAN TDD/TDD Intra Frequency Handover test.

Table 5.1.2.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD/TDD Intra Frequency Handover case

Parameter	Unit		Cell 1			Cell 2	
		T1	T2	Т3	T1	T2	T3
E-UTRA RF Channel			1			1	
Number							
BW _{channel}	MHz		10			10	
OCNG Patterns defined		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
in D.2.1 (OP.1 TDD)							
and in D.2.2 (OP.2							
TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0			0	
PDCCH_RA	dB	_					
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note}	dB						
OCNG_RB ^{Note}	dB						
\hat{E}_{s}/I_{ot}	dB	8	-3.8	-3.8	-Infinity	2.86	2.86
N_{oc}	dBm/15 KHz				-98		
\hat{E}_s/N_{oc}	dB	8	8	8	- Infinity	11.5	11.5
RSRP	dBm/15 KHz	-90	-90	-90	- Infinity	-86.5	-86.5
Propagation Condition		AWGN					
Note: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.				spectral			

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the PRACH to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

 $Handover\ delay\ D_{handover} = maximum\ RRC\ procedure\ delay\ +\ T^{interrupt}$

The maximum RRC procedure delay test requirement in this case is 15ms, as specified in TS 36.331 [5] clause 11.2.

The $T_{interrupt}$ test requirement in this case is 35 ms expressed as:

$$T_{interrupt} \equiv T_{search} + T_{IU} + 20 \ ms$$

 $T_{\text{search}} = 0$, since cell 2 is known prior to the test

 T_{IU} = 15 ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

The handover delay $D_{handover}$ shall be less than a total of 50 ms in this test case (note: this gives a total of 15 ms for maximum RRC procedure delay plus 35 ms for $T_{interrupt}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.3 E-UTRAN FDD-FDD Handover inter frequency case

5.1.3.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an inter-frequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward. Applicability requires support for FGI bits 5, 13, and 25.

5.1.3.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receive a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

 $D_{handover}$ equals the maximum RRC procedure delay defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.1.2.1.2.

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When inter-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$. The $T_{interrupt}$ equation is defined as:

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where:

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{search} = 0$ ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then $T_{search} = 80$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is know if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in TS 36.133 [4] clause 8.1.2.3.1 for inter-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.1.2.1 and A.5.2.1.

5.1.3.4 Test description

5.1.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 5.1.3.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.1.3.4.3.
- 5. There are two E-UTRA FDD carriers and one cell on each carrier specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.3.4.1-1: General Test Parameters for E-UTRAN FDD-FDD inter frequency handover test case

ı	Parameter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in clause A.1.1
PCFICH/PD	CCH/PHICH		DL Reference Measurement	As specified in clause A.2.1
parameters			Channel R.6 FDD	
Initial	Active cell		Cell 1	Cell 1 is on RF channel number 1
conditions	Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF	channel number		1, 2	Two FDD carriers are used
Channel Ba	ndwidth (BW _{channel})	MHz	10	
A3-Offset		dB	-4	
Hysteresis		dB	0	
TimeToTrig		Ms	0	
Filter coeffic	cient		0	L3 filtering is not used
DRX			DRX_L	As specified in Table 5.1.3.5-2
PRACH cor	figuration		4	As specified in table 5.7.1-2 in 3GPP TS 36.211 [9]
Access Bar	ring Information	-	Not sent	No additional delays in random access procedure
Time offset	between cells	3	ms	Asynchronous cells 3ms or 92160*Ts
Gap pattern	configuration Id		0	As specified in Table 8.1.2.1-1 in 3GPP TS 36.133 [4] started before T2 starts
T1		S	5	
T2		S	≤5	
T3		S	1	

5.1.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. T3 is defined as the end of the last TTI containing the RRC message implying handover.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 5.1.3.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.1.3.5-1.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3.

- 7. SS shall transmit an RRCConnectionReconfiguration message defined in Table H.3.2-3 implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.1.3.5-1.
- 9. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 10. If the UE transmits the uplink PRACH channel to Cell 2 less than 50 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 11. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 13. Repeat step 2-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.3.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 5.1.3.4.3-1: Common Exception messages for E-UTRAN FDD-FDD inter-frequency handover test requirement

e H.3.1-1 le H.3.1-3 le H.3.1-7 e H.3.2-1 e H.3.2-3 le H.3.6-2

Table 5.1.3.4.3-2: ReportConfigEUTRA-A3: Additional E-UTRAN FDD-FDD inter frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3			
Information Element	Value/remark	Comment	Condition
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-8 (-4 dB)	-4 is actual value in dB (-8 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 5.1.3.4.3-3: *MeasResults*: Additional E-UTRAN FDD-FDD inter frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResults ::= SEQUENCE {			
measld	1	Identifies the measurement id for the reporting being performed	
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
}			
}			

Table 5.1.3.4.3-4: MeasResultListEUTRA: Additional E-UTRAN FDD-FDD inter frequency handover test requirement

Information Element	Value/remark	Comment	Condition
MeasResultListEUTRA::= SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId		
measResult SEQUENCE {			
rsrpResult		Set according to	
		specific test	
rsrqResult		Set according to	
		specific test	
}			
}			

Table 5.1.3.4.3-5: RACH-ConfigCommon-DEFAULT: Additional E-UTRAN FDD-FDD inter frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT				
Information Element	Value/remark	Comment	Condition	
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {				
powerRampingParameters SEQUENCE {				
preambleInitialReceivedTargetPower	dBm-90			
}				
}				

5.1.3.5 Test requirement

Tables 5.1.3.4.1-1, 5.1.3.5-1, and 5.1.3.5-2 define the primary level settings including test tolerances for E-UTRAN FDD-FDD inter frequency handover test case.

Table 5.1.3.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD inter frequency handover test case

Parameter	Unit	Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1			2	
number							
BW _{channel}	MHz		10			10	
OCNG Patterns defined		OP.1	OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
in D.1.1 (OP.1 FDD)		FDD					
and in D.1.2 (OP.2							
FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB	1					
PHICH_RB	dB	1	0			0	
PDCCH_RA	dB	1					
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note 1}	dB						
OCNG_RB ^{Note 1}	dB						
\hat{E}_s/I_{ot}	dB	4	4	4	-Infinity	7.10	7.10
Noc Note 2	dBm/15 kHz			·	-98		
\hat{E}_s/N_{oc}	dB	4	4	4	-Infinity	7.10	7.10
RSRP Note 3	dBm/15 KHz	-94	-94	-94	-Infinity	-90.9	-90.9
Propagation Condition		AWGN					
Note 1: OCNG shall be	used such that b	oth cells are	e fully allocate	d and a cons	tant total trans	mitted power:	spectral

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 5.1.3.5-2: Reference DRX-Configuration to be used in E-UTRAN FDD-FDD inter frequency handover test case

Parameter	Value	Comments				
Reference configuration	DRX_L	As defined in 4.8.2.1.5 in TS 36.508 [7.]				
onDurationTimer	psf6					
drx-InactivityTimer	psf1920					
drx-RetransmissionTimer	psf16					
longDRX-CycleStartOffset	sf1280, 0					
shortDRX	disabled					
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].						

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the PRACH to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

 $Handover\ delay\ D_{handover} = maximum\ RRC\ procedure\ delay\ +\ T_{\mbox{interrupt}}$

 $T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$

 $T_{search} = 0$, since Cell 2 is known prior to the test

 $T_{\rm IU}$ = 15 ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

Maximum RRC procedure delay = 15 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 50 ms in this test case (note: this gives a total of 15 ms for maximum RRC procedure delay plus 35 ms for $T_{interrupt}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.4 E-UTRAN TDD-TDD Handover inter frequency case

5.1.4.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an inter-frequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward. Applicability requires support for FGI bits 5, 13, and 25.

5.1.4.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state

When the UE receives a RRC message implying handover, the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

D_{handover} equals the maximum RRC procedure delay defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.2.2.4.2.

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When inter-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$. The $T_{interrupt}$ equation is defined as:

$$T_{interrupt} = T_{search} + T_{IU} + 20 \ ms$$

Where:

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{search} = 0$ ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then $T_{search} = 80$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in new cell. T_{IU} can be up to 30ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

The normative reference for this requirement is TS 36.133 [4] clause 5.2.2.4 and A.5.1.4

5.1.4.4 Test description

5.1.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 5.1.4.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.1.4.4.3.
- 5. There are two E-UTRA TDD carriers and one cell on each carrier specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.4.4.1-1: General Test Parameters for E-UTRAN TDD-TDD inter frequency handover test case

Parameter		Unit	Value	Comment	
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in clause A.1.2	
PCFICH/PD	CCH/PHICH		DL Reference Measurement	As specified in clause A.2.2	
parameters			Channel R.6 TDD		
Initial	Initial Active cell		Cell 1	Cell 1 is on RF channel number 1	
	Neighbour cell		Cell 2	Cell 2 is on RF channel number 2	
Final condition	Active cell		Cell 2		
E-UTRA RF	channel number		1, 2	Two TDD carriers are used	
Channel Ba	ndwidth (BW _{channel})	MHz	10		
A3-Offset		dB	-4		
Hysteresis		dB	0		
TimeToTrig		Ms	0		
Filter coeffic	eient		0	L3 filtering is not used	
DRX			DRX_L	As specified in Table 5.1.4.5-2	
CP length			Normal		
PRACH configuration			53	As specified in table 5.7.1-3 in TS 36.211	
Access Barring Information		-	Not sent	No additional delays in random access procedure	
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211	
Uplink-dowr	nlink configuration		1	As specified in table 4.2-2 in TS 36.211	
Time offset between cells		μS	3	Synchronous cells 3µs or 92*Ts	
Gap pattern configuration Id			1	As specified in Table 8.1.2.1-1 in 3GPP TS 36.133 [4] started before T2 starts	
T1		s	5		
T2		S	≤5		
T3		S	1		

Table 5.1.4.4.1-2: Void

5.1.4.4.2 Test procedure

The test consists of one active cell and one neighbour cell. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods,

with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. The start of T3 is defined as the end of the last TTI containing the RRC message implying handover.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 5.1.4.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.1.4.5-1.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3.
- 7. SS shall transmit an RRCConnectionReconfiguration message defined in Table H.3.2-3 implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.1.4.5-1.
- 9. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 10. If the UE transmits the uplink PRACH channel to Cell 2 less than 50 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 11. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 13. Repeat step 2-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.1.4.4.3-1: Common Exception messages for E-UTRAN TDD-TDD inter-frequency handover test requirement

Default Message Contents				
Common contents of system information blocks exceptions				
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-3 Table H.3.1-7 Table H.3.2-2 Table H.3.2-3 Table H.3.6-2			

Table 5.1.4.4.3-2: ReportConfigEUTRA-A3: Additional E-UTRAN TDD-TDD inter frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table	4.6.6-6 ReportConfigEUTR	A-A3	
Information Element	Value/remark	Comment	Condition
ReportConfigEUTRA-A3 ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset	-8 (-4 dB)	-4 is actual value in dB (-8 * 0.5 dB)	
reportOnLeave	FALSE		
}			
}			
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)	
timeToTrigger	0 (0 ms)		
}			
}			

Table 5.1.4.4.3-3: *MeasResults*: Additional E-UTRAN TDD-TDD inter frequency handover test requirement

Information Element	Value/remark	Comment	Condition
MeasResults::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
}			

Table 5.1.4.4.3-4: MeasResultListEUTRA: Additional E-UTRAN TDD-TDD inter frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResultListEUTRA::= SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId of the Cell 2		
measResult SEQUENCE {			
rsrpResult		Set according to	
		specific test	
rsrqResult		Set according to	
		specific test	
}			
}			

Table 5.1.4.4.3-5: RACH-ConfigCommon-DEFAULT: Additional E-UTRAN TDD-TDD inter frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT						
Information Element	Value/remark	Comment	Condition			
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {						
powerRampingParameters SEQUENCE {						
preambleInitialReceivedTargetPower	dBm-98					
}						
}						

5.1.4.5 Test requirement

Tables 5.1.4.4.1-1 and 5.1.4.5-1 define the primary level settings including test tolerances for E-UTRAN TDD/TDD Inter Frequency Handover test.

Table 5.1.4.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD/TDD Inter Frequency Handover case

Parameter	Unit	Cell 1		Cell 2			
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1	•		2	
Number							
BW _{channel}	MHz		10			10	
OCNG Patterns defined		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
in TS 36.133 [4] D.2.1							
(OP.1 TDD) and in							
D.2.2 (OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0			0	
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note}	dB						
OCNG_RB ^{Note}	dB						
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4	4	-Infinity	7.10	7.10
N_{oc}	dBm/15 KHz				-98	·	
\hat{E}_s/N_{oc}	dB	4	4	4	-Infinity	7.10	7.10
RSRP	dBm/15 KHz	-94	-94	-94	- Infinity	-90.9	-90.9
Propagation Condition		AWGN					
	used such that	both cells ar	ooth cells are fully allocated and a constant total transmitted power spectral				

Note: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 5.1.4.5-2: Reference DRX-Configuration to be used in E-UTRAN TDD-TDD inter frequency handover test case

Parameter	Value	Comments		
Reference configuration	DRX_L	As defined in 4.8.2.1.5 in TS 36.508 [7.]		
onDurationTimer	psf6			
drx-InactivityTimer	psf1920			
drx-RetransmissionTimer	psf16			
longDRX-CycleStartOffset	sf1280, 0			
shortDRX	disabled			
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].				

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the PRACH to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

Handover delay $D_{bandover} = maximum RRC$ procedure delay + $T_{interrupt}$

The maximum RRC procedure delay test requirement in this case is 15ms, as specified in TS 36.331 [5] clause 11.2.

The T_{interrupt} test requirement in this case is 35 ms expressed as:

$$T_{interrupt} \equiv T_{search} + T_{IU} + 20 \text{ ms}$$

 $T_{\text{search}} = 0$, since cell 2 is known prior to the test

 T_{IU} = 15 ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

The handover delay $D_{handover}$ shall be less than a total of 50 ms in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.5 E-UTRAN FDD-FDD inter frequency Handover: unknown target cell

5.1.5.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an inter-frequency handover: unknown target cell is commanded by meeting the handover to an unknown target cell delay requirements.

5.1.5.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward. Applicability requires support for FGI bits 13, and 25.

5.1.5.3 Minimum conformance requirements

Procedure delays for all procedures that can command a handover are specified in TS 36.331 [5].

When the UE receive a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

 $D_{handover}$ equals the maximum RRC procedure delay defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.1.2.1.2.

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When inter-frequency handover is commanded, the interruption time shall be less than $T_{interrupt}$. The $T_{interrupt}$ equation is defined as:

$$T_{interrupt} = T_{search} + T_{IU} + 20 \ ms$$

Where:

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{search} = 0$ ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then $T_{search} = 80$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in TS 36.133 [4] clause 8.1.2.3.1 for inter-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.1.2.1 and A.5.1.5.

5.1.5.4 Test description

5.1.5.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 5.1.5.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.1.5.4.3.
- 5. There are two E-UTRA FDD carriers and one cell on each carrier specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.5.4.1-1: General Test Parameters for E-UTRAN FDD-FDD inter frequency handover: unknown target cell test case

Para	ameter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement	As specified in section A.1.1
			Channel R.0 FDD	
PCFICH/PDCCH/P	HICH parameters		DL Reference Measurement	As specified in section A.2.1
			Channel R.6 FDD	
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
E-UTRA RF chann	el number		1, 2	Two FDD carriers are used
Channel Bandwidth	n (BW _{channel})	MHz	10	
DRX			OFF	Non-DRX test
PRACH configurati	on		4	As specified in table 5.7.1-2 in
G				3GPP TS 36.211 [9]
Access Barring Info	ormation	-	Not sent	No additional delays in random
				access procedure
Time offset between cells			3 ms	Asynchronous cells
				3ms or 92160*Ts
T1		S	≤5	
T2		S	1	

5.1.5.4.2 Test procedure

The test scenario comprises of two E-UTRA FDD carriers and one cell on each carrier as given in tables 5.1.5.4.1-1 and 5.1.5.5-1. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. A RRC message implying handover shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and start to transmit the PRACH to Cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 5.1.5.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message implying handover to Cell 2.
- 4. The start of T2 is the instant when the last TTI containing the RRC connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table 5.1.5.5-1. T2 starts.
- 5. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 6. If the UE transmits the uplink PRACH channel to Cell 2 less than 130 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell..
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.5.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 5.1.5.4.3-1: Common Exception messages for E-UTRAN FDD-FDD inter-frequency handover: unknown target cell test requirement

Default Message Contents					
Common contents of system information					
blocks exceptions					
Default RRC messages and information	Table H.3.2-1				
elements contents exceptions	Table H.3.2-3				

Table 5.1.5.4.3-2: RACH-ConfigCommon-DEFAULT: Additional E-UTRAN FDD-FDD inter frequency handover: unknown target cell test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT						
Information Element	Value/remark	Comment	Condition			
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {						
powerRampingParameters SEQUENCE {						
preambleInitialReceivedTargetPower	dBm-90					
}						
}						

5.1.5.5 Test requirement

Tables 5.1.5.4.1-1 and 5.1.5.5-1define the primary level settings including test tolerances for E-UTRAN FDD-FDD inter frequency handover: unknown target cell test.

Table 5.1.5.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD-FDD inter frequency handover: unknown target cell test case

Parameter	Unit	Cell 1		Cel	12
		T1	T2	T1	T2
E-UTRA RF Channel		1		2	
number					
BW _{channel}	MHz	10)	10)
OCNG Patterns		OP.1 FDD	OP.2 FDD	OP.2 FDD	OP.1 FDD
defined in D.1.1 (OP.1					
FDD) and in D.1.2					
(OP.2 FDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0		0	
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				

\hat{E}_s/I_{ot}	dB	4	4	-Infinity	7
N _{oc} Note 2	dBm/15 kHz			-98	
\hat{E}_s/N_{oc}	dB	4	4	-Infinity	7
RSRP Note 3	dBm/15 KHz	-94	-94	-Infinity	-91
Propagation Condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for $^{N}{}_{oc}$ to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The handover to an unknown target cell delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit the PRACH to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

Handover delay $D_{handover} = maximum RRC$ procedure delay $+ T_{interrupt}$ (note: the target cell is unknown)

$$T_{interrupt} = T_{search} + T_{IU} + 20 \ ms$$

T_{search} = 80, since Cell 2 is unknown prior to the test

 $T_{\rm IU}$ = 15 ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

Maximum RRC procedure delay = 15 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ to an unknown target cell shall be less than a total of 130 ms in this test case (note: this gives a total of 15 ms for maximum RRC procedure delay plus 115 ms for $T_{interrupt}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.6 E-UTRAN TDD-TDD inter frequency handover: unknown target cell

5.1.6.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when the target cell is unknown and an inter-frequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.6.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward. Applicability requires support for FGI bits 13, and 25.

5.1.6.3 Minimum conformance requirements

Procedure delays for all procedures that can command a handover are specified in 3GPP TS 36.331 [5].

When the UE receive a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

 $D_{handover}$ equals the maximum RRC procedure delay defined in TS 36.331 [5] clause 11.2 plus the interruption time stated in TS 36.133 [4] clause 5.2.2.4.2.

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt.

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where:

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{search} = 0$ ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then $T_{search} = 80$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in new cell. T_{IU} can be up to 30ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in TS 36.133 [4] clause 8.1.2.3.4 for inter-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.2.2.4 and A.5.1.6

5.1.6.4 Test description

5.1.6.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 5.1.6.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.1.6.4.3.
- 5. There are two E-UTRA TDD carriers and one cell on each carrier specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.6.4.1-1: General test parameters for E-UTRAN TDD-TDD inter frequency handover test case when the target cell is unknown

Par	ameter	Unit	Value	Comment
PDSCH parameter	PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
PCFICH/PDCCHP	PCFICH/PDCCHPHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chann	nel Number		1, 2	Two TDD carriers
DRX			OFF	Non-DRX test
Access Barring Info	ormation	-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration			1	As specified in table 4.2-2 in TS 36.211
PRACH configuration index			53	As specified in table 5.7.1-3 in TS 36.211
Time offset between cells		μS	3	Synchronous cells 3µs or 92*Ts
Gap pattern configuration			-	No gap pattern configured
T1		S	≤5	
T2		S	1	

5.1.6.4.2 Test procedure

The test scenario comprises of two E-UTRA TDD carriers and one cell on each carrier as given in tables 5.1.6.4.1-1 and 5.1.6.5-1. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 5.1.6.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message implying handover to Cell 2.
- 4. The start of T2 is the instant when the last TTI containing the RRC connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table 5.1.6.5-1. T2 starts.
- 5. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 6. If the UE transmits the uplink PRACH channel to Cell 2 less than 130 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.6.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.1.6.4.3-1: Common Exception messages for E-UTRAN TDD-TDD inter frequency handover unknown target cell test requirements

Default Message Contents					
Common contents of system information					
blocks exceptions					
Default RRC messages and information	Table H.3.2-2				
elements contents exceptions	Table H.3.2-3				

Table 5.1.6.4.3-2: RACH-ConfigCommon-DEFAULT: Additional E-UTRAN TDD-TDD inter frequency handover: unknown target cell test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT						
Information Element	Value/remark	Comment	Condition			
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {						
powerRampingParameters SEQUENCE {						
preambleInitialReceivedTargetPower	dBm-98					
}						
}						

5.1.6.5 Test requirement

Tables 5.1.6.4.1-1 and 5.1.6.5-1 define the primary level settings including test tolerances for E-UTRAN TDD-TDD inter frequency handover test case when the target cell is unknown.

Table 5.1.6.5-1: Cell specific test parameters for E-UTRAN TDD-TDD inter frequency handover test case when the target cell is unknown

Parameter	Unit	Ce	II 1	C	ell 2
		T1	T2	T1	T2
E-UTRA RF Channel		•	1		2
Number					
BW _{channel}	MHz		0		10
OCNG Patterns		OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD
defined in D.2.1(OP.1					
TDD) and in					
D.2.2(OP.2 TDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB			0	
PHICH_RB	dB	()		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RANote 1	dB				
OCNG_RBNote 1	dB				
Note 3	dBm/15 kHz			-98	
RSRP Note 4	dBm/15 kHz	-94	-94	-Infinity	-93
$\hat{\mathtt{E}}_{\scriptscriptstyle{\mathrm{s}}}/\mathtt{I}_{\scriptscriptstyle{\mathrm{ot}}}$	dB	4	4	-Infinity	5
SCH_RP Note 4	dBm/15 kHz	-94	-94	-Infinity	-93
\hat{E}_s/N_{oc}	dB	4	4	-Infinity	5
Propagation Condition			А	WGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled

Note 4: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The handover delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit the PRACH to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover} = maximum RRC procedure delay + T_{interrupt}$

The maximum RRC procedure delay test requirement in this case is 15ms, as specified in TS 36.331 [5] clause 11.2.

The $T_{interrupt}$ test requirement in this case is expressed as:

 $T_{interrupt} \equiv T_{search} + T_{IU} + 20 \text{ ms}$ (note: the target cell is unknown)

T_{search} = 80 ms, since Cell 2 is unknown prior to the test

 $T_{IU} = 15$ ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

The handover delay $D_{handover}$ to an unknown target cell shall be less than a total of 130 ms in this test case (note: this gives a total of 15 ms for maximum RRC procedure delay plus 115 ms for $T_{interrupt}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.7 E-UTRAN FDD-TDD Handover inter frequency case

5.1.7.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an E-UTRAN FDD-TDD interfrequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.7.2 Test applicability

This test applies to all types of E-UTRA UE supporting FDD and TDD release 9 and forward. Applicability requires support for FGI bits 5, 25, and 30.

5.1.7.3 Minimum conformance requirements

Procedure delays for all procedures that can command a handover are specified in 3GPP TS 36.331 [5].

When the UE receives a RRC message implying handover, the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

 $D_{handover}$ equals the maximum RRC procedure delay to be defined in section 11.2 in 3GPP TS36.331 [5] plus the interruption time stated in TS 36.133 [4] section 5. 2.2.4.2.

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{search} = 0$ ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then $T_{search} = 80$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in TS 36.133 [4] Section 8.1.2.3.4 for inter-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.2.2.4 and A.5.1.7

5.1.7.4 Test description

5.1.7.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 5.1.7.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.1.7.4.3.
- 5. There are two E-UTRA carriers and one E-UTRA FDD Cell 1 and E-UTRA TDD Cell 2 on each carrier specified in the test. E-UTRA FDD Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.7.4.1-1: General Test Parameters for E-UTRAN FDD-TDD inter frequency handover test case

Paran	neter	Unit	Value	Comment
Cell 1 PDSCH par	Cell 1 PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
Cell 1 PCFICH/PD parameters	CCH/PHICH		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Cell 2 PDSCH par	ameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
Cell 2 PCFICH/PD parameters	CCH/PHICH		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Gap Pattern Id			0	As specified in 3GPP TS 36.133 [4] section 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
Cell 1 E-UTRA RF	channel number		1	One FDD carrier is used
Cell 2 E-UTRA RF	channel number		2	One TDD carrier is used
Channel Bandwidt	h (BW _{channel})	MHz	10	
A3-Offset		dB	-4	
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	
DRX			DRX_L	As specified in 3GPP TS 36.133 [4] section A.3.3
CP length			Normal	
E-UTRA TDD Acco	· ·	-	Not Sent	No additional delays in random access procedure.
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211. Applicable to cell 2.
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211. Applicable to cell 2
E-UTRA TDD PRACH configuration			53	As specified in table 5.7.1-3 in 3GPP TS 36.211
Time offset between cells			3 ms	Asynchronous cells
T1		S	5	
T2		S	≤5	
T3		S	1	

5.1.7.4.2 Test procedure

The test scenario comprises of one E-UTRA FDD cell and one E-UTRA TDD cell. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to

detect and send a measurement report. The start of T3 is defined as the end of the last TTI containing the RRC message implying handover.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 5.1.7.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.1.7.5-1.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3.
- 7. SS shall transmit an RRCConnectionReconfiguration message defined in Table H.3.2-3 implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.1.7.5-1.
- 9. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 10. If the UE transmits the uplink PRACH channel to Cell 2 less than 50 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 11. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 13. Repeat step 2-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.7.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.1.7.4.3-1: Common Exception messages for E-UTRAN FDD-TDD inter-frequency handover test requirement

Default Message Contents				
Common contents of system information blocks exceptions				
Default RRC messages and information elements contents exceptions	Table H.3.1-3			
	Table H.3.1-7 Table H.3.2-2			
	Table H.3.2-3			

Table 5.1.7.4.3-2: ReportConfigEUTRA-A3: Additional E-UTRAN FDD-TDD inter frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3				
Information Element	Value/remark	Comment	Condition	
ReportConfigEUTRA-A3 ::= SEQUENCE {				
triggerType CHOICE {				
event SEQUENCE {				
eventId CHOICE {				
eventA3 SEQUENCE {				
a3-Offset	-8 (-4 dB)	-4 is actual value in dB (-8 * 0.5 dB)		
reportOnLeave	FALSE			
}				
}				
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)		
timeToTrigger	0 (0 ms)			
}				
}				

Table 5.1.7.4.3-3: *MeasResults*: Additional E-UTRAN FDD-TDD inter frequency handover test requirement

Information Element	Value/remark	Comment	Condition
MeasResults::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
}			

Table 5.1.7.4.3-4: MeasResultListEUTRA: Additional E-UTRAN FDD-TDD inter frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResultListEUTRA::= SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId of the Cell 2		
measResult SEQUENCE {			
rsrpResult		Set according to	
		specific test	
rsrqResult		Set according to	
		specific test	
}			
}			

Table 5.1.7.4.3-5: RACH-ConfigCommon-DEFAULT: Additional E-UTRAN FDD-TDD inter frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT				
Information Element	Value/remark	Comment	Condition	
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {				
powerRampingParameters SEQUENCE {				
preambleInitialReceivedTargetPower	dBm-98			
}				
}				

5.1.7.5 Test requirement

Tables 5.1.7.4.1-1 and 5.1.7.5-1 define the primary level settings including test tolerances for E-UTRAN FDD-TDD Inter Frequency Handover test.

Table 5.1.7.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD (cell #1) in E-UTRAN FDD-TDD Inter Frequency Handover test case

Parameter	Unit	Cell 1			
		T1	T2	T3	
E-UTRA RF Channel number			1		
BW _{channel}	MHz		10		
OCNG Patterns defined in D.1.1 (OP.1 FDD) and in D.1.2 (OP.2 FDD)		OP.1 FDD	OP.1 FDD	OP.2 FDD	
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB	0			
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				
\hat{E}_s/I_{ot}	dB	4.00	4.00	4.00	
N _{oc} Note 2	dBm/15 kHz		-98		
\hat{E}_s/N_{oc}	dB	4.00	4.00	4.00	
RSRP Note 3	dBm/15 KHz	-94.00	-94.00	-94.00	
Propagation Condition		AWG	N		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{ac} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.

Table 5.1.7.5-2: Cell specific test parameters for E-UTRAN TDD (cell #2) in E-UTRAN FDD-TDD Inter frequency handover test case

Parameter	Unit	Cell 2			
		T1	T2	T3	
E-UTRA RF Channel number			2		
BW _{channel}	MHz		10		
OCNG Patterns defined in D.2.1 (OP.1 TDD) and in D.2.2 (OP.2 TDD)		OP.2 TDD	OP.2 TDD	OP.1 TDD	
PBCH RA	dB		I		
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB	†			
PHICH_RA	dB				
PHICH_RB	dB		0		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				
\hat{E}_s/I_{ot}	dB	-Infinity	7.10	7.10	
$N_{oc}^{ m Note~2}$	dBm/15 kHz		-98		
\hat{E}_s/N_{oc}	dB	-Infinity	7.10	7.10	
RSRP Note 3	dBm/15 KHz	-Infinity	-90.90	-90.90	
Propagation Condition		ÁWG	Ň		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the PRACH to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

 $Handover\ delay\ D_{handover} = maximum\ RRC\ procedure\ delay\ +\ T^{interrupt}$

The maximum RRC procedure delay test requirement in this case is 15ms, as specified in TS 36.331 [5] clause 11.2.

The T_{interrupt} test requirement in this case is 35 ms expressed as:

$$T_{interrupt} \equiv T_{search} + T_{IU} + 20 \ ms$$

 $T_{\text{search}} = 0$, since cell 2 is known prior to the test

 $T_{IU} = 15$ ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

The handover delay D_{handover} shall be less than a total of 50 ms in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.1.8 E-UTRAN TDD-FDD Handover inter frequency case

5.1.8.1 Test purpose

To verify the UE's ability to perform handover in RRC_CONNECTED state when an E-UTRAN TDD-FDD interfrequency handover is commanded by meeting the UE maximum RRC procedure delay and interruption time requirements.

5.1.8.2 Test applicability

This test applies to all types of E-UTRA UE supporting FDD and TDD release 9 and forward. Applicability requires support for FGI bits 5, 25, and 30.

5.1.8.3 Minimum conformance requirements

Procedure delays for all procedures that can command a handover are specified in 3GPP TS 36.331 [5].

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

D_{handover} equals the maximum RRC procedure delay to be defined in section 11.2 in 3GPP TS 36.331 [5] plus the interruption time stated in TS 36.133 [4] section 5.1.2.1.2.

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay. This requirement applies when UE is not required to perform any synchronisation procedure before transmitting on the new PRACH.

When inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt

$$T_{interrupt} = T_{search} + T_{IU} + 20 \ ms$$

Where:

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{search} = 0$ ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then $T_{search} = 80$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in TS 36.133 [4] Section 8.1.2.3.1 for inter-frequency handover.

The normative reference for this requirement is TS 36.133 [4] clause 5.1.2.1 and A.5.1.8.

5.1.8.4 Test description

5.1.8.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.14.
- 2. The general test parameter settings are set up according to Table 5.1.8.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.1.8.4.3.
- 5. There are two E-UTRA carriers and one E-UTRA TDD Cell 1 and one E-UTRA FDD Cell 2 on each carrier specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.1.8.4.1-1: General Test Parameters for E-UTRAN TDD-FDD inter frequency handover test case

Para	ameter	Unit	Value	Comment
Cell 1 PDSCH para	nmeters		DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
Cell 1 PCFICH/PD0 parameters	CCH/PHICH		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Cell 2 PDSCH para	meters		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
Cell 2 PCFICH/PD0 parameters	CCH/PHICH		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Initial conditions	Active cell		Cell 1	Cell 1 is on RF channel number 1
	Neighbouring cell		Cell 2	Cell 2 is on RF channel number 2
Final condition	Active cell		Cell 2	
Cell 1 E-UTRA RF	channel number		1	One TDD carrier is used
Cell 2 E-UTRA RF	channel number		2	One FDD carrier is used
Channel Bandwidth	n (BW _{channel})	MHz	10	
A3-Offset	, , , , , , , , , , , , , , , , , , , ,	dB	-4	
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			DRX_L	As specified in TS 36.133 [4] section A.3.3
E-UTRA FDD PRA	CH configuration		4	As specified in table 5.7.1-2 in 3GPP TS 36.211
E-UTRA FDD Accellinformation	ess Barring	-	Not sent	No additional delays in random access procedure
Time offset betwee	n cells		3 ms	Asynchronous cells
Gap pattern configu	uration Id		0	As specified in Table 8.1.2.1-1 started before T2 starts
T1		S	5	
T2		s	≤5	
T3		S	1	

5.1.8.4.2 Test procedure

The test consists of one active cell and one neighbour cell. PDCCHs indicating new transmissions should be sent continuously to ensure that the UE would not enter the DRX state. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. The start of T3 is defined as the end of the last TTI containing the RRC message implying handover.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 5.1.8.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.1.8.5-1.

- 6. UE shall transmit a MeasurementReport message triggered by Event A3.
- 7. SS shall transmit an RRCConnectionReconfiguration message defined in Table H.3.2-3 implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.1.8.5-1.
- 9. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 10. If the UE transmits the uplink PRACH to Cell 2 less than 50 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 11. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 13. Repeat step 2-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.1.8.4.3 Message contents

Message contents are according to TS 36.508 [7] values 4.6 with the following exceptions:

Table 5.1.8.4.3-1: Common Exception messages for E-UTRAN TDD-FDD inter-frequency handover test requirement

Default Message Contents			
Common contents of system information			
blocks exceptions			
Default RRC messages and information	Table H.3.1-1		
elements contents exceptions	Table H.3.1-3		
	Table H.3.1-7		
	Table H.3.2-1		
	Table H.3.2-3		
	Table H.3.6-2		

Table 5.1.8.4.3-2: ReportConfigEUTRA-A3: Additional E-UTRAN TDD-FDD inter frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-6 ReportConfigEUTRA-A3				
Information Element	Value/remark	Comment	Condition	
ReportConfigEUTRA-A3 ::= SEQUENCE {				
triggerType CHOICE {				
event SEQUENCE {				
eventId CHOICE {				
eventA3 SEQUENCE {				
a3-Offset	-8 (-4 dB)	-4 is actual value in dB (-8 * 0.5 dB)		
reportOnLeave	FALSE			
}				
}				
Hysteresis	0 (0 dB)	0 is actual value in dB (0 * 0.5 dB)		
timeToTrigger	0 (0 ms)			
}				
}				

Table 5.1.8.4.3-3: *MeasResults*: Additional E-UTRAN TDD-FDD inter frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResults ::= SEQUENCE {			
measld	1	Identifies the measurement id for the reporting being performed	
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListEUTRA	MeasResultListEUTRA		
}	_		
}			

Table 5.1.8.4.3-4: MeasResultListEUTRA: Additional E-UTRAN TDD-FDD inter frequency handover test requirement

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResultListEUTRA::= SEQUENCE (SIZE (1maxCellReport)) OF SEQUENCE {			
physCellId	PhysCellId of the Cell 2		
measResult SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
}			

Table 5.1.8.4.3-5: RACH-ConfigCommon-DEFAULT: Additional E-UTRAN TDD-FDD inter frequency handover test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT				
Information Element	Value/remark	Comment	Condition	
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {				
powerRampingParameters SEQUENCE {				
preambleInitialReceivedTargetPower	dBm-90			
}				
}				

5.1.8.5 Test requirement

Tables 5.1.8.4.1-1, 5.1.8.5-1, and 5.1.8.5-2 define the primary level settings including test tolerances for E-UTRAN TDD-FDD inter frequency handover test case.

Table 5.1.8.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD (cell #1) in TDD-FDD Inter frequency handover test case

Parameter	Unit	Cell 1				
		T1 T2		T3		
E-UTRA RF Channel number			1			
BW _{channel}	MHz		10			
OCNG Patterns defined in D.2.1 (OP.1 TDD) and in D.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD		
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB		0			
PDCCH_RA	dB	7				
PDCCH_RB	dB	7				
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA ^{Note 1}	dB					
OCNG_RB ^{Note 1}	dB					
\hat{E}_s/I_{ot}	dB	4.00 4.00 4.00				
N _{oc} Note 2	dBm/15 kHz		-98			
\hat{E}_s/N_{oc}	dB	4.00 4.00 4.00				
RSRP Note 3	dBm/15 KHz	-94.00 -94.00 -94.00				
Propagation Condition		AWGN				

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.

Table 5.1.8.5-2: Cell specific test parameters for E-UTRAN FDD (cell #2) in E-UTRAN TDD-FDD Inter frequency handover test case

Parameter	Unit	Cell 2				
		T1	T2	T3		
E-UTRA RF Channel number			2			
BW _{channel}	MHz		10			
OCNG Patterns defined in		OP.2 FDD	OP.2 FDD	OP.1 FDD		
D.1.1 (OP.1 FDD) and in D.1.2						
(OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA ^{Note 1}	dB					
OCNG_RB ^{Note 1}	dB					
\hat{E}_s/I_{ot}	dB	-Infinity 7.10 7.1				
N_{oc} Note 2	dBm/15 kHz		-98			
\hat{E}_s/N_{oc}	dB	-Infinity	7.10	7.10		
RSRP Note 3	dBm/15 KHz	-Infinity -90.90 -90.90				
Propagation Condition		AWGN				

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameter themselves.

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the PRACH to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover} = maximum RRC$ procedure delay $+ T_{interrupt}$

 $T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$

 $T_{\text{search}} = 0$, since Cell 2 is known prior to the test

 T_{IU} = 15 ms, since 10 ms due to uncertainty in frame and 5 ms additional delay due to PRACH transmission occasion

Maximum RRC procedure delay = 15 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 50 ms in this test case (note: this gives a total of 15 ms maximum RRC procedure delay plus 35 ms for $T_{interrupt}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2 Handover from E-UTRAN to other RATs

5.2.1 E-UTRAN FDD - UTRAN FDD handover

5.2.1.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to UTRAN in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.2.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD. Applicability requires support for FGI bits 8, and 22.

5.2.1.3 Minimum conformance requirements

When the UE receives a RRC message implying handover to UTRAN the UE shall be ready to start the transmission of the new UTRA uplink DPCCH within $D_{handover}$ seconds from the end of the last E-UTRAN TTI containing the RRC MOBILITY FROM E-UTRA command.

Where:

 $D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in TS 36.133 [4] clause 5.3.1.1.2.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink DPCCH in UTRAN FDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not. The target cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell is known the interruption time shall be less than Tinterrupt 1.

$$T_{interrupt1} = T_{iU} + T_{sync} + 50 + 10*F_{max} ms$$

If the target cell is unknown the interruption time shall be less than T_{interrupt2}.

$$T_{interrupt2} = \quad T_{IU} + T_{sync} + 150 + 10*F_{max} \ ms$$

This requirement shall be met, provided that there is one target cell in the MOBILITY FROM E-UTRA command. Performance requirements for E-UTRA to UTRA soft handover are not specified. When UE is connected to an E-UTRA cell, UTRA SFN timing measurements are not reported. This implies that the timing of the DPCH of the UTRA target cells in the active set cannot be configured by UTRAN to guarantee that all target cells fall within the UE reception window of T_0 +/- 148 chips.

Where:

 T_{IU} is the interruption uncertainty when changing the timing from the E-UTRAN to the new UTRAN cell. T_{IU} can be up to one UTRA frame (10 ms).

 F_{max} denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH on the UTRA target cell.

 T_{sync} is the time required for measuring the downlink DPCCH channel as stated in TS 25.214 [12] clause 4.3.1.2. In case higher layers indicate the usage of a post-verification period $T_{sync} = 0$ ms. Otherwise $T_{sync} = 40$ ms.

The phase reference is the UTRA primary CPICH.

The requirements assume that N312 has the smallest possible value i.e. only one in-sync is required.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.1 and A.5.2.1.

5.2.1.4 Test description

5.2.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.2.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.2.1.4.3.
- 5. There is one E-UTRA FDD serving cell and one UTRA FDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.1.4.1-1: General Test Parameters for E-UTRAN FDD - UTRAN FDD handover test case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement	As specified in section A.1.1
		Channel R.0 FDD	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in section A.2.1
		Channel R.6 FDD	
Initial conditions Active cell		Cell 1	E-UTRAN cell
Neighbouring cell		Cell 2	UTRAN cell
Final condition Active cell		Cell 2	UTRAN cell
Channel Bandwidth (BW _{channel})	MHz	10	
Gap Pattern Id		0	As specified in TS 36.133 [4]
			Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD measurement		RSRP	
quantity			
Inter-RAT (UTRAN FDD)		CPICH Ec/N0	
measurement quantity			
b2-Threshold1	dBm	-90	Absolute E-UTRAN RSRP
			threshold for event B2
b2-Threshold2-UTRA	dB	-18	Absolute UTRAN CPICH Ec/N0
			threshold for event B2
Hysteresis	dB	0	
TimeToTrigger	dB	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	Non-DRX test
Access Barring Information	-	Not sent	No additional delays in random
			access procedure
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier
			frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BWchannel)			
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Monitored UTRA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell before T2.
Post-verification period		False	
T1	S	5	
T2	S	≤5	
T3	S	1	

5.2.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring. The RRC message implying handover shall be sent to the UE during T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.2.1.5-1 and 5.2.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.1.5-1 and 5.2.1.5-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event B2.
- 7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.2.1.5-1 and 5.2.1.5-2.
- 9. If the UE transmits the UL DPCCH to Cell 2 less than 190 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 10. After T3 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. .Cell 1 is the active cell.
- 11. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code 50) mod 200 + 100) for next iteration of the test procedure loop.
- 12. Repeat step 2-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and 4.7B with the following exceptions:

Table 5.2.1.4.3-1: Common Exception messages for E-UTRAN FDD - UTRAN FDD handover

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.3.1-1			
elements contents exceptions	Table H.3.1-5			
·	Table H.3.1-7			
	Table H.3.3-1			
	Table H.3.3-3			

Table 5.2.1.4.3-2: ReportConfigInterRAT-B2-UTRA: Additional E-UTRAN FDD - UTRAN FDD handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-8 ReportConfigInterRAT-B2(EUTRA-Thres, UTRA-Thres)				
Information Element	Value/remark	Comment	Condition	
ReportConfigInterRAT-B2-UTRA(EUTRA-Thres,				
UTRA-Thres) ::= SEQUENCE {				
triggerType CHOICE {				
event SEQUENCE {				
eventId CHOICE {				
eventB2 SEQUENCE {				
b2-Threshold1 CHOICE {				
threshold-RSRP	50(-90 dBm)	-90 dBm EUTRA- Thres is actual threshold value in dBm (50 - 140 dBm)		
}				
b2-Threshold2 CHOICE {				
b2-Threshold2-UTRA CHOICE {				
thresholdUTRA-EcN0	13 (-18 dB)	-18 dB is actual UTRA-Thres is actual Ec/NOEcNO value in dB ((13 - 49)/2 dB)		
}				
}				
}				
}				
hysteresis	0 (0 dB)			
timeToTrigger	ms0			
}				
}				
maxReportCells	1			
reportInterval	ms1024			
reportAmount	r1			
}				

Table 5.2.1.4.3-3: MeasResults: Additional E-UTRAN FDD - UTRAN FDD handover

Information Element	Value/remark	Comment	Condition
MeasResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultsServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultsNeighCells CHOICE {			
measResultListUTRA	MeasResultListUTRA		
}			
}			

Table 5.2.1.4.3-4: MeasResultListUTRA: Additional E-UTRAN FDD - UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResultListUTRA ::= SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
fdd	250	This is the typical	
		value range used in	
		UTRAN FDD tests.	
}			
measResult SEQUENCE {			
utra-EcN0		Set according to	
		specific test	
}			
}			

Table 5.2.1.4.3-5: HANDOVER TO UTRAN COMMAND

Information Element	Value/remark	Comment	Condition
Downlink information common for all radio links			
 Downlink DPCH info common for all RL 			
- Timing indicator	Initialize		
- Default DPCH Offset Value	Arbitrary set to value		
	0306688 by step of 512		

5.2.1.5 Test requirement

Tables 5.2.1.4.1-1, 5.2.1.5-1 and 5.2.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD - UTRAN FDD handover test.

Table 5.2.1.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD to UTRAN FDD handover test case (Cell 1)

Parameter	Unit	Cell 1 (E-UTRA)		
		T1	T2	T3
E-UTRA RF Channel			1	
number				
BW _{channel}	MHz		10	
OCNG Patterns defined		OP.1 FDD	OP.1 FDD	OP.2 FDD
in D.1.1 (OP.1 FDD) and				
in D.1.2 (OP.2 FDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB		0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note}	dB			
OCNG_RB ^{Note}	dB			

\hat{E}_s/I_{ot}	dB	-0.80	-0.80		
\hat{E}_s/N_{oc}		-0.80	-0.80	-0.80	
N_{oc}	dBm/15 kHz		-98		
RSRP Note 2	dBm/15 KHz	-98.80	-98.80	-98.80	
lo Note 2	dBm/9 MHz	-67.59	-67.59	-67.59	
Propagation Condition		AWGN			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 5.2.1.5-2: Cell Specific Test requirement Parameters for Cell 2 UTRAN FDD cell

Parameter	Unit	Cell 2 (UTRA)		A)
		T1	T2	T3
CPICH_Ec/lor	dB		-10	
PCCPCH_Ec/lor	dB		-12	
SCH_Ec/lor	dB		-12	
PICH_Ec/lor	dB		-15	
DCH_Ec/lor	dB	N/A	N/A	Note 1
OCNS_Ec/lor	dB	-0.941	-0.941	Note 2
\hat{I}_{or}/I_{oc}	dB	-infinity	-1.8	-1.8
I_{oc}	dBm/3,84 MHz	-70	-70	-70
CPICH_Ec/lo	dB	-infinity	-14	-14
Propagation Condition			AWGN	

Note 1: The DPCH level is controlled by the power control loop

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the UL DPCCH to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

 $Handover\ delay\ D_{handover} = maximum\ RRC\ procedure\ delay\ +\ T_{interrupt1}\ (note:\ the\ target\ cell\ is\ known)$

 $T_{interrupt1} = T_{IU} + T_{sync} + 50 + 10*F_{max} ms$

 $T_{IU} = 10 \text{ ms}$; T_{IU} can be up to one UTRA frame (10 ms).

 F_{max} = 4 radio frames; The maximum radio frames within the transmission time intervals to fit into DCCH with 40 ms TTI

 $T_{sync} = 40$ ms; In case higher layers indicate the usage of a post-verification period $T_{sync} = 0$ ms. Otherwise $T_{sync} = 40$ ms

Maximum RRC procedure delay = 50 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 190 ms in this test case (note: this gives a total of 50 ms for maximum RRC procedure delay plus 140 ms for $T_{interrupt1}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.2 E-UTRAN TDD - UTRAN FDD handover

5.2.2.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to UTRAN in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.2.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support UTRA FDD. Applicability requires support for FGI bits 8, and 22.

5.2.2.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying handover to UTRAN the UE shall be ready to start the transmission of the new UTRA uplink DPCCH within $D_{handover}$ seconds from the end of the last E-UTRAN TTI containing the RRC MOBILITY FROM E-UTRA command.

Where:

 $D_{handover}$ equals the RRC procedure delay, which is 50ms plus the interruption time stated in TS 36.133 [4] clause 5.3.1.1.2.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink DPCCH in UTRAN FDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not. The target cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell is known the interruption time shall be less than $T_{interrupt1}$. The $T_{interrupt1}$ equation is defined as:

$$T_{interrupt1} = T_{iU} + T_{sync} + 50 + 10*F_{max} ms$$

If the target cell is unknown the interruption time shall be less than $T_{interrupt2}$. The $T_{interrupt2}$ equation is defined as:

$$T_{interrupt2} = T_{IU} + T_{sync} + 150 + 10*F_{max} ms$$

This requirement shall be met, provided that there is one target cell in the MOBILITY FROM E-UTRA command. When UE is connected to an E-UTRA cell, UTRA SFN timing measurements are not reported. This implies that the timing of the DPCH of the UTRA target cells in the active set cannot be configured by UTRAN to guarantee that all target cells fall within the UE reception window of T_0 +/- 148 chips.

Where:

 T_{IU} is the interruption uncertainty when changing the timing from the E-UTRAN to the new UTRAN cell. T_{IU} can be up to one UTRA frame (10 ms).

 F_{max} denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH on the UTRA target cell.

 T_{sync} is the time required for measuring the downlink DPCCH channel as stated in TS 25.214 [12] clause 4.3.1.2. In case higher layers indicate the usage of a post-verification period $T_{sync} = 0$ ms. Otherwise $T_{sync} = 40$ ms.

The phase reference is the UTRA primary CPICH.

The requirements assume that N312 has the smallest possible value i.e. only one "in_sync" is required.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.1 and A.5.2.2.

5.2.2.4 Test description

5.2.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.2.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.2.2.4.3.
- 5. There is one E-UTRA TDD serving cell and one UTRA FDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for call setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.2.4.1-1: General test parameters for E-UTRAN TDD-UTRAN FDD handover

Pa	rameter	Unit	Value	Comment
PDSCH param	eters (E-UTRAN		DL Reference Measurement	As specified in section A.1.2
TDD)	·		Channel R.0 TDD	
PCFICH/PDCC	CH/PHICH		DL Reference Measurement	As specified in section A.2.2
parameters (E-	·UTRAN TDD)		Channel R.6 TDD	
	Active cell		Cell 1	Cell 1 is on E-UTRA RF channel
conditions				number 1.
	Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Final	Active cell		Cell 2	
conditions				
Special subfrar	me configuration		6	As specified in table 4.2-1 in 3GPP TS 36.211. Applicable to cell 1.
Uplink-downlin	k configuration		1	As specified in table 4.2-2 in 3GPP TS 36.211. Applicable to cell 1
E-UTRAN TDD) measurement		RSRP	
quantity				
Inter-RAT (UTF			CPICH Ec/lo	
measurement of	quantity			
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-	-UTRA	dB	-18	UTRAN FDD CPICH Ec/Io threshold for event B2
Hysteresis		dB	0	
DRX			OFF	No DRX configured.
Time to Trigge	r	ms	0	
Filter coefficien	nt		0	
CP length			Normal	Applicable to cell 1
Gap pattern co	nfiguration Id		0	As specified in Table 8.1.2.1-1; to start before T2 starts
E-UTRA RF Ch	nannel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Chani (BW _{channel})	nel Bandwidth	MHz	10	
UTRA RF Cha	nnel Number		1	One UTRA FDD carrier frequency is used.
	RA FDD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell list before T2.
Post-verificatio	n period		False	Post verification is not used.
T1		S	5	
T2		S	≤5	
T3		S	1	

5.2.2.4.2 Test procedure

The test consists of one E-UTRAN TDD cell and one neighbour UTRAN FDD cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 is configured before the start of T2 to enable the monitoring of UTRAN FDD. A neighbouring cell list, including the UTRA cell (Cell 2) is sent to the UE before T2 starts. During the time T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. The RRC message implying handover shall be sent to the UE during T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 5.2.2.5-1 and 5.2.2.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.

- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.2.5-1 and 5.2.2.5-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event B2.
- 7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.2.2.5-1 and 5.2.2.5-2.
- 9. If the UE transmits the Uplink DPCCH channel to Cell 2 less than 190 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 10. After T3 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 11. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code 50) mod 200 + 100) for next iteration of the test procedure loop.
- 12. Repeat step 2-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and 4.7B with the following exceptions:

Table 5.2.2.4.3-1: Common Exception messages for E-UTRAN TDD - UTRAN FDD handover

Default Message Contents			
Common contents of system information			
blocks exceptions			
Default RRC messages and information	Table H.3.1-1		
elements contents exceptions	Table H.3.1-5		
·	Table H.3.1-7		
	Table H.3.3-1		
	Table H.3.3-3		

Table 5.2.2.4.3-2: ReportConfigInterRAT-B2-UTRA: Additional E-UTRAN TDD - UTRAN FDD handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-8 ReportConfigInterRAT-B2(EUTRA-Thres, UTRA-Thres)-			
Information Element	Value/remark	Comment	Condition
ReportConfigInterRAT-B2-UTRA(EUTRA-Thres,			
UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
Threshold-RSRP	50 (-90dBm)	-90 dBm EUTRA- Thres is actual threshold value in	
		dBm (50 - 140 dBm)	
}			
b2-Threshold2 CHOICE {			
b2-Threshold2-UTRA CHOICE {			
thresholdUTRA-EcN0	13 (-18dB)	-18 dB is actual UTRA-Thres is actual Ec/NO value in dB ((13 - 49)/2 dB)	
}			
}			
}			
}			
hysteresis	0 (0 dB)		
timeToTrigger	ms0		
}			
}			
maxReportCells	1		
reportInterval	ms1024		
reportAmount	r1		
}			

Table 5.2.2.4.3-3: MeasResults: Additional E-UTRAN TDD - UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResults ::= SEQUENCE {			
measld	1		
measResultsServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultsNeighCells CHOICE {			
measResultListUTRA	MeasResultListUTRA		
}			
}			

Table 5.2.2.4.3-4: MeasResultListUTRA: Additional E-UTRAN TDD - UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResultListUTRA ::= SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
fdd	250	This is the typical	
		value range used in	
		UTRAN FDD tests.	
}			
measResult SEQUENCE {			
utra-EcN0		Set according to	
		specific test	
}			
}			

Table 5.2.2.4.3-5: HANDOVER TO UTRAN COMMAND

Information Element	Value/remark	Comment	Condition
Downlink information common for all radio links			
 Downlink DPCH info common for all RL 			
- Timing indicator	Initialize		
- Default DPCH Offset Value	Arbitrary set to value		
	0306688 by step of 512		

5.2.2.5 Test requirement

Tables 5.2.2.4.1-1, 5.2.2.5-1 and 5.2.2.5-2 define the primary level settings including test tolerances for E-UTRAN TDD - UTRAN FDD handover test.

Table 5.2.2.5-1: Cell specific test parameters for E-UTRAN TDD (cell 1) for handover to UTRAN FDD (cell # 2)

Parameter	Unit		Cell 1 (E-UTRAN)		
		T1	T2	T3	
E-UTRA RF Channel			1		
Number					
BW _{channel}	MHz		10		
OCNG Pattern defined in					
D.2.1 (OP.1 TDD) and in		OP.1	TDD	OP.2 TDD	
D.2.2 (OP.1 TDD)					
PBCH_RA					
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA		0			
PHICH_RB	dB				
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA ^{Note}					
OCNG_RB ^{Note}					

RSRP	dBm/15 kHz	-98.80	-98.80	-98.80
\hat{E}_s/I_{oc}	dB	-0.80	-0.80	-0.80
\hat{E}_s/N_{oc}	dB	-0.80	-0.80	-0.80
N_{oc}	dBm/15 kHz	-98		
Propagation Condition		AWGN		
Note: OCNC shall be used such that the sall is fully allocated and a constant total transmitted				

Note: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 5.2.2.5-2: Cell specific test parameters for UTRAN FDD (cell # 2) for handover from E-UTRAN TDD cell (cell #1)

Parameter	Unit	Cell 2 (UTRA)		A)
		T1	T2	T3
CPICH_Ec/lor	dB		-10	
PCCPCH_Ec/lor	dB		-12	
SCH_Ec/lor	dB	-12		
PICH_Ec/lor	dB		-15	
DPCH_Ec/lor	dB	N/A	N/A	Note 1
OCNS_Ec/lor	dB	-0.941	-0.941	Note 2
\hat{I}_{or}/I_{oc}	dB	-infinity	-1.8	-1.8
I_{oc}	dBm/3.84 MHz		-70	
CPICH_Ec/Io	dB	-infinity	-14	-14
Propagation Condition		AWGN		
Note 1: The DPCH level is controlled by the power control loop				

Note 1: The DPCH level is controlled by the power control loop

Note 2: The power of the OCNS channel that is added shall make
the total power from the cell to be equal to I_{or}.

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the UL DPCCH to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

Handover delay D_{handover} = maximum RRC procedure delay + T_{interrupt1} (note: the target cell is known)

 $T_{interrupt1} = T_{IU} + T_{sync} + 50 + 10*F_{max} ms$

 $T_{IIJ} = 10 \text{ ms}$; T_{IIJ} can be up to one UTRA frame (10 ms).

 $F_{max} = 4$ radio frames; The maximum radio frames within the transmission time intervals to fit into DCCH with 40 ms TTI

 $T_{\text{sync}} = 40 \text{ ms}$; In case higher layers indicate the usage of a post-verification period $T_{\text{sync}} = 0 \text{ ms}$. Otherwise $T_{\text{sync}} = 40 \text{ ms}$

Maximum RRC procedure delay = 50 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 190 ms in this test case (note: this gives a total of 50ms for maximum RRC procedure delay plus 140 ms for Tinterrupt1).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.3 E-UTRAN FDD - GSM handover

5.2.3.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to GSM in RRC_CONNECTED state by meeting the UE handover delay and interruption time requirements.

5.2.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support GSM. Applicability requires support for FGI bits 9, 15 and 23.

5.2.3.3 Minimum conformance requirements

The handover delay given in table 5.2.3.3-1 and interruption time given in table 5.2.3.3-2 requirements for the case where the UE has not synchronised to the GSM cell before receiving the RRC MOBILITY FROM E-UTRA command are valid when the signal quality of the GSM cell is sufficient for successful synchronisation with one attempt. If the UE is unable to synchronise to the GSM cell on the first attempt, it shall continue to search for synchronisation information for up to 800 ms duration. If after 800 ms the UE has not synchronised to the GSM cell it shall follow the handover failure procedure specified in TS 36.331 [5].

When the UE receives a RRC MOBILITY FROM E-UTRA command the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT within the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.3.3-1 from the end of the last TTI containing the RRC command.

The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay.

Table 5.2.3.3-1: E-UTRAN/GSM handover - handover delay

UE synchronisation status	handover delay [ms]
The UE has synchronised to the GSM cell before the	90
RRC MOBILITY FROM E-UTRA COMMAND is received	
The UE has not synchronised to the GSM cell before	190
RRC the MOBILITY FROM E-UTRA COMMAND is	
received	

The interruption time is the time between the end of the TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink channel in GSM, excluding the RRC procedure delay. The interruption time depends on whether the UE has synchronized to the target GSM cell or not and shall be less than the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.3.3-2.

Table 5.2.3.3-2: E-UTRAN/GSM handover - interruption time

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the	40
RRC MOBILITY FROM E-UTRA COMMAND is received	
The UE has not synchronised to the GSM cell before the	140
RRC MOBILITY FROM E-UTRA COMMAND is received	

The normative reference for this requirement is TS 36.133 [4] clause 5.3.3 and A.5.2.3.

5.2.3.4 Test description

5.2.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
- 2. The general test parameter settings are set up according to Table 5.2.3.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 5.2.3.4.3.
- 5. There is one E-UTRA FDD serving cell and one GSM cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.3.4.1-1: General Test Parameters for E-UTRAN FDD - GSM handover test case

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Gap Pattern Id			1	As specified in TS 36.133 [4] section 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Final conditions Active cell		Cell 2	
Inter-RAT measu	Inter-RAT measurement quantity		GSM Carrier RSSI	
Threshold other s	system	dBm	-80	Absolute GSM carrier RSSI threshold for event B1.
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
T1		S	20	
T2		S	7	
T3	·	S	1	

5.2.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. The RRC message implying handover to Cell 2 shall be sent to the UE during T2, after the UE has reported Event B1. T3 is defined as the end of the last E-UTRAN TTI containing the RRC message implying handover. The requirements are also applicable for a UE not requiring measurement gap, in which case no measurement gap pattern is sent.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.2.3.5-1 and 5.2.3.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.3.5-1 and 5.2.3.5-2. T2 starts.
- 6. UE shall transmit a MeasurementReport message triggered by Event B1.
- 7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.2.3.5-2. T3 starts.
- 9. If the UE sends access bursts on the new DCCH to Cell 2 less than 100 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 10. After T3 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 11. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 12. Repeat step 2-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.3.4.3-1: Common Exception messages for E-UTRAN FDD - GSM handover

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.3.1-1			
elements contents exceptions	Table H.3.1-6			
	Table H.3.1-7			
	Table H.3.3-2			
	Table H.3.3-3			

Table 5.2.3.4.3-2: SystemInformationBlockType7: Additional E-UTRAN FDD - GSM handover

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-3 SystemInformationBlockType7					
Information Element	Value/remark	Comment	Condition		
commonInfo SEQUENCE {					
p-MaxGERAN	33 (33 dBm)		GSM 400 &		
			GSM 900 &		
			GSM 850 &		
			GSM 700		
	30 (30 dBm)		DCS 1800		
			& PCS 1900		
}					

Table 5.2.3.4.3-3: ReportConfigInterRAT-B1-GERAN: Additional E-UTRAN FDD - GSM handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6-7A ReportConfigInterRAT-B1-GERAN(GERAN-Thres)					
Information Element	Value/remark	Comment	Condition		
ReportConfigInterRAT-B1-GERAN(GERAN-					
Thres) ::= SEQUENCE {					
triggerType CHOICE {					
event SEQUENCE {					
eventId CHOICE {					
eventB1 SEQUENCE {					
b1-Threshold CHOICE {					
b1-thresholdGERAN	30 (-80 dBm)	-80 is actual value			
		in dBm (30 - 110			
		dBm)			

Table 5.2.3.4.3-4: MeasResults: Additional E-UTRAN FDD - GSM handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResults::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListGERAN }	MeasResultListGERAN		
}			

Table 5.2.3.4.3-5: MeasResultListGERAN: Additional E-UTRAN FDD - GSM handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark Comm		ent Condition
MeasResultListGERAN ::= SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
MeasResultGERAN SEQUENCE {			
carrierFreq	CarrierFreqGERAN	Contains the carrier frequency of the target GERAN cell	
physCellId	PhysCellIdGERAN	Contains the Base Station Identity Code (BSIC)	
}			
measResult SEQUENCE {			
rssi		Set according to specific test	
}			
}			

5.2.3.5 Test requirement

Tables 5.2.3.4.1-1, 5.2.3.5-1 and 5.2.3.5-2 defines the primary level settings including test tolerances for E-UTRAN FDD to GSM handover test case.

Table 5.2.3.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Cell 1	
		T1, T2	Т3
BW _{channel}	MHz	1	0
OCNG Patterns			
defined in D.1.1		OP.1 FDD	OP.2 FDD
(OP.1 FDD) and in		OF.1 FDD	OF.2 FDD
D.1.2 (OP.2 FDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	()
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note1	dB		
OCNG_RB Note1	dB		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4
N_{oc} Note 2	dBm/15	-98 (AWGN)	
	kHz	(,
\hat{E}_s/N_{oc}	dB	2	1

RSRP Note 3	dBm/15kH z	-94	
Propagation Condition		AWGN	
Note 2: Interfe	mitted power specterence from other	ch that cell 1 is fully allocated and a constant total tral density is achieved for all OFDM symbols. cells and noise sources not specified in the test is	
AWG Note 3: RSRF	N of appropriate polevels have been	t over subcarriers and time and shall be modelled as ower for $\frac{N_{oc}}{N_{oc}}$ to be fulfilled. In derived from other parameters for information settable parameters themselves.	

Table 5.2.3.5-2: Cell Specific Test requirement Parameters for Cell 2 GSM cell

Parameter	Unit	Cell 2 (0	GSM)		
Parameter	Onit	T1 T2, T3		T1 T2, T3	T2, T3
Absolute RF Channel Number		ARFCN 1			
RXLEV	dBm	-85	-75		

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to send access bursts on the new DCCH to Cell 2.

The handover delay T_{Handover delay} test requirement in this case is expressed as:

Handover delay $T_{Handover delay} = handover delay + T_{Offset} + T_{UL}$

Handover delay = 90 ms; this is based on handover delay value as defined in Table 5.2.3.3.-1

 $T_{offset} = 4.65$ ms; GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

 $T_{UL} = 4.65$ ms; the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame

The handover delay $T_{\text{Handover delay}}$ shall be less than a total of 100 ms in this test case (note: this gives a total of 99.29 ms but the test allows 100 ms).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.4 E-UTRAN TDD - UTRAN TDD handover

5.2.4.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to UTRAN in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.2.4.2 Test applicability

This test applies to all types of release 8 and forward E-UTRA TDD UEs that support release 9 and forward UTRA TDD. Applicability requires support for FGI bits 8, and 22.

5.2.4.3 Minimum conformance requirements

When the UE receives a RRC message implying E-UTRAN/UTRAN TDD handover the UE shall be ready to start the transmission of the new uplink DPCH or the SYNC-UL within $D_{handover}$ seconds from the end of the last TTI containing the RRC MOBILITY FROM E-UTRA command.

Where:

 D_{handover} equals the RRC procedure performance value plus the interruption time stated in TS 36.133 [4] clause 5.3.2.2.2.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink DPCH or the SYNC-UL in UTRAN TDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell has been measured by the UE during the last 5 seconds, the interruption time shall be less than $T_{interrupt1}$

$$T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + 20 + 10*F_{max} \text{ ms}$$

If the target cell has not been measured by the UE during the last 5 seconds, the interruption time shall be less than $T_{interrupt2}$

$$T_{interrupt2} = T_{offset} + T_{UL} + 30*F_{SFN} + 180 + 10*F_{max} ms$$

Where:

 T_{offset} Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel

T_{III.} Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell

F_{SEN} Equal to 1 if SFN decoding is required and equal to 0 otherwise

 F_{max} denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

The interruption time requirements for an unknown target cell shall apply only if the signal quality of the unknown target cell is sufficient for successful synchronisation with one attempt.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.2 and A.5.2.4.

5.2.4.4 Test description

5.2.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.2.4.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.2.4.4.3.
- 5. There is one E-UTRA TDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.4.4.1-1: General test parameters for E-UTRA TDD to UTRA (1.28 Mcps TDD OPTION) handover test case

Param	neter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement	As specified in section A.1.2
			Channel R.0 TDD	
PCFICH/PDCCH	/PHICH		DL Reference Measurement	As specified in section A.2.2
parameters			Channel R.6 TDD	
	Active cell		Cell 1	E-UTRA TDD cell
conditions	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Final conditions	Active cell		Cell 2	
Gap Pattern Id			0	As specified in 3GPP TS 36.133 [4] section 8.1.2.1.
Uplink-downlink o	-		1	As specified in table 4.2.2 in TS 36.211 [9]
Special subframe of cell 1	configuration		6	As specified in table 4.2.1 in TS 36.211 [9]
CP length of cell	1		Normal	
Time offset between			3 ms	Asynchronous cells 3ms or 92160*Ts
Access Barring Ir	nformation		Not Sent	No additional delays in random access procedure.
Assigned Sub-Ch	nannel Number		1	No additional delays in random access procedure due to ASC.
Hysteresis		dB	0	
Time To Trigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
Ofn		dB	0	
Hys		dB	0	
Thresh1		dBm	-93	E-UTRA event B2 threshold
Thresh2		dBm	-80	UTRA event B2 threshold
T1		S	5	
T2		S	≤10	
T3		S	1	

5.2.4.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. A neighbouring cell list, including the UTRA cell (Cell 2) is sent to the UE before T2 starts. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. T3 is defined as the end of the last TTI containing the RRC message implying handover.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.2.4.5-1 and 5.2.4.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.4.5-1 and 5.2.4.5-2. T2 starts.
- 6. UE shall transmit a MeasurementReport message triggered by Event B2.
- 7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC MobilityFromEUTRACommand message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.2.4.5-1 and 5.2.4.5-2. T3 starts.

- 9. If the UE transmits the UL to Cell 2 less than 120 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 10. After T3 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 11. The SS shall set Cell 2 cell parameter id =(current cell 2 cell parameter id +4) mod 16 for next iteration of the test procedure loop.
- 12. Repeat step 2-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and 4.7B with the following exceptions:

Table 5.2.4.4.3-1: Common Exception messages for E-UTRA TDD to UTRA TDD cell handover

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.3.1-1			
elements contents exceptions	Table H.3.1-5			
	Table H.3.1-7			
	Table H.3.3-1			
	Table H.3.3-3			

Table 5.2.4.4.3-2: ReportConfigInterRAT-B2-UTRA: Additional E-UTRAN TDD - UTRAN TDD handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.	.6.6-8 ReportConfigInterRA	T-B2(EUTRA-Thres, UTF	RA-Thres)
Information Element	Value/remark	Comment	Condition
ReportConfigInterRAT-B2-UTRA(EUTRA-Thres,			
UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
threshold-RSRP	47 (-93 dBm)	-93 dBm EUTRA-	
		Thres is actual	
		threshold value in	
		dBm (47 - 140	
		dBm)	
}			
b2-Threshold2 CHOICE {			
b2-Threshold2 UTRA CHOICE {			
utra-RSCP	35 (-80 dB)	-80 dB is actual	
		UTRA-Thres is	
		actual RSCP value	
		in dB (35 - 115	
		dBm)	
}			
}			
}			
}			
hysteresis	0 (0 dB)		
timeToTrigger	ms0		
}			
}			
maxReportCells	1		
reportInterval	ms1024		
reportAmount	r1		
}			

Table 5.2.4.4.3-3: MeasResults: Additional E-UTRAN TDD - UTRAN TDD handover

Derivation Path: TS 36.331 [5] clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResults ::= SEQUENCE {			
measld	1	Identifies the measurement id for the reporting being performed	
measResultsServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultsNeighCells CHOICE {			
measResultListUTRA	MeasResultListUTRA		
}			
}			

Table 5.2.4.4.3-4: MeasResultListUTRA: Additional E-UTRAN TDD - UTRAN TDD handover

Derivation Path: TS 36.331 [5] clause 6.3.5			T
Information Element	Value/remark	Comment	Condition
MeasResultListUTRA ::= SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
tdd	12	This is the typical	
		value range used in	
		UTRAN TDD tests.	
}			
measResult SEQUENCE {			
utra-RSCP		Set according to	
		specific test	
}			
}			

Table 5.2.4.4.3-5: HANDOVER TO UTRAN COMMAND

Information Element	Value/remark	Comment	Condition
Downlink information common for all radio links			
- Downlink DPCH info common for all RL			
- Timing indicator	Initialize		
- Default DPCH Offset Value	Arbitrary set to value		
	0306688 by step of 512		
CHOICE channel requirement	Uplink DPCH info		
- Uplink DPCH power control info			
- CHOICE mode	TDD		
- Activation time	Not Present		
-Downlink information for each radio links			
- CHOICE mode	TDD		
- Primary CCPCH info			
- Downlink DPCH info for each RL			
- CHOICE mode	TDD		
- Activation time	Not Present		

5.2.4.5 Test requirement

Tables 5.2.4.4.1-1, 5.2.4.5-1 and 5.2.4.5-2 define the primary level settings including test tolerances for E-UTRAN TDD - UTRAN TDD handover test.

Table 5.2.4.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD to UTRA TDD handover test case (Cell 1)

Parameter	Unit		Cell 1		
		T1	T2	T3	
E-UTRA RF Channel Number			1		
BW _{channel}	MHz		10		
OCNG Pattern defined in D.2.1 (OP.1 TDD) and in D.2.2 (OP.2 TDD)		OF	P.1 TDD	OP.2 TDD	
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0	0	0	
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				
$[\hat{\mathtt{E}}_{\scriptscriptstyle{\mathrm{s}}}/\mathtt{I}_{\scriptscriptstyle{\mathrm{ot}}}]$	dB	14.6	-3	-3	
\hat{E}_s/N_{oc}	dB	14.6	-3	-3	
N_{oc}	dBm/15kHz		-98.8		
RSRP	dBm/15kHz	-84.2	-101.8	-101.8	
SCH_RP	dBm/15 kHz	-84.2	-101.8	-101.8	
Io Note 2	dBm/9MHz	-56.27	-69.25	-69.25	
Propagation Condition			AWGN	•	
Note 1: OCNC shall be used such th	ot call in fully allog	otod ood	o constant tota		

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: RSRP, SCH_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 5.2.4.5-2: Cell Specific Test requirement Parameters for Cell 2 UTRAN TDD cell

Parameter	Unit		Cell 2 (UTRA)				
Timeslot Number		0 DwPTS					
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number Note 1		Channel 2					
PCCPCH_Ec/lor	dB	-3					
DwPCH_Ec/lor	dB	0					
OCNS_Ec/lor	dB		-3				
\hat{I}_{or}/I_{oc}	dB	-3	12.6	12.6	-3	12.6	12.6
I_{oc}	dBm/1.28 MHz	-80.8					
PCCPCH RSCP	dBm	-86.8 -71.2 -71.2 n.a.					
lo Note 2	dBm/1.28 MHz	-79.04	-67.97	-67.97	-79.04	-67.97	-67.97
Propagation Condition				AW	GN		·

Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.

Note 2: PCCPCH_RSCP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

 $D_{handover} = maximum RRC procedure delay + T_{interrupt1}$

$$T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + 20 + 10*F_{max} ms$$

 T_{offse} = 10 ms; The frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel

 $T_{UL} = 10$ ms; The time that can elapse until the appearance of the UL timeslot in the target cell

 $F_{SFN} = 1$; Equal to 1 if SFN decoding is required and equal to 0 otherwise.

 $F_{max} = 0$; The maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

Maximum RRC procedure delay = 50 ms as defined in TS 36.331 [5] clause 11.2.

The handover delay D_{handover} shall be less than a total of 120 ms in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.5 E-UTRAN FDD - UTRAN TDD handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

5.2.5.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN FDD to UTRAN TDD in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.2.5.2 Test applicability

This test applies to all types of release 8 and forward E-UTRA FDD UEs that support release 9 and forward UTRA TDD. Applicability requires support for FGI bits 8, and 22.

5.2.5.3 Minimum conformance requirements

5.2.5.3.1 3.84Mcps TDD option

Editor's note: FFS note: FFS

5.2.5.3.2 1.28Mcps TDD option

When the UE receives a RRC message implying E-UTRAN/UTRAN TDD handover the UE shall be ready to start the transmission of the new uplink DPCH or the SYNC-UL within D_{handover} seconds from the end of the last TTI containing the RRC MOBILITY FROM E-UTRA command.

Where:

 $D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in TS 36.133 [4] clause 5.3.2.2.2.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink DPCH or the SYNC-UL in UTRAN TDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell has been measured by the UE during the last 5 seconds, the interruption time shall be less than $T_{interrupt1}$.

$$T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + 20 + 10*F_{max} ms$$

If the target cell has not been measured by the UE during the last 5 seconds, the interruption time shall be less than $T_{interrupt2}$.

$$T_{interrupt2} = T_{offset} + T_{UL} + 30*F_{SFN} + 180 + 10*F_{max} ms$$

Where:

T_{offset} Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time

that can elapse until the appearance of a Beacon channel

T_{UL} Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell

F_{SEN} Equal to 1 if SFN decoding is required and equal to 0 otherwise

 F_{max} denotes the maximum number of radio frames within the transmission time intervals of all

transport channels that are multiplexed into the same CCTrCH.

The interruption time requirements for an unknown target cell shall apply only if the signal quality of the unknown target cell is sufficient for successful synchronisation with one attempt.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.2 and A.5.2.5.

5.2.5.3.2 7.68 Mcps TDD option

Editor's note: FFS

5.2.5.4 Test description

5.2.5.4.1 3.84Mcps TDD option

Editor's note: FFS

5.2.5.4.2 1.28Mcps TDD option

5.2.5.4.2.1Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.2.5.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.2.5.4.3.
- 5. There is one E-UTRA FDD serving cell and one UTRATDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.5.4.2.1-1; General Test Parameters for E-UTRAN FDD - UTRAN TDD handover test case

Parar	meter	Unit	Value	Comment
PDSCH parame			DL Reference Measurement Channel R.0 FDD	As specified in section A. 1.1
PCFICH/PDCCI parameters	H/PHICH		DL Reference Measurement Channel R.6 FDD	As specified in section A. 2.1
Initial	Active cell		Cell 1	E-UTRA FDD cell
conditions	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD Cell
Final conditions	Active cell		Cell 2	
Gap Pattern Id			1	As specified in 3GPP TS 36.133 section 8.1.2.1.
E-UTRAN FDD quantity	measurement		RSRP	
UTRAN TDD mo	easurement		RSCP	
CP length of cel	l 1		Normal	
Access Barring			Not Sent	No additional delays in random access procedure.
Assigned Sub-C	Channel Number		1	No additional delays in random access procedure due to ASC.
Hysteresis		dB	0	
Time To Trigger	•	dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
Ofn		dB	0	
Hys		dB	0	
Thresh1		dBm	-94	Absolute E-UTRAN RSRP threshold for event B2
Thresh2		dBm	-79	Absolute UTRAN RSCP threshold for event B2
T1		S	5	
T2		S	≤ 10	
T3		S	1	

5.2.5.4.2.2 Test procedure

The test scenario comprises of two cells, E-UTRA TDD cell1 and UTRA TDD cell2. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #1 as specified in TS 36.133 [4] Table 8.1.2.1-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain cell 2 as the target cell.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.2.5.5.2-1 and 5.2.5.5.2-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.5.5.2.-1 and 5.2.5.5.2-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event B2.
- 7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.

- 8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.2.5.5-1 and 5.2.5.5-2.
- 9. If the UE transmits the UL DPCH Cell 2 less than 120 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 10. After T3 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 11. SS shall change set cell 2 cell parameter id =(current cell 2 cell parameter id +4) mod 16.
- 12. Repeat step 2-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.5.4.2.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.5.4.2.3-1: Common Exception messages for E-UTRAN FDD - UTRAN TDD handover

Default Message Contents					
Common contents of system information					
blocks exceptions					
Default RRC messages and information	Table H.3.1-1				
elements contents exceptions	Table H.3.1-5				
	Table H.3.1-7				
	Table H.3.3-1				
	Table H.3.3-3				

Table 5.2.5.4.2.3-2: ReportConfigInterRAT-B2-UTRA: Additional E-UTRAN FDD - UTRAN TDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
ReportConfigInterRAT-B2-UTRA(EUTRA-Thres,			
UTRA-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
threshold-RSRP	46 (-94 dBm)	-94 dBm EUTRA-	
	, , ,	Thres is actual	
		threshold value in	
		dBm (46 - 140	
		dBm)	
}			
b2-Threshold2 CHOICE {			
b2-Threshold2UTRA CHOICE {			
utra-RSCP	36 (-79 dBm)	-79 dBm is actual	
		UTRA-Thres is	
		actual RSCP	
		value in dBm (36-	
		115dBm)	
}			
}			
}			
}			
hysteresis	0		
timeToTrigger	ms0		
}			
}			
maxReportCells	1		
reportInterval	ms1024		
reportAmount	r1		

Table 5.2.5.4.2.3-3: MeasResults: Additional E-UTRAN FDD - UTRAN FDD handover

Derivation Path: 36.331 clause 6.3.5		-	
Information Element	Value/remark	Comment	Condition
MeasResults ::= SEQUENCE {			
measld	1		
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListUTRA	MeasResultListUTRA		
}			
}			

Table 5.2.5.4.2.3-4: MeasResultListUTRA: Additional E-UTRAN FDD - UTRAN TDD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResultListUTRA ::= SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
physCellId CHOICE {			
tdd	12		
}			
measResult SEQUENCE {			
utra-RSCP	Set according to specific		
	test		
}			
}			

Table 5.2.5.4.2.3-5: HANDOVER TO UTRAN COMMAND

Information Element	Value/remark	Comment	Condition
Downlink information common for all radio links			
- Downlink DPCH info common for all RL			
- Timing indicator	Initialize		
- Default DPCH Offset Value	Arbitrary set to value		
	0306688 by step of 512		
CHOICE channel requirement	Uplink DPCH info		
- Uplink DPCH power control info			
- CHOICE mode	TDD		
- Activation time	Not Present		
-Downlink information for each radio links			
- CHOICE mode	TDD		
- Primary CCPCH info			
- Downlink DPCH info for each RL			
- CHOICE mode	TDD		
- Activation time	Not Present		

5.2.5.4.3 7.68 Mcps TDD option

Editor's note: FFS

5.2.5.5 Test requirement

5.2.5.5.1 3.84Mcps TDD option

Editor's note: FFS

5.2.5.5.2 1.28Mcps TDD option

Tables 5.2.5.4.2.1-1, 5.2.5.5.2-1 and 5.2.5.5.2-2 define the primary level settings including test tolerances for E-UTRAN FDD - UTRAN TDD handover test.

Table 5.2.5.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Cell 1 (E-UTRA)				
		T1	T2	T3		
E-UTRA RF Channel			1			
number						
BW _{channel}	MHz		10			
OCNG Patterns		OP.1 FDD OP.1 FDD OP.2 FD				
defined in D.1.1 (OP.1						
FDD) and in D.1.2						
(OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA ^{Note 1}	dB					
OCNG_RB ^{Note 1}	dB					
\hat{E}_s/N_{oc}	dB	11 + TT	-3 + TT	-3+ TT		
N_{oc}	dBm/15 kHz		-98			
\hat{E}_s/I_{ot}	dB	11 + TT	-3 + TT	-3+ TT		
RSRP	dBm/15 KHz	-87 + TT	-101 + TT	-101+ TT		
Propagation Condition			AWGN			
Note 1: OCNG shall be u	sed such that bot	h cells are full	ly allocated and	a constant		
total transmitte	ed power spectral	density is ach	nieved for all OF	DM symbols.		

Table 5.2.5.5-2: Cell Specific Test requirement Parameters for Cell 2 UTRAN TDD cell

Parameter	Unit	Cell 2 (UTRA)					
Timeslot Number		0 DwPTS				3	
		T1	T2	T3	T1	T2	T3
UTRA RF Channel Number*		Channel 2					
PCCPCH_Ec/lor	dB		-3				
DwPCH_Ec/lor	dB				0		
OCNS_Ec/lor	dB		-3				
\hat{I}_{or}/I_{oc}	dB	-3 TT	11 TT	11 TT	-3 TT	11 TT	11 TT
I_{oc}	dBm/1.28 MHz			-8	80		
PCCPCH RSCP	dBm	-86 TT	-72 TT	-72 TT	n.a.		
Propagation Condition		AWGN					
* Note: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.							

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

 $Handover\ delay\ D_{handover} = maximum\ RRC\ procedure\ delay\ +\ T_{interrupt}$

 $T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + 20 + 10*F_{max} \ ms$

 T_{offse} = 10 ms; The frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel

 $T_{UL} = 10$ ms; The time that can elapse until the appearance of the UL timeslot in the target cell

 $F_{SEN} = 1$; Equal to 1 if SFN decoding is required and equal to 0 otherwise.

 $F_{max} = 0$; The maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

Maximum RRC procedure delay = 50 ms as defined in TS 36.331 [5] clause 11.2

The handover delay $D_{handover}$ shall be less than a total of 120 ms in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.5.5.2 7.68 Mcps TDD option

Editor's note: FFS

5.2.6 E-UTRA TDD - GSM handover

5.2.6.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to GSM in RRC_CONNECTED state by meeting the UE handover delay and interruption time requirements.

5.2.6.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support GSM. Applicability requires support for FGI bits 9, 15 and 23.

5.2.6.3 Minimum conformance requirements

The handover delay $T_{Handover}$ delay shall be less than handover delay + T_{offset} + T_{UL} in RRC_CONNECTED state.

The handover delay given in table 5.2.6.3-1 and interruption time given in table 5.2.6.3-2 requirements for the case where the UE has not synchronised to the GSM cell before receiving the RRC MOBILITY FROM E-UTRA command are valid when the signal quality of the GSM cell is sufficient for successful synchronisation with one attempt. If the UE is unable to synchronise to the GSM cell on the first attempt, it shall continue to search for synchronisation information for up to 800 ms duration. If after 800 ms the UE has not synchronised to the GSM cell it shall follow the handover failure procedure specified in TS 36.331 [5].

When the UE receives a RRC MOBILITY FROM E-UTRA command the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT within the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.6.3-1 from the end of the last TTI containing the RRC command.

The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay.

Table 5.2.6.3-1: E-UTRAN/GSM handover - handover delay

UE synchronisation status	handover delay [ms]
The UE has synchronised to the GSM cell before the	90
RRC MOBILITY FROM E-UTRA COMMAND is received	
The UE has not synchronised to the GSM cell before	190
RRC the MOBILITY FROM E-UTRA COMMAND is	
received	

The interruption time, i.e. the time between the end of the last TTI containing a transport block on the old channel and the time the UE is ready to transmit on the new channel, shall be less than the value defined in TS 36.133 [4] clause 5.3.3.2.2 and shown in table 5.2.6.3-2:

Table 5.2.6.3-2: E-UTRAN/GSM handover - interruption time

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the	40
RRC MOBILITY FROM E-UTRA COMMAND is received	
The UE has not synchronised to the GSM cell before the	140
RRC MOBILITY FROM E-UTRA COMMAND is received	

The normative reference for this requirement is TS 36.133 [4] clause 5.3.3 and A.5.2.6.

5.2.6.4 Test description

5.2.6.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
- 2. The general test parameter settings are set up according to Table 5.2.6.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 5.2.6.4.3.
- 5. There is one E-UTRA TDD serving cell and one GSM cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.6.4.1-1: General Test Parameters for E-UTRAN TDD - GSM handover test case

Parameter		Unit	Value	Comment
PDSCH paramete	PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
PCFICH/PDCCH parameters	/PHICH		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Gap Pattern Id			1	As specified in TS 36.133 [4] section 8.1.2.1.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
Uplink-downlink of cell 1	configuration of		1	As specified in table 4.2.2 in TS 36.211 [9]
Special subframe cell 1	configuration of		6	As specified in table 4.2.1 in TS 36.211 [9]
CP length of cell	1		Normal	
Inter-RAT measu	rement quantity		GSM Carrier RSSI	
E-UTRA RF Chai	nnel Number		1	E-UTRA RF Channel Number
E-UTRA Channe (BW _{channel})	I Bandwidth	MHz	10	E-UTRA Channel Bandwidth (BW _{channel})
Threshold other s	system	dBm	-80	Absolute GSM carrier RSSI threshold for event B1.
Hysteresis		dB	0	
Time to Trigger		ms	0	
Filter coefficient			0	L3 filtering is not used
DRX				OFF
T1		S	20	
T2		S	7	
T3		S	1	

5.2.6.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. The RRC message implying handover to Cell 2 shall be sent to the UE during T2, after the UE has reported Event B1. T3 is defined as the end of the last E-UTRAN TTI containing the RRC message implying handover. The requirements are also applicable for a UE not requiring measurement gap, in which case no measurement gap pattern is sent.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.2.6.5-1 and 5.2.6.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.2.6.5-1 and 5.2.6.5-2. T2 starts.
- 6. UE shall transmit a MeasurementReport message triggered by Event B1.
- 7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 5.2.6.5-2. T3 starts.
- 9. If the UE sends access bursts on the new DCCH to Cell 2 less than 100 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 10. After T3 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3 . Cell 1 is the active cell.

- 11. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 12. Repeat step 2-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.6.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.6.4.3-1: Common Exception messages for E-UTRAN TDD - GSM handover

Default Message Contents		
Common contents of system information blocks exceptions		
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-6 Table H.3.1-7 Table H.3.3-2 Table H.3.3-3	

Table 5.2.6.4.3-2: SystemInformationBlockType7: Additional E-UTRAN TDD - GSM handover

Derivation Path: TS 36.508 [7] clause 4.4.3.3, 1	Table 4.4.3.3-3 SystemInformation	BlockType7	
Information Element	Value/remark	Comment	Condition
commonInfo SEQUENCE {			
p-MaxGERAN	33 (33 dBm)		GSM 400 &
			GSM 900 &
			GSM 850 &
			GSM 700
	30 (30 dBm)		DCS 1800
	,		& PCS 1900
}			

Table 5.2.6.4.3-3: ReportConfigInterRAT-B1-GERAN: Additional E-UTRAN TDD - GSM handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
ReportConfigInterRAT-B1-GERAN(GERAN-			
Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB1 SEQUENCE {			
b1-Threshold CHOICE {			
B1-Threshold-GERAN CHOICE {			
thresholdGERAN	30 (-80 dBm)	-80 is actual value	
	,	in dBm (30 - 110 dBm)	

Table 5.2.6.4.3-4: MeasResults: Additional E-UTRAN TDD - GSM handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultListGERAN	MeasResultListGERAN		
}			
}			

Table 5.2.6.4.3-5: MeasResultListGERAN: Additional E-UTRAN TDD - GSM handover

Information Element	Value/remark	Comment	Condition
MeasResultListGERAN ::= SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
MeasResultGERAN SEQUENCE {			
CarrierFreq	CarrierFreqGERAN	Contains the carrier frequency of the target GERAN cell	
physCellId	PhysCellIdGERAN	Contains the Base Station Identity Code (BSIC) and is used %%	
}			
Cgi-Info SEQUENCE {			
cellGloballd	CellGlobalIdGERAN		
routingAreaCode	Not present		
Rssi		Set according to specific test	
}		specific test	

5.2.6.5 Test requirement

Tables 5.2.6.4.1-1, 5.2.6.5-1 and 5.2.6.5-2 defines the primary level settings including test tolerances for E-UTRAN TDD to GSM handover test case.

Table 5.2.6.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN TDD cell

Parameter	Unit	Cell 1	
		T1, T2	T3
E-UTRA RF Channel Number		1	
BW _{channel}	MHz	10)
OCNG Patterns defined in D.2.1 (OP.1 TDD) and in D.2.2 (OP.2 TDD)		OP.1 TDD	OP.2 TDD
PBCH_RA	dB		
PBCH_ RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_ RB	dB		
PHICH_ RA	dB		
PHICH_ RB	dB	0	
PDCCH_ RA	dB		
PDCCH_ RB	dB		
PDSCH_ RA	dB		
PDSCH_ RB	dB		
OCNG_ RA Note1	dB		
OCNG_ RB Note1	dB		
\hat{E}_s/N_{oc}	dB	4	
$N_{\it oc}$ Note 2	dBm/15 kHz	-98 (A\	WGN)
\hat{E}_s/I_{ot}	dB	4	
RSRP Note 3	dBm/15kHz	-9	4
Propagation Condition		AW	GN
		fully allocated and a constant	

spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 5.2.6.5-2: Cell Specific Test requirement Parameters for Cell 2 GSM cell

Doromotor	Unit	Cell 2 (0	GSM)
Parameter	Unit	T1	T2, T3
Absolute RF Channel		ARFC	NI 1
Number		AREC	IN I
RXLEV	dBm	-85	-75

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to send access bursts on the new DCCH to Cell 2.

The handover delay T_{Handover delay} test requirement in this case is expressed as:

Handover delay $T_{Handover\ delay}$ = handover delay + T_{offset} + T_{UL}

Handover delay = 90 ms; this is based on handover delay value as defined in Table 5.2.6.3.-1

T_{offset} = 4.65 ms; GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

 $T_{UL} = 4.65$ ms; the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame

The handover delay $T_{Handover\,delay}$ shall be less than a total of 100 ms in this test case (note: this gives a total of 99.3 ms but the test allows 100 ms).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.7 E-UTRAN FDD - UTRAN FDD handover: unknown target cell

5.2.7.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to UTRAN handover: unknown target cell in RRC_CONNECTED state by meeting the handover to an unknown target cell delay requirements.

5.2.7.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support UTRA FDD. Applicability requires support for FGI bits 8, and 22.

5.2.7.3 Minimum conformance requirements

When the UE receives a RRC message implying handover to UTRAN the UE shall be ready to start the transmission of the new UTRA uplink DPCCH within $D_{handover}$ seconds from the end of the last E-UTRAN TTI containing the RRC MOBILITY FROM E-UTRA command.

Where:

 $D_{handover}$ equals the RRC procedure delay, which is 50 ms plus the interruption time stated in TS 36.133 [4] clause 5.3.1.1.2.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink DPCCH in UTRAN FDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

The target cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell is known the interruption time shall be less than T_{interrupt1}.

$$T_{interrupt1} = T_{IU} + T_{sync} + 50 + 10*F_{max} ms$$

If the target cell is unknown the interruption time shall be less than T_{interrupt2}.

$$T_{interrupt2} = \quad T_{IU} + T_{sync} + 150 + 10*F_{max} \; ms \label{eq:timestate}$$

This requirement shall be met, provided that there is one target cell in the MOBILITY FROM E-UTRA command. When UE is connected to an E-UTRA cell, UTRA SFN timing measurements are not reported. This implies that the timing of the DPCH of the UTRA target cells in the active set cannot be configured by UTRAN to guarantee that all target cells fall within the UE reception window of T_0 +/- 148 chips.

Where:

 T_{IU} is the interruption uncertainty when changing the timing from the E-UTRAN to the new UTRAN cell. T_{IU} can be up to one UTRA frame (10 ms).

 F_{max} denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH on the UTRA target cell.

 T_{sync} is the time required for measuring the downlink DPCCH channel as stated in TS 25.214 [12] clause 4.3.1.2. In case higher layers indicate the usage of a post-verification period $T_{\text{sync}} = 0$ ms. Otherwise $T_{\text{sync}} = 40$ ms.

The phase reference is the primary CPICH.

The requirements assume that N312 has the smallest possible value i.e. only one in-sync is required.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.1 and A.5.2.7.

5.2.7.4 Test description

5.2.7.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.2.7.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.2.7.4.3.
- 5. There is one E-UTRA FDD serving cell and one UTRA FDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.7.4.1-1: General Test Parameters for E-UTRAN FDD - UTRAN FDD handover: unknown target cell test case

Para	ameter	Unit	Value	Comment
PDSCH parameter	S		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/P	HICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN cell
	Neighbouring cell		Cell 2	UTRAN cell
Final condition	Active cell		Cell 2	UTRAN cell
Channel Bandwidth	n (BW _{channel})	MHz	10	
E-UTRAN FDD me	asurement quantity		RSRP	
Inter-RAT (UTRAN	FDD) measurement		CPICH Ec/N0	
quantity				
DRX			OFF	Non-DRX test
Access Barring Info	ormation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Chann	el Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel E (BWchannel)	Bandwidth	MHz	10	
UTRA RF Channel	Number		1	One UTRA FDD carrier frequency is used.
Monitored UTRA F	DD cell list size		12	UTRA cells on UTRA RF channel 1 provided in the cell before T2.
Post-verification pe	riod		False	
T1		s	≤5	
T2		S	1	

5.2.7.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. A RRC message implying handover shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. Starting T2, Cell 2 becomes detectable and the UE receives a RRC handover command from the network.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.2.7.5-1 and 5.2.7.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

- 3. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 4. The start of T2 is the instant when the last TTI containing the RRC MobilityFromEUTRACommand message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Tables 5.2.7.5-1 and 5.2.7.5-2. T2 starts.
- 5. If the UE transmits the UL DPCCH to Cell 2 less than 290 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 6. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 7. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code 50) mod 200 + 100) for next iteration of the test procedure loop.
- 8. Repeat step 2-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.7.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.7.4.3-1: Common Exception messages for E-UTRAN FDD - UTRAN FDD handover: unknown target cell test requirement

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.3.3-1			
elements contents exceptions	Table H.3.3-3			

Table 5.2.7.4.3-2: HANDOVER TO UTRAN COMMAND

Information Element	Value/remark	Comment	Condition
Downlink information common for all radio links			
 Downlink DPCH info common for all RL 			
- Timing indicator	Initialize		
- Default DPCH Offset Value	Arbitrary set to value 0306688 by step of 512		

5.2.7.5 Test requirement

Tables 5.2.7.4.1-1, 5.2.7.5-1 and 5.2.7.5-2 define the primary level settings including test tolerances for E-UTRAN FDD - UTRAN FDD handover: unknown target cell test.

Table 5.2.7.5-1: Cell Specific Test requirement Parameters for Cell 1 in E-UTRAN FDD - UTRAN FDD handover: unknown target cell test

Parameter	Unit	Cell 1 (E-UTRA)	
		T1	T2
E-UTRA RF Channel			1
number			
BW _{channel}	MHz		10
OCNG Patterns defined in		OP.1 FDD	OP.2 FDD
D.1.1 (OP.1 FDD) and in			
D.1.2 (OP.2 FDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB	0	
PHICH_RA	dB		
PHICH_RB	dB		
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA ^{Note 1}	dB		
OCNG_RB ^{Note 1}	dB		
\hat{E}_s/I_{ot}	dB	0	0
$N_{oc}^{ m Note~2}$	dBm/15 kHz	-98	
\hat{E}_s/N_{oc}	dB	0	0
RSRP Note 3	dBm/15 KHz	-98	-98
Propagation Condition	AWGN		
Note 1: OCNG shall be used such that both cells are fully allocated and			
a constant total transmitted power spectral density is achieved			
for all OFDM symbols.			
Note 2: Interference from other calls and noise courses not enceified in			

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time

and shall be modelled as AWGN of appropriate power for $N_{\it oc}$ to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 5.2.7.5-2: Cell Specific Test requirement Parameters for Cell 2 in E-UTRAN - UTRAN FDD handover: unknown target cell test

Parameter	Unit Cell 2 (UTRA)		(UTRA)	
		T1	T2	
CPICH_Ec/lor	dB	-	·10	
PCCPCH_Ec/lor	dB	-	·12	
SCH_Ec/lor	dB	-	·12	
PICH_Ec/lor	dB	-15		
DCH_Ec/lor	dB	Note 1		
OCNS_Ec/lor	dB	Note 2		
\hat{I}_{or}/I_{oc}	dB	-infinity -1.8		
I_{oc}	dBm/3,84 MHz	-70 -70		
CPICH_Ec/lo	dB	-infinity	-14	
Propagation Condition	AWGN			

Note 1: The DPCH level is controlled by the power control loop

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.

The handover to an unknown target cell delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit the UL DPCCH to Cell 2.

The handover to an unknown target cell delay test requirement in this case is expressed as:

Handover delay D_{handover} = maximum RRC procedure delay + T_{interrupt2} (note: the target cell is unknown)

 $T_{interrupt2} = T_{IU} + T_{sync} + 150 + 10*F_{max} \ ms$

 $T_{IU} = 10 \text{ ms}$; T_{IU} can be up to one UTRA frame (10 ms).

 F_{max} = 4 radio frames; The maximum radio frames within the transmission time intervals to fit into DCCH with 40 ms TTI

 $T_{sync} = 40 \text{ ms}$; In case higher layers indicate the usage of a post-verification period $T_{sync} = 0 \text{ ms}$. Otherwise $T_{sync} = 40 \text{ ms}$

Maximum RRC procedure delay = 50 ms as defined in TS 36.331 [5] clause 11.2

The handover to an unknown target cell delay shall be less than a total of 290 ms in this test case (note: this gives a total of 50 ms for maximum RRC procedure delay plus 240 ms for $T_{interrupt2}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.8 E-UTRAN FDD - GSM handover: unknown target cell

5.2.8.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to GSM handover: unknown target cell in RRC_CONNECTED state by meeting the handover to an unknown target cell delay requirements.

5.2.8.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support GSM. Applicability requires support for FGI bits 9, and 23.

5.2.8.3 Minimum conformance requirements

The handover delay $T_{Handover\,delay}$ shall be less than handover delay + T_{offset} + T_{UL} in RRC_CONNECTED state.

The handover delay given in table 5.2.8.3-1 and interruption time given in table 5.2.8.3-2 requirements for the case where the UE has not synchronised to the GSM cell before receiving the RRC MOBILITY FROM E-UTRA command are valid when the signal quality of the GSM cell is sufficient for successful synchronisation with one attempt. If the UE is unable to synchronise to the GSM cell on the first attempt, it shall continue to search for synchronisation information for up to 800 ms duration. If after 800 ms the UE has not synchronised to the GSM cell it shall follow the handover failure procedure specified in TS 36.331 [5].

When the UE receives a RRC MOBILITY FROM E-UTRA command the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT within the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.8.3-1 from the end of the last TTI containing the RRC command.

The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay.

Table 5.2.8.3-1: E-UTRAN/GSM handover - handover delay

UE synchronisation status	handover delay [ms]
The UE has synchronised to the GSM cell before the	90
RRC MOBILITY FROM E-UTRA COMMAND is received	
The UE has not synchronised to the GSM cell before	190
RRC the MOBILITY FROM E-UTRA COMMAND is	
received	

The interruption time is the time between the end of the TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink channel in GSM, excluding the RRC procedure delay. The interruption time depends on whether the UE has synchronized to the target GSM cell or not and shall be less than the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.8.3-2.

Table 5.2.8.3-2: E-UTRAN/GSM handover - interruption time

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the	40
RRC MOBILITY FROM E-UTRA COMMAND is received	
The UE has not synchronised to the GSM cell before the	140
RRC MOBILITY FROM E-UTRA COMMAND is received	

The normative reference for this requirement is TS 36.133 [4] clause 5.3.3 and A.5.2.8.

5.2.8.4 Test description

5.2.8.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
- 2. The general test parameter settings are set up according to Table 5.2.8.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 5.2.8.4.3.
- 5. There is one E-UTRA FDD serving cell and one GSM cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.8.4.1-1: General Test Parameters for E-UTRAN FDD - GSM handover: unknown target cell test case

Para	meter	Unit	Value	Comment
PDSCH paramete	ers		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/ parameters	/PHICH		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Gap Pattern Id			None	No measurement gaps shall be provided.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
DRX			OFF	No DRX configured
T1		S	≤7	
T2		S	1	

5.2.8.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. A RRC message implying handover shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. Starting T2, Cell 2 becomes detectable and the UE receives a RRC handover command from the network.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.2.8.5-1 and 5.2.8.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The neighbour cell shall broadcast its own BSIC, SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 4. The start of T2 is the instant when the last TTI containing the RRC MobilityFromEUTRACommand message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table 5.2.8.5-1 and 5.2.8.5-2. T2 starts.
- 5. If the UE sends access bursts on the new DCCH to Cell 2 less than 200 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 6. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 7. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 8. Repeat step 2-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.8.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.8.4.3-1: Common Exception messages for E-UTRAN FDD - GSM handover: unknown target cell test requirement

Default Message Contents		
Common contents of system information		
blocks exceptions		
Default RRC messages and information	Table H.3.3-2	
elements contents exceptions	Table H.3.3-3	

Table 5.2.8.4.3-2: SystemInformationBlockType7: Additional E-UTRAN FDD - GSM handover: unknown target cell test requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-3 SystemInformationBlockType7			
Information Element	Value/remark	Comment	Condition
commonInfo SEQUENCE {			
p-MaxGERAN	33 (33 dBm)		GSM 400 &
			GSM 900 &
			GSM 850 &
			GSM 700
	30 (30 dBm)		DCS 1800
	, ,		& PCS 1900
}			

5.2.8.5 Test requirement

Tables 5.2.8.4.1-1, 5.2.8.5-1 and 5.2.8.5-2 defines the primary level settings including test tolerances for E-UTRAN FDD to GSM handover: unknown target cell test.

Table 5.2.8.5-1: Cell Specific Test requirement Parameters for Cell 1 in E-UTRAN FDD - GSM handover: unknown target cell test

Parameter	Unit	Cell 1		
		T1	T2	
BW _{channel}	MHz		10	
OCNG Patterns				
defined in D.1.1		OP.1 FDD	OP.2 FDD	
(OP.1 FDD) and in		OF.1 FDD	OF.2 FDD	
D.1.2 (OP.2 FDD)				
PBCH_RA	dB			
PBCH_ RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_ RB	dB			
PHICH_ RA	dB			
PHICH_ RB	dB		0	
PDCCH_ RA	dB			
PDCCH_ RB	dB			
PDSCH_ RA	dB			
PDSCH_ RB	dB			
OCNG_ RA Note1	dB			
OCNG_ RB Note1	dB			
${\hat{ m E}}_{ m s}/{ m I}_{ m ot}$	dB		4	
$N_{_{oc}}^{\mathrm{Note 2}}$	dBm/15 kHz		-98	
\hat{E}_s/N_{oc}	dB		4	
RSRP Note 3	dBm/15 kHz		-94	
Propagation		Δ	wgn	
Condition		-		
transmitted	d power spectral	hat cell 1 is fully allocated density is achieved for all as and noise sources not s	l OFDM symbols.	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as

AWGN of appropriate power for $\frac{N_{oc}}{N_{oc}}$ to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

arposed. They are not settable parameters themselves.

Table 5.2.8.5-2: Cell Specific Test requirement Parameters for Cell 2 in E-UTRAN FDD - GSM handover: unknown target cell test

Parameter	Unit	Cell 2 (GSM)	
Parameter	Onit	T1	T2
Absolute RF Channel Number		ARFC	N 1
RXLEV	dBm	-Infinity	-75

The handover to an unknown target cell delay is defined as the time from the beginning of time period T2, to the moment the UE start to send access bursts on the new DCCH to Cell 2.

The handover to an unknown target cell delay test requirement in this case is expressed as:

Handover delay $T_{Handover delay} = handover delay + T_{offset} + T_{UL}$

Handover delay = 190 ms; this is based on handover delay value as defined in Table 5.2.3.3.-1

 $T_{offset} = 4.65$ ms; GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

 $T_{\rm UL} = 4.65$ ms; the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame

The handover to an unknown target cell delay shall be less than a total of 200 ms in this test case (note: this gives a total of 199.3 ms but the test allows 200 ms).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.9 E-UTRAN TDD - GSM handover: unknown target cell

5.2.9.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN TDD to GSM in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements when the target cell is unknown.

5.2.9.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward that support GSM. Applicability requires support for FGI bits 9, and 23.

5.2.9.3 Minimum conformance requirements

The handover delay given in table 5.2.9.3-1 and interruption time given in table 5.2.9.3-2 requirements for the case where the UE has not synchronised to the GSM cell before receiving the RRC MOBILITY FROM E-UTRA command are valid when the signal quality of the GSM cell is sufficient for successful synchronisation with one attempt. If the UE is unable to synchronise to the GSM cell on the first attempt, it shall continue to search for synchronisation information for up to 800 ms duration. If after 800 ms the UE has not synchronised to the GSM cell it shall follow the handover failure procedure specified in TS 36.331 [5].

When the UE receives a RRC MOBILITY FROM E-UTRA command the UE shall be ready to transmit (as specified in 3GPP TS 45.010 [13]) on the channel of the new RAT within the value defined in TS 36.133 [4] clause 5.3.3.2.1 and shown in table 5.2.9.3-1 from the end of the last TTI containing the RRC command.

The UE shall process the RRC procedures for the MOBILITY FROM E-UTRA command within 50 ms, which is noted as RRC procedure delay.

Table 5.2.9.3-1: E-UTRAN/GSM handover - handover delay

UE synchronisation status	handover delay [ms]
The UE has synchronised to the GSM cell before the	90
RRC MOBILITY FROM E-UTRA COMMAND is received	
The UE has not synchronised to the GSM cell before	190
RRC the MOBILITY FROM E-UTRA COMMAND is	
received	

The interruption time is the time between the end of the TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink channel in GSM, excluding the RRC procedure delay. The interruption time depends on whether the UE has synchronized to the target GSM cell or not and shall be less than the value defined in TS 36.133 [4] clause 5.3.3.2.2 and shown in table 5.2.9.3-2.

Table 5.2.9.3-2: E-UTRAN/GSM handover - interruption time

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the	40
RRC MOBILITY FROM E-UTRA COMMAND is received	
The UE has not synchronised to the GSM cell before the	140
RRC MOBILITY FROM E-UTRA COMMAND is received	

The normative reference for this requirement is TS 36.133 [4] clause 5.3.3 and A.5.2.9.

5.2.9.4 Test description

5.2.9.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.14.
- 2. The general test parameter settings are set up according to Table 5.2.9.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 5.2.9.4.3.
- 5. There is one E-UTRA TDD serving cell and one GSM cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.9.4.1-1: General Test Parameters for E-UTRAN TDD to GSM handover test case; unknown target cell

Parameter		Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Gap Pattern Id			None	No measurement gaps shall be provided.
Initial conditions	Active cell		Cell 1	
	Neighbour cell		Cell 2	
Final conditions	Active cell		Cell 2	
DRX			OFF	No DRX configured
Special subframe configuration			6	As specified in table 4.2-1 in 3GPP TS 36.211[8]
Uplink-downlink configuration			1	As specified in table 4.2-2 in 3GPP TS 36.211[8]
T1		S	7	
T2		S	1	

5.2.9.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of two successive time periods, with time duration of T1, T2 respectively. At the start of time duration T1, the UE will not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. No Gap pattern configuration shall be used.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.2.9.5-1 and 5.2.9.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The neighbour cell shall broadcast its own BSIC, SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 4. The start of T2 is the instant when the last TTI containing the RRC MobilityFromEUTRACommand message implying handover is sent to the UE, At that instant the SS shall switch the power settings from T1 to T2 as specified in Table 5.2.9.5-1 and 5.2.9.5-2. T2 starts.
- 5. If the UE sends access bursts on the new DCCH to Cell 2 less than 200 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 6 . After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 7. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 8. Repeat step 2-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.9.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.9.4.3-1: Common Exception messages for E-UTRAN TDD - GSM handover: unknown target cell test requirement

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.3.3-2			
elements contents exceptions	Table H.3.3-3			

Table 5.2.9.4.3-2: SystemInformationBlockType7: Additional E-UTRAN TDD - GSM handover: unknown target cell test requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-3 SystemInformationBlockType7				
Information Element	Value/remark	Comment	Condition	
commonInfo SEQUENCE {				
p-MaxGERAN	33 (33 dBm)		GSM 400 &	
			GSM 900 &	
			GSM 850 &	
			GSM 700	
	30 (30 dBm)		DCS 1800	
	. ,		& PCS 1900	
}				

5.2.9.5 Test requirement

Tables 5.2.9.4.1-1, 5.2.9.5-1 and 5.2.9.5-2 defines the primary level settings including test tolerances for E-UTRAN TDD to GSM handover test case when the target cell is unknown.

Table 5.2.9.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN TDD GSM handover: unknown target cell test

Parameter	Unit	Cell 1		
		T1	T2	
BW _{channel}	MHz	10		
OCNG Patterns				
defined in D.2.1		OP.1 TDD	OP.2 TDD	
(OP.1 TDD) and in		01.11700	01.2.100	
D.2.2(OP.2 TDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB	0		
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note1	dB			
OCNG_RB Note1	dB			
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB		4	
N_{oc} Note 2	dBm/15 kHz		-98	
\hat{E}_s/N_{oc}	dB		4	

	dBm/15 kHz	-94		
Propagation Condition		AWGN		
OCNG shall be used such that cell 1 is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.				
Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as				
AWGN of appropriate power for $rac{N_{oc}}{}$ to be fulfilled.				
RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				
	DCNG sha ransmitted nterference assumed to AWGN of a RSRP leve	DCNG shall be used such transmitted power spectral on the ference from other cells assumed to be constant over AWGN of appropriate powers RSRP levels have been determined.		

Table 5.2.9.5-2: Cell Specific Test requirement Parameters for Cell 2 E-UTRAN TDD – GSM handover: unknown target cell test

Parameter	Unit	Cell 2 (GSM)		
Parameter		T1	T2	
Absolute RF Channel		ARFCN 1		
Number				
RXLEV	dBm	-Infinity	-75	

The handover delay is defined as the time from the beginning of time period T2, to the moment the UE start to send access bursts on the new DCCH to Cell 2.

The handover delay $T_{\text{Handover delay}}$ test requirement in this case is expressed as:

Handover delay $T_{Handover delay} = handover delay + T_{offset} + T_{UL}$

Handover delay = 190 ms; this is based on handover delay value as defined in Table 5.2.9.3.-1

 $T_{offset} = 4.65$ ms; GSM timing uncertainty between the time from when the UE is ready to transmit until the start of the next timeslot in GSM 26 multiframe structure

 $T_{\rm UL} = 4.65$ ms; the time the UE has to wait in case the next timeslot is an idle frame or a SACCH frame

The handover delay $T_{Handover\ delay}$ shall be less than a total of 200 ms in this test case (note: this gives a total of 199.3 ms but the test allows 200 ms).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.2.10 E-UTRAN TDD - UTRAN TDD handover: unknown target cell

5.2.10.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN TDD to UTRAN TDD in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements when the target cell is unknown.

5.2.10.2 Test applicability

This test applies to all types of release 8 and forward E-UTRA TDD UEs that support release 9 and forward UTRA TDD. Applicability requires support for FGI bits 8, and 22.

5.2.10.3 Minimum conformance requirements

When the UE receives a RRC message implying E-UTRAN/UTRAN TDD handover the UE shall be ready to start the transmission of the new uplink DPCH or the SYNC-UL within $D_{handover}$ seconds from the end of the last TTI containing the RRC MOBILITY FROM E-UTRA command.

Where:

 D_{handover} equals the RRC procedure delay, which is 50 ms plus the interruption time stated in TS 36.133 [4] clause 5.3.2.2.2.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission on the uplink DPCH or the SYNC-UL in UTRAN TDD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

The UE shall always perform a UTRA synchronisation procedure as part of the handover procedure.

If the target cell has been measured by the UE during the last 5 seconds, the interruption time shall be less than $T_{interrupt1}$

$$T_{interrupt1} = T_{offset} + T_{UL} + 30*F_{SFN} + 20 + 10*F_{max} ms$$

If the target cell has not been measured by the UE during the last 5 seconds, the interruption time shall be less than $T_{interrupt2}$

$$T_{interrupt2} = T_{offset} + T_{UL} + 30*F_{SFN} + 180 + 10*F_{max} ms$$

Where:

 T_{offset} Equal to 10 ms, the frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel

T_{III.} Equal to 10 ms, the time that can elapse until the appearance of the UL timeslot in the target cell

F_{SEN} Equal to 1 if SFN decoding is required and equal to 0 otherwise

 F_{max} denotes the maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

The interruption time requirements for an unknown target cell shall apply only if the signal quality of the unknown target cell is sufficient for successful synchronisation with one attempt.

The normative reference for this requirement is TS 36.133 [4] clause 5.3.2 and A.5.2.10.

5.2.10.4 Test description

5.2.10.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.2.10.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.2.10.4.3.
- 5. There is one E-UTRA TDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.2.10.4.1-1: General test parameters for E-UTRA TDD to unknown UTRA (1.28 Mcps TDD OPTION) handover test case

Parame	eter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Initial	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbour cell		Cell 2	UTRA 1.28Mcps TDD cell
Final conditions	Active cell		Cell 2	UTRA 1.28Mcps TDD cell
CP length of cell	1		Normal	
Uplink-downlink of cell 1	configuration		1	As specified in table 4.2.2 in TS 36.211[9]
Special subframe configuration of cell 1			6	As specified in table 4.2.1 in TS 36.211[9]
Time offset betw	een cells		3 ms	Asynchronous cells 3ms or 92160*Ts
Access Barring Information			Not Sent	No additional delays in random access procedure.
Assigned Sub-C Number	hannel		1	No additional delays in random access procedure due to ASC.
TimeToTrigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	
T1		S	5	During T1, cell 2 shall be powered off, and during the off time the physical layer cell identity shall be changed.
T2		S	1	

5.2.10.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, a RRC message implying handover to UTRA 1.28Mcps TDD cell shall be sent to the UE including activation time "now". The end of the last TTI containing handover message is the beginning of T2 duration.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Tables 5.2.10.5-1 and 5.2.10.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 4. The start of T2 is the instant when the last TTI containing the RRC MobilityFromEUTRACommand message implying handover is sent to the UE, At that instant the SS shall switch the power settings from T1 to T2 as specified in Tables 5.2.10.5-1 and 5.2.10.5-2. T2 starts.
- 5. If the UE transmits the UL to Cell 2 less than 280ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 6. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 7. The SS shall set Cell 2 cell parameter id =(current cell 2 cell parameter id +4) mod 16 for next iteration of the test procedure loop.
- 8. Repeat step 2-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.2.10.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 5.2.10.4.3-1: Common Exception messages for E-UTRA TDD to unknown UTRA TDD cell handover

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.3.3-1			
elements contents exceptions	Table H.3.3-3			

Table 5.2.10.4.3-2: HANDOVER TO UTRAN COMMAND

Information Element	Value/remark	Comment	Condition
Downlink information common for all radio links			
- Downlink DPCH info common for all RL			
- Timing indicator	Initialize		
- Default DPCH Offset Value	Arbitrary set to value 0306688 by step of 512		
CHOICE channel requirement	Uplink DPCH info		
- Uplink DPCH power control info			
- CHOICE mode	TDD		
- Activation time	Not Present		
-Downlink information for each radio links			
- CHOICE mode	TDD		
- Primary CCPCH info			
- Downlink DPCH info for each RL			
- CHOICE mode	TDD		
- Activation time	Not Present		

5.2.10.5 Test requirement

Tables 5.2.10.4.1-1, 5.2.10.5-1 and 5.2.10.5-2 define the primary level settings including test tolerances for E-UTRAN TDD to unknown UTRAN TDD cell handover test.

Table 5.2.10.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD to unknown UTRAN TDD cell handover test case (cell1)

Parameter	Unit	Cell 1		
		T1	T2	
E-UTRA RF Channel			1	
Number				
BWchannel	MHz	1	0	
OCNG Patterns defined in		OP.1 TDD	OP.2 TDD	
D.2.1 (OP.1 TDD) and in				
D.2.2(OP.2 TDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0	0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA (Note 1)	dB			
OCNG_RB (Note 1)	dB			
\hat{E}_s/I_{ot}	dB	3	3	
\hat{E}_s/N_{oc}	dB	3	3	
N_{oc}	dBm/15kHz	-98		
RSRP	dBm/15kHz	-95	-95	
SCH_RP	dBm/15 kHz	-95	-95	
Propagation Condition		AWGN		
Note 1: OCNG shall be used such that cell is fully allocated and a				

Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 5.2.10.5-2: Cell Specific Test requirement Parameters for Cell 2 UTRAN TDD cell

Parameter	Unit	Cell 2 (UTRA)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number ^{Note1}		Channel 2			
PCCPCH_Ec/lor	dB	-3			
DwPCH_Ec/lor	dB			0	
OCNS_Ec/lor	dB	-3			
\hat{I}_{or}/I_{oc}	dB	-infinity	13	-infinity	13
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP	dBm	-infinity	-70	n.	a.
Propagation Condition		AWGN			

Note1: In the case of multi-frequency cell, the UTRA RF Channel Number is the

primary frequency's channel number.

Note2: P-CCPCH RSCP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The handover delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit SYNCH-UL sequence in the UpPTS to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

 $D_{handover} = maximum RRC procedure delay + T_{interrupt2}$

$$T_{interrupt2} = T_{offset} + T_{UL} + 30*F_{SFN} + 180 + 10*F_{max} ms$$

 $T_{offse\,t} = 10$ ms; The frame timing uncertainty between the old cell and the target cell and the time that can elapse until the appearance of a Beacon channel

 $T_{UL} = 10$ ms; The time that can elapse until the appearance of the UL timeslot in the target cell

 $F_{SEN} = 1$; Equal to 1 if SFN decoding is required and equal to 0 otherwise.

 $F_{max} = 0$; The maximum number of radio frames within the transmission time intervals of all transport channels that are multiplexed into the same CCTrCH.

Maximum RRC procedure delay = 50 ms as defined in TS 36.331 [5] clause 11.2.

The handover delay D_{handover} shall be less than a total of 280 ms in this test case.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.3 Handover from E-UTRAN to non-3GPP RATs

5.3.1 E-UTRAN FDD - HRPD handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined: Protocol procedure for the test state is under discussion.

5.3.1.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to HRPD in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.3.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support HRPD. Applicability requires support for FGI bits 12, and 26.

5.3.1.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay (which is 50 ms) + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying handover to HRPD, the UE shall be ready to start the transmission of the new reverse control channel in HRPD within $D_{handover}$ from the end of the last E-UTRAN TTI containing the RRC command.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in HRPD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

An HRPD cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 6.6 of [17], the interruption time shall be less than $T_{interrupt}$

$$T_{interrupt} = T_{IU} + 40 + 10*KC*SW_K + 10*OC*SW_O ms$$

Where:

 T_{IU} It is the interruption uncertainty when changing the timing from the E-UTRAN to the new HRPD cell. T_{IU} can be up to one HRPD frame (26.66 ms).

$$SW_K \qquad \qquad \text{is} \quad SW_K = \left\lceil \frac{srch_win_k}{60} \right\rceil \quad \text{where srch_win_k is the number of HRPD chips indicated by the}$$

search window for known target HRPD cells in the message

$$SW_O$$
 is $SW_O = \left\lceil \frac{srch_win_o}{60} \right\rceil$ where $srch_win_o$ is the number of HRPD chips indicated by the

search window for unknown target HRPD cells in the message

KC It is the number of known target HRPD cells in the message, and

OC It is the number of unknown target HRPD cells in the message.

Note: An additional delay in the interruption time may occur due to the reverse link silence interval [18], which is specific to HRPD.

The normative reference for this requirement is TS 36.133 [4] clause 5.4.1 and A.5.3.1.

5.3.1.4 Test description

5.3.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.3.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.3.1.4.3.
- 5. There is one E-UTRA FDD serving cell and one HRPD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.3.1.4.1-1: General test parameters for E-UTRAN FDD to HRPD handover test case

Param	eter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Initial conditions A	ctive cell		Cell 1	E-UTRAN FDD cell
	eighbouring cell		Cell 2	HRPD cell
	ctive cell		Cell 2	HRPD cell
Channel Bandwidth (I	3W _{channel})	MHz	10	
Gap Pattern Id			0	As specified in TS 36.133 [4] Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD meas	urement quantity		RSRP	
Inter-RAT (HRPD) me			CDMA2000 HRPD Pilot	
quantity			Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA	2000	dB	-7	Absolute 'CDMA2000 HRPD Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Inforn	nation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel	Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bar (BWchannel)	ndwidth	MHz	10	,
HRPD RF Channel N	umber		1	One HRPD carrier frequency is used.
HRPD neighbour cell list size			8	HRPD cells on HRPD RF channel 1 provided in the cell list before T2.
cdma2000-SearchWii	ndowSize		8 (60 PN chips)	Search window size as defined in section 6.3.5 in 3GPP TS 36.331 [5]
T1		s	5	
T2		s	≤10	
T3		S	1	

5.3.1.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. The RRC message implying handover shall be sent to the UE during T2, after the UE has reported Event B2. T3 is defined as the end of the last E-UTRAN TTI containing the RRC message implying handover.

- 1. Ensure the UE is in [State 3B-RF] according to TS 36.508 [7] clause [7.2A.4]. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.3.1.5-1 and 5.3.1.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The neighbour cell shall broadcast its own PN offset and the measurement cell list of Cell 1 shall contain the PN offset of Cell 2. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.3.1.5-1 and 5.3.1.5-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event B2.

- 7. The SS transmits a *HandoverFromEUTRAPreparationRequest* on Cell 1.
- 8. The UE transmit tunnelled HRPD *Connection Request* and *Route Update* messages contained in an *ULHandoverPreparationTransfer* message on Cell 1.
- 9. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2. The tunnelled HRPD *Traffic Channel Assignment, HRPD Silence Parameters* and *HRPD Open Loop Parameters* messages are contained in *MobilityFromEUTRACommand*.
- 10. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.3.1.5-1 and 5.3.1.5-2.
- 11. If the UE starts to transmit the Reverse Control Channel to Cell 2 in less than 127 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 12. After T3 expires, the UE shall be switched off. Then ensure the UE is in State 3B according to TS 36.508 [7] clause 4.5.3B. Cell 1 is the active cell.
- 13. The SS shall set a different PN Offset on Cell 2 so that the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 14. Repeat steps 2-13 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.3.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and 4.4.7.1 with the following exceptions.

Table 5.3.1.4.3-1: Common Exception messages for E-UTRAN FDD - HRPD handover

Default Message Contents		
Common contents of system information		
blocks exceptions		
Default RRC messages and information	Table H.3.1-1	
elements contents exceptions	Table H.3.1-7	
·	Table H.3.1-8	
	Table H.3.3-3	
	Table H.3.3-4	

Table 5.3.1.4.2-2: MeasObjectCDMA2000: Additional E-UTRAN FDD - HRPD handover

Derivation Path: 36.508, Table 4.6.6-1C Information Element	Value/remark	Comment	Condition
MeasObjectCDMA2000-GENERIC ::= SEQUENCE {			
cdma2000-Type	TypeHRPD		
carrierFreq SEQUENCE {			
bandClass	Band Class of frequency under test		
Arfcn	f14		
}			
searchWindowSize	8		
offsetFreq	db0		
cellsToRemoveList	Not present		
cellsToAddModList CHOICE {			
cellsToAddModListCDMA2000 ::= SEQUENCE (SIZE			
(1 maxCellMeas)) OF SEQUENCE {			
cellIndex [1]	1		
physCellId [1]	PN offset of Cell 2		
cellIndex [2]	2		
physCellId [2]	PN offset of Cell 2 + 4		
cellIndex [3]	3		
physCellId [3]	PN offset of Cell 2 + 8		
cellIndex [4]	4		
physCellId [4]	PN offset of Cell 2 + 12		
cellIndex [5]	5		
physCellId [5]	PN offset of Cell 2 + 16		
cellIndex [6]	6		
physCellId [6]	PN offset of Cell 2 + 20		
cellIndex [7]	7		
physCellId [7]	PN offset of Cell 2 + 24		
cellIndex [8]	8		
physCellId [8]	PN offset of Cell 2 + 28		
}			
}			
cellForWhichToReportCGI	Not present		

Table 5.3.1.4.3-3: ReportConfigInterRAT-B2-CDMA2000: Additional E-UTRAN FDD - HRPD handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6	6-7C ReportConfigInterRA	Γ-B2-CDMA2000(EUTR	A-Thres,
CDMA2000-Thres)			
Information Element	Value/remark	Comment	Condition
ReportConfigInterRAT-B2-CDMA2000(EUTRA-Thres,			
CDMA2000-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
threshold-RSRP	50(-90 dBm)	-90 dBm EUTRA- Thres is actual threshold value in dBm (50 - 140 dBm)	
}			
b2-Threshold2 CHOICE {			
b2-Threshold2CDMA2000	14 (-7 dB)	Integer (063)	
}			
}			
}			
hysteresis	0		
timeToTrigger	ms0		
}			
}			
maxReportCells	1		
reportInterval	ms2048		
reportAmount	r1		
}			

Table 5.3.1.4.3-4: MeasuredResults: Additional E-UTRAN FDD - HRPD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultsServing			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
neighbouringMeasResults CHOICE {			
measResultsCDMA2000	MeasResultsCDMA2000		
}			

Table 5.3.1.4.3-5: MeasResultListCDMA2000: Additional E-UTRAN FDD - HRPD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResultsCDMA2000 ::= SEQUENCE (SIZE (1maxCellReport)) OF SEQUENCE {			
physCellId	PhysicalCellIdentity of Cell 2		
cgi-Info	Not present		
measResult SEQUENCE {			
pilotPnPhase		Set according to specific test	
pilotStrength		Set according to specific test	
}			
}			

Table 5.3.1.4.3-6: HandoverFromEUTRAPreparationRequest

Derivation Path: 36.508 Table 4.6.1-4			
Information Element	Value/remark	Comment	Condition
HandoverFromEUTRAPreparationRequest ::=			
SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
handoverFromEUTRAPreparationRequest-r8			
SEQUENCE {			
cdma2000-Type	typeHRPD		
Rand	Not present		
mobilityParameters	Not present		
}			
}			
}			
}			

Table 5.3.1.4.3-7: *ULHandoverPreparationTransfer*

Derivation Path: 36.508 Table 4.6.1-24			
Information Element	Value/remark	Comment	Condition
ULHandoverPreparationTransfer ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
ulHandoverPreparationTransfer-r8			
SEQUENCE {			
cdma2000-Type	typeHRPD		
Meid	Not present		
dedicatedInfo	Set according to Table	HRPD Connection	
	8.4.5.4.3.3-7	Request and	
		Route Update	
}			
}			
}			
}			

Table 5.3.1.4.3-8: HRPD Connection Request

Information Element	Value/remark	Comment	Condition
SAPState	'0'B	SAP Header	

SessionConfigurationToken	16 bits, Set by UE	
ConnectionLayerFormat	1 bit, Set by UE	
ATI Record	34 bits, Set based on UATI assigned to UE	
Reserved	'0000'B	
MessageID	'000001'	Connection Request
TransactionID	Any allowed value	8 bit field
RequestReason	,0000,	Access Terminal Initiated

Table 5.3.1.4.3-9: HRPD Route Update

Information Element	Value/remark	Comment	Condition
SAPState	'0'B	SAP Header	
SessionConfigurationToken	16 bits, Set by UE		
ConnectionLayerFormat	1 bit, Set by UE		
ATI Record	34 bits, Set based on		
	UATI assigned to UE		
Reserved	'0000'B		
MessageID	'0000000'B	Route Update	
MessageSequence	8 bits, Set by UE		
ReferencePilotPN	9 bits, Set by UE		
ReferencePilotStrength	6 bits, Set by UE		
ReferenceKeep	'1'B		
NumPilots	'0000'B		
CompatibleReserved	'0'B		
ReferencePilotChannelIncluded	'1'B		
ReferencePilotChannel	24 bits, Set by UE		
ReferencePilotArrivalIncluded	'1'B		
ReferencePilotArrival	15 bits, Set by UE		
Reserved	0-7 bits, Set all 0s by UE		

Table 5.3.1.4.3-10: HRPD Traffic Channel Assignment

Information Element	Value/remark	Comment	Condition
SAPState	'1'B	SAP Header	
SessionConfigurationToken	'0'B		
ConnectionLayerFormat	1 bit, Set by SS		
ATI Record	34 bits, Set based on		
	UATI assigned to UE		
Reserved	'0000'B		
MessageID	'0000001'B	Traffic Channel	
		Assignment	
MessageSequence	Set by SS	8 bit field	
ChannelIncluded	'1'B	Channel record included	
Channel	'0000000000000000011 11010'B	channel record for Cell 15	
FrameOffset	'1010'B	frame offset for Cell 15	
DRCLength	'01'B	DRCLength for	
Č		Cell 15	
DRCChannelGainBase ACKChannelGain	'111101'B '000110'B	ratio of the power level of the DRC Channel (when it is transmitted) to the power level of the Reverse Traffic Pilot Channel expressed as 2's complement value in units of 0.5 dB ratio of the power level of the Ack Channel (when it is transmitted) to the power level of the Reverse Traffic	
Al Pile	4475	Pilot Channel expressed as 2's complement value in units of 0.5 dB	
NumPilots	'1'B	DN Office ()	
PilotPN	'000110010'B	PN Offset of target sector (Cell 15)	
SofterHandoff	'0'B	Set to '0'since only 1 pilot included in message	
MACIndexLSBs	Set by SS	6 least significant bits of the MACIndex assigned to UE	
DRCCover	'001'B	index of the DRC cover associated with target sector (Cell 15)	
RABLength	'01'B	2 bit field	
RABOffset	'010'B	3 bit field	

Table 5.3.1.4.3-11: HRPD Silence Parameters

Information Element	Value/remark	Comment	Condition
SAPState	'0'B	SAP Header	
SessionConfigurationToken	16 bits, Set by UE		
ConnectionLayerFormat	1 bit, Set by SS		
ATI Record	34 bits, Set based on UATI assigned to UE		
Reserved	'0000'B		
MessageID	'0000010'B		
ReverseLinkSilenceDuration	2 bits, Set by SS		
ReverseLinkSilencePeriod	2 bits, Set by SS		
Reserved	0-7 bits, Set all 0s by SS		

Table 5.3.1.4.3-12: HRPD Open Loop Parameters

Information Element	Value/remark	Comment	Condition
SAPState	'0'B	SAP Header	
SessionConfigurationToken	16 bits, Set by UE		
ConnectionLayerFormat	1 bit, Set by SS		
ATI Record	34 bits, Set based on		
	UATI assigned to UE		
Reserved	'0000'B		
MessageID	'00000111'B		
NumPilots	'0001'B		
PilotPN	9 bits, Set by SS		
OpenLoopAdjust	8 bits, Set by SS		
InitialAdjust	5 bits, Set by SS		
PilotStrengthIncluded	1 bit, Set by SS		
PilotStrengthNominal	3 bits, Set by SS		
PilotStrengthCorrectionMin	3 bits, Set by SS		
PilotStrengthCorrectionMax	3 bits, Set by SS		
Reserved	0-7 bits, Set all 0s by SS		

5.3.1.5 Test requirement

Tables 5.3.1.4.1-1, 5.3.1.5-1 and 5.3.1.5-2 define the primary level settings including test tolerances for E-UTRAN FDD - HRPD handover test.

Table 5.3.1.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Cell 1 (E-UTRA)				
		T1	T2	T3		
E-UTRA RF Channel			1			
number						
BW _{channel}	MHz		10			
OCNG Patterns defined in		OP.1	OP.1	OP.2		
D.1.1 (OP.1 FDD) and in		FDD	FDD	FDD		
D.1.2 (OP.2 FDD)						
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PCFICH_RB	dB					
PHICH_RA	dB					
PHICH_RB	dB		0			
PDCCH_RA	dB					
PDCCH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA ^{Note 1}	dB	7				
OCNG_RB ^{Note 1}	dB					

N Note 2	!	dBm/15	-98 (AWGN)		
- · oc		kHz			
RSRP Note	3	dBm/15	-98.80	-98.80	-98.80
		KHz			
\hat{E}_s/N_{oc}		dB	-0.8	-0.8	-0.8
\hat{E}_s/I_{ot}		dB	-0.8	-0.8	-0.8
Propagation Condition			AWGN		
Note 1:	OCNG shall be us				
	constant total trans	smitted powe	r spectral der	nsity is achiev	ed for all
	OFDM symbols.	•	-	-	
Note 2:	Interference from	other cells an	d noise source	ces not specif	ied in the
	test is assumed to			•	
				λI	
	be modelled as AV	NGN of appro	opriate power	for $^{IV}_{oc}$ to	be fulfilled.
Note 3:	RSRP levels have	been derived	d from other p	parameters fo	r

Table 5.3.1.5-2: Cell Specific Test requirement Parameters for Cell 2 HRPD cell

information purposes. They are not settable parameters themselves

Parameter	Unit	Cell 2 (HRPD)			
		T1	T2	T3	
$\frac{\text{Control E}_{\text{b}}}{\text{N}_{\text{t}}} (38.4 \text{ kbps})$	dB	21			
$\frac{\text{Control } E_b}{N_t} $ (76.8 kbps)	dB	18			
\hat{I}_{or}/I_{oc}	dB	-infinity	0	0	
I_{oc}	dBm/1.2288 MHz		-55		
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3	-3	
Propagation Condition			AWGN		

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the reverse control channel in HRPD to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

 $Handover \ delay \ D_{handover} = maximum \ RRC \ procedure \ delay + T_{interrupt}$

$$T_{interrupt} = T_{IU} + 40 + 10*KC*SW_K + 10*OC*SW_O ms$$

 $T_{IU} = 26.66$ ms; T_{IU} can be up to one HRPD frame (26.66 ms).

$$SW_K = 1$$
; $SW_K = \left\lceil \frac{srch_win_k}{60} \right\rceil$ where $srch_win_k$ is the number of HRPD chips (60) indicated by the search

window for known target HRPD cells in the message

KC = 1; 1 known cell; HRPD cell is identified during T2 and is therefore known before T3

OC = 0; OC is the number of unknown target HRPD cells (0).

Maximum RRC procedure delay = 50 ms as defined in TS 36.133 [4].

The handover delay $D_{handover}$ shall be less than a total of 127 ms in this test case (note: this gives a total of 50 ms for maximum RRC procedure delay plus 76.66 ms for Tinterrupt - allow 127 ms in the test).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.3.2 E-UTRAN FDD - cdma2000 1xRTT handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Mobility From EUTRA Command message parameters are undefined
- InterRAT-Target and InterRAT-Message field description is FFS
- The Message contents are undefined
- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

5.3.2.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to cdma2000 1xRTT in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.3.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support cdma2000 1xRTT. Applicability requires support for FGI bits 11, and 24.

5.3.2.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay (which is 130 ms) + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying handover to cdma2000 1xRTT, the UE shall be ready to start the transmission of the new reverse control channel in cdma2000 1xRTT within $D_{handover}$ from the end of the last E-UTRAN TTI containing the RRC command.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in cdma2000 1xRTT, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

A cdma2000 1xRTT cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 4.2.1 of [19], the interruption time shall be less than T_{interrupt}:

$$T_{interrupt} = T_{IU} + [40] + [10]*KC*SW_K + [10]*OC*SW_O ms$$

Where:

 T_{IU} It is the interruption uncertainty when changing the timing from the E-UTRAN to the new cdma2000 1xRTT cell. T_{IU} can be up to one cdma2000 1xRTT frame (20 ms).

SW_K is
$$SW_K = \left[\frac{srch_win_k}{60} \right]$$
 where srch_win_k is the number of cdma2000 1xRTT chips

indicated by the search window for known target cdma2000 1xRTT cells in the message

$$SW_{O} \hspace{1cm} \text{is} \hspace{1cm} SW_{O} = \left \lceil \frac{srch_win_o}{60} \right \rceil \hspace{1cm} \text{where srch_win_o is the number of cdma2000 1xRTT chips}$$

indicated by the search window for unknown target cdma2000 1xRTT cells in the message

KC It is the number of known target cdma2000 1xRTT cells in the message, and

OC It is the number of unknown target cdma2000 1xRTT cells in the message.

The normative reference for this requirement is TS 36.133 [4] clause 5.4.2 and A.5.3.2.

5.3.2.4 Test description

5.3.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.3.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.3.2.4.3.
- 5. There is one E-UTRA FDD serving cell and one cdma2000 1xRTT cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.3.2.4.1-1: General test parameters for E-UTRAN FDD to cdma2000 1xRTT handover test case

Para	meter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters			DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell
Channel Bandwidth	(BW _{channel})	MHz	10	
Gap Pattern Id			0	As specified in TS 36.133 [4] Table 8.1.2.1-1 started before T2 starts
E-UTRAN FDD mea			RSRP	
Inter-RAT (cdma200 quantity	00 1X) measurement		CDMA2000 1xRTT Pilot Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDM	1A2000	dB	-14	Absolute 'CDMA2000 1xRTT Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		dB	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Info	rmation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Channe	el Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Ba (BWchannel)	andwidth	MHz	10	
cdma2000 1X RF C	hannel Number		1	One HRPD carrier frequency is used.
cdma2000 1X neigh	bour cell list size		8	cdma2000 1X cells on cdma2000 1X RF channel 1 provided in the cell list before T2.
cdma2000-SearchW	/indowSize		8 (60 PN chips)	Search window size as defined in section 6.3.5 in 3GPP TS 36.331 [5]
T1		S	5	
T2		S	≤10	
T3		S	1	

5.3.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. The RRC message implying handover shall be sent to the UE during T2, after the UE has reported Event B2. T3 is defined as the end of the last E-UTRAN TTI containing the RRC message implying handover.

- 1. Ensure the UE is in FFS according to TS 36.508 [7] clause FFS. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.3.2.5-1 and 5.3.2.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The neighbour cell shall broadcast its own PN offset and the measurement cell list of Cell 1 shall contain the PN offset of Cell 2. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.3.2.5-1 and 5.3.2.5-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event B2.
- 7. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.3.2.5-1 and 5.3.2.5-2.
- 9. If the UE starts to transmit the Reverse Control Channel to Cell 2 in less than 200 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 10. After T3 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 11. The SS shall set a different PN Offset on Cell 2 so that the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 12. Repeat steps 2-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.3.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions [FFS]

5.3.2.5 Test requirement

Tables 5.3.2.4.1-1, 5.3.2.5-1 and 5.3.2.5-2 define the primary level settings including test tolerances for E-UTRAN FDD - cdma2000 1xRTT handover test.

Table 5.3.2.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD cell

Parameter	Unit	Cell 1 (E-UTRA)			
		T1 T2 7		T3	
E-UTRA RF Channel			1		
number					
BW _{channel}	MHz		10		
OCNG Patterns defined in		OP.1	OP.1	OP.2	
D.1.1 (OP.1 FDD) and in		FDD	FDD	FDD	
D.1.2 (OP.2 FDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB		0		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				
N_{oc} Note 2	dBm/15		-98 (AWGN)		
	kHz				
RSRP Note 3	dBm/15	-98 + TT	-98 + TT	-98 + TT	
	KHz				
\hat{E}_s/N_{oc}	dB	0 + TT	0 + TT	0 +TT	
\hat{E}_s/I_{ot}	dB	0 + TT	0 + TT	0 + TT	
Propagation Condition			AWGN		
Note 1: OCNG shall be us					
constant total tran	smitted powe	r spectral de	nsity is achie	ved for all	
OFDM symbols.					
Note 2: Interference from other cells and noise so					
test is assumed to	test is assumed to be constant over subcarriers and time and shall				
		٠.	N_{ac}		
be modelled as A\			rior oc to	be fulfilled.	
Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselv					
information purpos	ses. They are	not settable	parameters t	nemselves.	

Table 5.3.2.5-2: Cell Specific Test requirement Parameters for Cell 2 cdma2000 1xRTT cell

Parameter	Unit	Cell 2 (cdma2000 1X)			
		T1	T2	T3	
$\frac{\text{Pilot } \mathbf{E}_{c}}{\mathbf{I}_{or}}$	dB		-7		
$\frac{\text{Sync } E_c}{I_{\text{or}}}$	dB	-16			
$\frac{\text{Paging } E_{c}}{I_{or}} \text{(4.8 kbps)}$	dB		-12		
\hat{I}_{or}/I_{oc}	dB	-infinity	0 + TT	0 + TT	
I_{oc}	dBm/1.2288 MHz		-55		
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10 + TT	-10 + TT	
Propagation Condition			AWGN		

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the reverse control channel in cdma2000 1xRTT to Cell 2.

The handover delay $D_{handover}$ test requirement in this case is expressed as:

Handover delay $D_{handover} = maximum RRC$ procedure delay $+ T_{interrupt}$

$$T_{interrupt} = T_{IU} + [40] + [10]*KC*SW_K + [10]*OC*SW_O ms$$

 $T_{IU} = 20 \text{ ms}$; T_{IU} can be up to one cdma2000 1xRTT frame (20 ms).

$$SW_K = 1$$
; $SW_K = \left[\frac{srch_win_k}{60}\right]$ where $srch_win_k$ is the number of cdma2000 1xRTT chips (60) indicated

by the search window for known target cdma2000 1xRTT cells in the message

KC = 1; 1 known cell; cdma2000 1xRTT cell is identified during T2 and is therefore known before T3

OC = 0; OC is the number of unknown target cdma2000 1xRTT cells (0).

Maximum RRC procedure delay = 130 ms as defined in TS 36.133 [4].

The handover delay $D_{handover}$ shall be less than a total of 200 ms in this test case (note: this gives a total of 130 ms for maximum RRC procedure delay plus 70 ms for Tinterrupt).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.3.3 E-UTRAN FDD - HRPD handover: unknown target cell

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The MobilityFromEUTRACommand message parameters are undefined
- targetRAT-Type and targetRAT-MessageContainer field descriptions are FFS
- The Message contents are undefined
- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

5.3.3.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to HRPD handover: unknown target cell in RRC_CONNECTED state by meeting the handover to an unknown target cell delay requirements.

5.3.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support HRPD. Applicability requires support for FGI bits 12, and 26.

5.3.3.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay (which is 50 ms) + $T_{interrupt}$ in RRC CONNECTED state.

When the UE receives a RRC message implying handover to HRPD, the UE shall be ready to start the transmission of the new reverse control channel in HRPD within $D_{handover}$ from the end of the last E-UTRAN TTI containing the RRC command.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in HRPD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

An HRPD cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 6.6 of [17], the interruption time shall be less than $T_{interrupt}$

$$T_{interrupt} = T_{IU} + [40] + [10]*KC*SW_K + [10]*OC*SW_O ms$$

Where:

 T_{IU} It is the interruption uncertainty when changing the timing from the E-UTRAN to the new HRPD cell. T_{IU} can be up to one HRPD frame (26.66 ms).

 $SW_K = \left\lceil \frac{srch_win_k}{60} \right\rceil \text{ where srch_win_k is the number of HRPD chips indicated by the}$

search window for known target HRPD cells in the message

 $SW_{O} \qquad \qquad \text{is} \quad SW_{O} = \left\lceil \frac{srch_win_o}{60} \right\rceil \quad \text{where srch_win_o is the number of HRPD chips indicated by the}$

search window for unknown target HRPD cells in the message

KC It is the number of known target HRPD cells in the message, and

OC It is the number of unknown target HRPD cells in the message.

NOTE: An additional delay in the interruption time may occur due to the reverse link silence interval [18], which is specific to HRPD.

The normative reference for this requirement is TS 36.133 [4] clause 5.4.1 and A.5.3.3.

5.3.3.4 Test description

5.3.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.3.3.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.3.3.4.3.
- 5. There is one E-UTRA FDD serving cell and one HRPD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.3.3.4.1-1: General test parameters for E-UTRAN FDD to HRPD handover: unknown target cell test case

Pai	rameter	Unit	Value	Comment
PDSCH paramete	rs		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/	PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	HRPD cell
Final condition	Active cell		Cell 2	HRPD cell
Channel Bandwidt	th (BW _{channel})	MHz	10	
DRX			OFF	Non-DRX test
Access Barring Inf	formation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Chan	nel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel (BWchannel)	Bandwidth	MHz	10	
HRPD RF Channe	el Number		1	One HRPD carrier frequency is used.
cdma2000-Search	nWindowSize		8 (60 PN chips)	Search window size as defined in section 6.3.5 in 3GPP TS 36.331
T1		S	≤5	
T2		S	1	

5.3.3.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. A RRC message implying handover shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. Starting at T2, Cell 2 becomes detectable and the UE receives a RRC handover command from the network.

- 1. Ensure the UE is in [State 3B-RF] according to TS 36.508 [7] clause [7.2A.4]. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.3.3.5-1 and 5.3.3.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The SS shall transmit the message containing Information Element systemTimeInfo as defined in TS 36.331 [5] clause 6.3.1. The neighbour cell shall broadcast its own PN offset. The SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. The SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 6. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table's 5.3.3.5-1 and 5.3.3.5-2.
- 7. If the UE starts to transmit the Reverse Control Channel to Cell 2 in less than 127 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 8. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 9. The SS shall set a different PN Offset on Cell 2 so that the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 10. Repeat steps 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.3.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions [FFS]

5.3.3.5 Test requirement

Tables 5.3.3.4.1-1, 5.3.3.5-1 and 5.3.3.5-2 define the primary level settings including test tolerances for E-UTRAN FDD - HRPD handover: unknown target cell test.

Table 5.3.3.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD to HRPD handover: unknown target cell test case

Parameter	Unit	Cell 1 (E-UTRAN FDD)	
		T1	T2
E-UTRA RF Channel			1
number			
BW _{channel}	MHz	1	0
OCNG Patterns defined in D.1.1 (OP.1 FDD)		OP.1	FDD
PBCH_RA	dB		
PBCH_RB	dB	†	
PSS_RA	dB	1	
SSS_RA	dB	1	
PCFICH_RB	dB	1	
PHICH_RA	dB		
PHICH_RB	dB		0
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$N_{oc}^{ m Note2}$	dBm/15 kHz	-9	98
RSRP Note 3	dBm/15 kHz	-98 + TT	-98 + TT
\hat{E}_s/N_{oc}	dB	0 + TT	0 + TT
\hat{E}_s/I_{ot}	dB	0 + TT	0 + TT
Propagation Condition		AW	/GN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for

 $N_{\it oc}$ to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 5.3.3.5-2: Cell Specific Test requirement Parameters for Cell 2 E-UTRAN FDD to HRPD handover: unknown target cell test case

Parameter	Unit	Cell 2 (HRPD)	
		T1	T2
$\frac{\text{Control E}_{\text{b}}}{\text{N}_{\text{t}}} \text{(38.4 kbps)}$	dB		21
$\frac{\text{Control } E_b}{N_t} \text{ (76.8 kbps)}$	dB		18
\hat{I}_{or}/I_{oc}	dB	-infinity	0 + TT
I_{oc}	dBm/1.2288 MHz		-55
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3 + TT
Propagation Condition			AWGN

The handover to an unknown target cell delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit the reverse control channel in HRPD to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

 $Handover\ delay\ D_{handover} = maximum\ RRC\ procedure\ delay\ +\ T_{interrupt}$

$$T_{interrupt} = T_{IU} + [40] + [10]*KC*SW_K + [10]*OC*SW_O ms$$

 $T_{IU} = 26.66$ ms; T_{IU} can be up to one HRPD frame (26.66 ms).

$$SW_O = 1$$
; $SW_O = \left[\frac{srch_win_o}{60} \right]$ where srch_win_o is the number of HRPD chips (60) indicated by the search

window for unknown target HRPD cells in the message

KC = 0; KC is the number of known target HRPD cells (0).

OC = 1; OC is the number of unknown target HRPD cells (1).

Maximum RRC procedure delay = 50 ms as defined in TS 36.133 [4].

The handover delay $D_{handover}$ shall be less than a total of 127 ms in this test case (note: this gives a total of 50 ms for maximum RRC procedure delay plus 76.66 ms for Tinterrupt - allow 127 ms in the test).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.3.4 E-UTRAN FDD - cdma2000 1xRTT handover: unknown target cell

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Mobility From EUTRA Command message parameters are undefined
- targetRAT-Type and targetRAT-MessageContainer field descriptions are FFS
- The Message contents are undefined
- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

5.3.4.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to cdma2000 1xRTT handover: unknown target cell in RRC_CONNECTED state by meeting the handover to an unknown target cell delay requirements.

5.3.4.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward that support cdma2000 1xRTT. Applicability requires support for FGI bits 11, and 24.

5.3.4.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay (which is 130 ms) + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying handover to cdma2000 1xRTT, the UE shall be ready to start the transmission of the new reverse control channel in cdma2000 1xRTT within $D_{handover}$ from the end of the last E-UTRAN TTI containing the RRC command.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in cdma2000 1xRTT, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

A cdma2000 1xRTT cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 4.2.1 of [19], the interruption time shall be less than T_{interrupt}:

$$T_{interrupt} = T_{IU} + [40] + [10]*KC*SW_K + [10]*OC*SW_O ms$$

Where:

 $T_{\rm IU}$ It is the interruption uncertainty when changing the timing from the E-UTRAN to the new cdma2000 1xRTT cell. $T_{\rm IU}$ can be up to one cdma2000 1xRTT frame (20 ms).

$$SW_K$$
 is $SW_K = \left\lceil \frac{srch_win_k}{60} \right\rceil$ where $srch_win_k$ is the number of cdma2000 1xRTT chips

indicated by the search window for known target cdma2000 1xRTT cells in the message

SW_O is SW_O =
$$\left[\frac{\text{srch_win_o}}{60}\right]$$
 where srch_win_o is the number of cdma2000 1xRTT chips

indicated by the search window for unknown target cdma2000 1xRTT cells in the message

KC It is the number of known target cdma2000 1xRTT cells in the message, and

OC It is the number of unknown target cdma2000 1xRTT cells in the message.

The normative reference for this requirement is TS 36.133 [4] clause 5.4.2 and A.5.3.4.

5.3.4.4 Test description

5.3.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.3.4.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.3.4.4.3.

5. There is one E-UTRA FDD serving cell and one cdma2000 1xRTT cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.3.4.4.1-1: General test parameters for E-UTRAN FDD to cdma2000 1xRTT handover: unknown target cell test case

Pai	rameter	Unit	Value	Comment
PDSCH paramete	rs		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/	PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Initial conditions	Active cell		Cell 1	E-UTRAN FDD cell
	Neighbouring cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell
Channel Bandwidt	th (BW _{channel})	MHz	10	
DRX			OFF	Non-DRX test
Access Barring Inf	formation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Chan	nel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel (BWchannel)	Bandwidth	MHz	10	
cdma2000 1X RF	Channel Number		1	One HRPD carrier frequency is used.
cdma2000-Search	nWindowSize		8 (60 PN chips)	Search window size as defined in section 6.3.5 in 3GPP TS 36.331
T1		S	≤5	
T2		S	1	

5.3.4.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. A RRC message implying handover shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. Starting at T2, Cell 2 becomes detectable and the UE receives a RRC handover command from the network.

- 1. Ensure the UE is in FFS according to TS 36.508 [7] clause FFS. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.3.4.5-1 and 5.3.4.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The SS shall transmit the message containing Information Element systemTimeInfo as defined in TS 36.331 [5] clause 6.3.1. The neighbour cell shall broadcast its own PN offset. The SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. The SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2.
- 6. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table's 5.3.4.5-1 and 5.3.4.5-2.
- 7. If the UE starts to transmit the Reverse Control Channel to Cell 2 in less than 200 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 8. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 9. The SS shall set a different PN Offset on Cell 2 so that the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.

10. Repeat steps 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.3.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions [FFS]

5.3.4.5 Test requirement

Tables 5.3.4.4.1-1, 5.3.4.5-1 and 5.3.4.5-2 define the primary level settings including test tolerances for E-UTRAN FDD - cdma2000 1xRTT handover: unknown target cell test.

Table 5.3.4.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN FDD to cdma2000 1xRTT handover: unknown target cell test case

Parameter	Unit	Cell 1 (E-U	TRAN FDD)
		T1	Ť2
E-UTRA RF Channel number		,	
BW _{channel}	MHz	1	0
OCNG Patterns defined in D.1.1 (OP.1 FDD)		OP.1	FDD
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	()
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$N_{oc}^{ m Note 2}$	dBm/15 kHz	-9	98
RSRP Note 3	dBm/15 kHz	-98 + TT	-98 + TT
\hat{E}_s/N_{oc}	dB	0 + TT	0 + TT
\hat{E}_s/I_{ot}	dB	0 + TT	0 + TT
Propagation Condition		AW	GN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for

 $N_{\it oc}$ to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 5.3.4.5-2: Cell Specific Test requirement Parameters for Cell 2 E-UTRAN FDD to cdma2000 1xRTT handover: unknown target cell test case

Parameter	Unit	Cell 2 (cdma2000 1X)	
		T1	T2
$\frac{\text{Pilot } \mathbf{E_{c}}}{\mathbf{I_{or}}}$	dB		-7
$\frac{\text{Sync } E_c}{I_{\text{or}}}$	dB		-16
$\frac{\text{Paging } E_c}{I_{\text{or}}} \text{(4.8 kbps)}$	dB	-12	
\hat{I}_{or}/I_{oc}	dB	-infinity	0 + TT
I_{oc}	dBm/1.2288 MHz	-55	
CDMA2000 1xRTT Pilot Strength	dB	-infinity	-10 + TT
Propagation Condition		, A	AWGN

The handover to an unknown target cell delay is defined as the time from the beginning of time period T2, to the moment the UE start to transmit the reverse control channel in cdma2000 1xRTT to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

Handover delay $D_{handover} = maximum RRC$ procedure delay $+ T_{interrupt}$

$$T_{interrupt} = T_{IU} + [40] + [10]*KC*SW_K + [10]*OC*SW_O ms$$

 T_{IU} = 20 ms; T_{IU} can be up to one cdma2000 1xRTT frame (20 ms).

$$SW_O = 1$$
; $SW_O = \left[\frac{srch_win_o}{60} \right]$ where $srch_win_o$ is the number of cdma2000 1xRTT chips (60) indicated

by the search window for unknown target cdma2000 1xRTT cells in the message

KC = 0; KC is the number of known target cdma2000 1xRTT cells (0).

OC = 1; OC is the number of unknown target cdma2000 1xRTT cells (1).

Maximum RRC procedure delay = 130 ms as defined in TS 36.133 [4].

The handover delay $D_{handover}$ shall be less than a total of 200 ms in this test case (note: this gives a total of 130 ms for maximum RRC procedure delay plus 70 ms for Tinterrupt).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.3.5 E-UTRAN TDD - HRPD handover

5.3.5.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to HRPD in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.3.5.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 9 and forward that support HRPD. Applicability requires support for FGI bits 12, and 26.

5.3.5.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay (which is 50 ms) + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying handover to HRPD, the UE shall be ready to start the transmission of the new reverse control channel in HRPD within $D_{handover}$ from the end of the last E-UTRAN TTI containing the RRC command.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in HRPD, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

An HRPD cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 6.6 of [17], the interruption time shall be less than $T_{interrupt}$

$$T_{interrupt} = T_{IU} + 40 + 10*KC*SW_K + 10*OC*SW_O ms$$

Where:

 T_{IU} It is the interruption uncertainty when changing the timing from the E-UTRAN to the new HRPD cell. T_{IU} can be up to one HRPD frame (26.66 ms).

$$SW_K$$
 is $SW_K = \left\lceil \frac{srch_win_k}{60} \right\rceil$ where $srch_win_k$ is the number of HRPD chips indicated by the

search window for known target HRPD cells in the message

$$SW_O$$
 is $SW_O = \left[\frac{srch_win_o}{60}\right]$ where $srch_win_o$ is the number of HRPD chips indicated by the

search window for unknown target HRPD cells in the message

KC It is the number of known target HRPD cells in the message, and

OC It is the number of unknown target HRPD cells in the message.

Note: An additional delay in the interruption time may occur due to the reverse link silence interval [18], which is specific to HRPD.

The normative reference for this requirement is TS 36.133 [4] clause 5.4.1 and A.5.3.5.

5.3.5.4 Test description

5.3.5.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.3.5.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.3.5.4.3.
- 5. There is one E-UTRA TDD serving cell and one HRPD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 5.3.5.4.1-1: General test parameters for E-UTRAN TDD to HRPD handover test case

Parame	eter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
PCFICH/PDCCH/PHIC	CH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Initial conditions Ac	tive cell		Cell 1	E-UTRAN TDD cell
Ne	eighbouring cell		Cell 2	HRPD cell
	tive cell		Cell 2	HRPD cell
Channel Bandwidth (B	W _{channel})	MHz	10	
Gap Pattern Id			0	As specified in TS 36.133 [4] Table 8.1.2.1-1 started before T2 starts
E-UTRAN TDD measu	rement quantity		RSRP	
Inter-RAT (HRPD) mea	asurement		CDMA2000 HRPD Pilot	
quantity			Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDMA2	2000	dB	-7	Absolute 'CDMA2000 HRPD Pilot Strength' threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Inform	ation	-	Not sent	No additional delays in random access procedure
E-UTRA RF Channel N	Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Band (BWchannel)	dwidth	MHz	10	
Uplink-downlink config			1	As specified in table 4.2.2 in TS 36.211
Special subframe conf	iguration of cell 1		6	As specified in table 4.2.1 in TS 36.211
HRPD RF Channel Nu	ımber		1	One HRPD carrier frequency is used.
HRPD neighbour cell I	ist size		8	HRPD cells on HRPD RF channel 1 provided in the cell list before T2.
cdma2000-SearchWin	dowSize		8 (60 PN chips)	Search window size as defined in section 6.3.5 in 3GPP TS 36.331
T1		S	5	
T2		S	≤10	
T3		S	1	

5.3.5.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. The RRC message implying handover shall be sent to the UE during T2, after the UE has reported Event B2. T3 is defined as the end of the last E-UTRAN TTI containing the RRC message implying handover.

- 1. Ensure the UE is in [State 3B-RF] according to TS 36.508 [7] clause 7.2A.4. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table's 5.3.5.4.4-1 and 5.3.5.4.4-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The neighbour cell shall broadcast its own PN offset and the measurement cell list of Cell 1 shall contain the PN offset of Cell 2. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.

- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table's 5.3.5.4.4-1 and 5.3.5.4.4-2.
- 6. The UE shall transmit a MeasurementReport message triggered by Event B2.
- 7. The SS transmits a *HandoverFromEUTRAPreparationRequest* on Cell 1.
- 8. The UE transmits tunnelled HRPD *Connection Request* and *Route Update* messages contained in an *ULHandoverPreparationTransfer* message on Cell 1.
- 9. SS shall transmit a MobilityFromEUTRACommand message implying handover to Cell 2. The tunnelled HRPD *Traffic Channel Assignment, HRPD Silence Parameters* and *HRPD Open Loop Parameters* messages are contained in *MobilityFromEUTRACommand*.
- 10. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.3.5.4.4-1 and 5.3.5.4.4-2.
- 11. If the UE starts to transmit the Reverse Control Channel to Cell 2 in less than 127 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure testes is increased by one.
- 12. After T3 expires, the UE shall be switched off. Then ensure the UE is in State 3B-RF according to TS 36.508 [7] clause 7.2A.4. Cell 1 is the active cell.
- 13. The SS shall set a different PN Offset on Cell 2 so that the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 14. Repeat steps 2-13 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.3.5.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 and 4.4.7.1 with the following exceptions.

Table 5.3.5.4.3-1: Common Exception messages for E-UTRAN TDD - HRPD handover

Default Message Contents					
Common contents of system information					
blocks exceptions					
Default RRC messages and information	Table H.3.1-1				
elements contents exceptions	Table H.3.1-7				
·	Table H.3.1-8				

Table 5.3.5.4.3-2: MeasObjectCDMA2000: Additional E-UTRAN TDD - HRPD handover

Derivation Path: 36.508, Table 4.6.6-1C Information Element	Value/remark	Comment	Condition
MeasObjectCDMA2000-GENERIC ::= SEQUENCE {	Value/Terriark	Comment	Condition
cdma2000-Type	TypeHRPD		
carrierFreq SEQUENCE {	Typering		
bandClass	Band Class of frequency		
bandolass	under test		
Arfcn	f14		
}			
searchWindowSize	8		
offsetFreq	db0		
cellsToRemoveList	Not present		
cellsToAddModList CHOICE {			
cellsToAddModListCDMA2000 ::= SEQUENCE (SIZE			
(1 maxCellMeas)) OF SEQUENCE {			
cellIndex [1]	1		
physCellId [1]	PN offset of Cell 2		
cellIndex [2]	2		
physCellId [2]	PN offset of Cell 2 + 4		
cellIndex [3]	3		
physCellId [3]	PN offset of Cell 2 + 8		
cellIndex [4]	4		
physCellId [4]	PN offset of Cell 2 + 12		
cellIndex [5]	5		
physCellId [5]	PN offset of Cell 2 + 16		
cellIndex [6]	6		
physCellId [6]	PN offset of Cell 2 + 20		
cellIndex [7]	7		
physCellId [7]	PN offset of Cell 2 + 24		
cellIndex [8]	8		
physCellId [8]	PN offset of Cell 2 + 28		
}			
}			
cellForWhichToReportCGI	Not present		

Table 5.3.5.4.3-3: ReportConfigInterRAT-B2-CDMA2000: Additional E-UTRAN TDD - HRPD handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6	-7C ReportConfigInterRA	Γ-B2-CDMA2000(EUTR	A-Thres,
CDMA2000-Thres)			
Information Element	Value/remark	Comment	Condition
ReportConfigInterRAT-B2-CDMA2000(EUTRA-Thres,			
CDMA2000-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
threshold-RSRP	50(-90 dBm)	-90 dBm EUTRA- Thres is actual threshold value in dBm (50 - 140 dBm)	
}			
b2-Threshold2 CHOICE {			
b2-Threshold2CDMA2000	14 (-7 dB)	Integer (063)	
}			
}			
}			
hysteresis	0		
timeToTrigger	ms0		
}			
}			
maxReportCells	1		
reportInterval	ms2048		
reportAmount	r1		
}			

Table 5.3.5.4.3-4: MeasuredResults: Additional E-UTRAN TDD - HRPD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasuredResults ::= SEQUENCE {			
measld	1	Identifies the measurement id for the reporting being performed	
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultsCDMA2000	MeasResultsCDMA2000		
}			
}			I

Table 5.3.5.4.3-5: MeasResultsCDMA2000: Additional E-UTRAN TDD - HRPD handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResultsCDMA2000 ::= SEQUENCE {			
preRegistrationStatusHRPD	TRUE		
measResultListCDMA2000 ::=SEQUENCE (SIZE (1maxCellReport)) OF SEQUENCE {			
physCellId	PhysicalCellIdentity of Cell 2		
cgi-Info	Not present		
measResult SEQUENCE {			
pilotStrength		Set according to specific test	
}			
}			
}			

Table 5.3.5.4.3-6: HandoverFromEUTRAPreparationRequest

Derivation Path: 36.508 Table 4.6.1-4			
Information Element	Value/remark	Comment	Condition
HandoverFromEUTRAPreparationRequest ::=			
SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
handoverFromEUTRAPreparationRequest-r8			
SEQUENCE {			
cdma2000-Type	typeHRPD		
Rand	Not present		
mobilityParameters	Not present		
}			
}			
}			
}			

Table 5.3.5.4.3-7: ULHandoverPreparationTransfer

Derivation Path: 36.508 Table 4.6.1-24			
Information Element	Value/remark	Comment	Condition
ULHandoverPreparationTransfer ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
ulHandoverPreparationTransfer-r8			
SEQUENCE {			
cdma2000-Type	typeHRPD		
Meid	Not present		
dedicatedInfo	Set according to Table	HRPD Connection	
	5.3.5.4.3-8	Request and	
		Route Update	
}			
}			
}			
1			

Table 5.3.5.4.3-8: dedicatedInfo in ULHandoverPreparationTransfer (Table 5.3.5.4.3-7)

Information Element	Value/remark	Comment	Condition
SAPState	'0'B	SAP Header	
SessionConfigurationToken	16 bits, Set by UE		
ConnectionLayerFormat	1 bit, Set by UE		
ATI Record	34 bits, Set based on		
	UATI assigned to UE		
Reserved	'0000'B		
Length	Length of HRPD Route Update message (Table 5.3.5.4.3-10) + length of StreamHeader + length of SLPHeader + length of SNPHeader below, Set by SS	Connection Layer Header	
StreamHeader	'00'B	Stream Layer header. Stream 0 is assigned to the Default Signalling Application	
SLPHeader	Set by the UE	Signalling Link Protocol SLP-D and SLP-F headers.	
SNPHeader	'00001110'	Signalling Network Protocol header. InConfigurationPro tocol=0, Type=Route Update.	
SessionLayerPacket	HRPD Route Update message (Table 5.3.5.4.3-10)		
Length	Length of HRPD Connection Request message (Table 5.3.5.4.3-9) + length of StreamHeader + length of SLPHeader + length of SNPHeader below, Set by SS	Connection Layer Header	
StreamHeader	'00'B	Stream Layer header. Stream 0 is assigned to the Default Signalling Application	
SLPHeader	Set by the UE	Signalling Link Protocol SLP-D and SLP-F headers.	
SNPHeader	'00001100'	Signalling Network Protocol header. InConfigurationPro tocol=0, Type=Idle State.	
SessionLayerPacket	HRPD Connection Request message (Table 5.3.5.4.3-9)		

Table 5.3.5.4.3-9: HRPD Connection Request (Table 5.3.5.4.3-8)

Information Element	Value/remark	Comment	Condition
MessageID	'000001'	Connection	
		Request	
TransactionID	Any allowed value	8 bit field	
RequestReason	'0000'	Access Terminal	
		Initiated	

Table 5.3.5.4.3-10: HRPD Route Update (Table 5.3.5.4.3-8)

Information Element	Value/remark	Comment	Condition
MessageID	'0000000'B	Route Update	
MessageSequence	8 bits, Set by UE		
ReferencePilotPN	9 bits, Set by UE		
ReferencePilotStrength	6 bits, Set by UE		
ReferenceKeep	'1'B		
NumPilots	'0000'B		
CompatibleReserved	'0'B		
ReferencePilotChannelIncluded	'1'B		
ReferencePilotChannel	24 bits, Set by UE		
ReferencePilotArrivalIncluded	'1'B		
ReferencePilotArrival	15 bits, Set by UE		
Reserved	0-7 bits, Set all 0s by UE		

Table 5.3.5.4.3-11: MobilityFromEUTRACommand (step 9)

Derivation Path: 36.508, Table 4.6.1-6			
Information Element	Value/remark	Comment	Condition
MobilityFromEUTRACommand ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE{			
mobilityFromEUTRACommand-r8 SEQUENCE			
{			
cs-FallbackIndicator	False		
purpose CHOICE{			
handover SEQUENCE {			
targetRAT-Type	cdma2000-HRPD		
targetRAT-MessageContainer	Set according to Table 5.3.5.4.3-12	HRPD Silence Parameters and HRPD Open Loop Parameters, HRPD Traffic Channel Assignment	
}			
}			
}			
}			
}			
}			

Table 5.3.5.4.3-12: targetRAT-MessageContainer in MobilityFromEUTRACommand (Table 5.3.5.4.3-11)

Information Element	Value/remark	Comment	Condition
SAPState	'1'B	SAP Header	
SessionConfigurationToken	'0'B		
ConnectionLayerFormat	1 bit, Set by SS		
ATI Record	34 bits, Set based on		
	UATI assigned to UE		
Reserved	'0000'B		
Length	Length of HRPD Silence	Connection Layer	
	Parameters message	Header	
	(Table 5.3.5.4.3-14) +	(Note 1)	
	length of StreamHeader		
	+ length of SLPHeader +		
	length of SNPHeader		
StreamHeader	below, Set by SS '00'B	Stream Layer	
Stream leader	00 B	header. Stream 0	
		is assigned to the	
		Default Signalling	
		Application	
SLPHeader	Set by the SS	Signalling Link	
		Protocol SLP-D	
		and SLP-F	
		headers.	
SNPHeader	'00001111'	Signalling Network	
		Protocol header.	
		InConfigurationPro	
		tocol=0,	
		Type=Overhead	
		Messages.	
SessionLayerPacket	HRPD Silence	(Note 1)	
	Parameters message		
Longth	(Table 5.3.5.4.3-14)	Connection	
Length	Length of HRPD Open Loop Parameters	Connection Layer Header	
	message (Table	(Note 1)	
	5.3.5.4.3-15) + length of	(14016-1)	
	StreamHeader + length		
	of SLPHeader + length		
	of SNPHeader below,		
	Set by SS		
StreamHeader	'00'B	Stream Layer	
		header. Stream 0	
		is assigned to the	
		Default Signalling	
0.5		Application	
SLPHeader	Set by the SS	Signalling Link	
		Protocol SLP-D and SLP-F	
SNPHeader	'00000100'	headers. Signalling Network	
JINI I IEAUEI	00000100	Protocol header.	
		InConfigurationPro	
		tocol=0,	
		Type=Reverse	
		Traffic Channel	
		MAC.	
SessionLayerPacket	HRPD Open Loop	(Note 1)	
-	Parameters message	,	
	(Table 5.3.5.4.3-15)		
Length	Length of HRPD Traffic	Connection Layer	
	Channel Assignment	Header	
	message (Table		
	5.3.5.4.3-13) + length of		
	StreamHeader + length		
	of SLPHeader + length		
	of SNPHeader below,		

	Set by SS	
StreamHeader	'00'B	Stream Layer header. Stream 0 is assigned to the Default Signalling Application
SLPHeader	Set by the SS	Signalling Link Protocol SLP-D and SLP-F headers.
SNPHeader	'00001110'	Signalling Network Protocol header. InConfigurationPro tocol=0, Type=Route Update.
SessionLayerPacket	HRPD Traffic Channel Assignment message (Table 5.3.5.4.3-13)	

NOTE 1: HRPD Silence Parameters message and HRPD Open Loop Parameters message can be sent in any order.

Table 5.3.5.4.3-13: HRPD Traffic Channel Assignment (Table 5.3.5.4.3-12)

Information Element	Value/remark	Comment	Condition
MessageID	'0000001'B	Traffic Channel	
		Assignment	
MessageSequence	Set by SS	8 bit field	
ChannelIncluded	'1'B	Channel record	
		included	
Channel	'000000000000000011	channel record for	
	11010'B	Cell 15	
FrameOffset	'1010'B	frame offset for	
		Cell 15	
DRCLength	'01'B	DRCLength for	
		Cell 15	
DRCChannelGainBase	'111101'B	ratio of the power	
		level of the DRC	
		Channel (when it is	
		transmitted) to the	
		power level of the	
		Reverse Traffic	
		Pilot Channel	
		expressed as 2's	
		complement value	
		in units of 0.5 dB	
ACKChannelGain	'000110'B	ratio of the power	
		level of the Ack	
		Channel (when it is	
		transmitted) to the	
		power level of the	
		Reverse Traffic	
		Pilot Channel	
		expressed as 2's	
		complement value	
		in units of 0.5 dB	
NumPilots	'1'B		
PilotPN	'000110010'B	PN Offset of target	
		sector (Cell 15)	
SofterHandoff	'0'B	Set to '0'since only	
Conton landon	0.5	1 pilot included in	
		message	
MACIndexLSBs	Set by SS	6 least significant	
C.IIGOALOSO	55.2, 55	bits of the	
		MACIndex	
		assigned to UE	
DRCCover	'001'B	index of the DRC	
21.000101	001.5	cover associated	
		with target sector	
		(Cell 15)	
RABLength	'01'B	2 bit field	
RABOffset	'010'B	3 bit field	
NADOIISEL	UIUD	3 DIL HEIU	

Table 5.3.5.4.3-14: HRPD Silence Parameters (Table 5.3.5.4.3-12)

Information Element	Value/remark	Comment	Condition
MessageID	'00000010'B		
ReverseLinkSilenceDuration	2 bits, Set by SS		
ReverseLinkSilencePeriod	2 bits, Set by SS		
Reserved	0-7 bits, Set all 0s by SS		

Table 5.3.5.4.3-15: HRPD Open Loop Parameters (Table 5.3.5.4.3-12)

Information Element	Value/remark	Comment	Condition
MessageID	'00000111'B		
NumPilots	'0001'B		
PilotPN	9 bits, Set by SS		
OpenLoopAdjust	8 bits, Set by SS		
InitialAdjust	5 bits, Set by SS		
PilotStrengthIncluded	1 bit, Set by SS		
PilotStrengthNominal	3 bits, Set by SS		
PilotStrengthCorrectionMin	3 bits, Set by SS		
PilotStrengthCorrectionMax	3 bits, Set by SS		
Reserved	0-7 bits, Set all 0s by SS		

5.3.5.5 Test requirement

Tables 5.3.5.4.1-1, 5.3.5.5-1 and 5.3.5.5-2 define the primary level settings including test tolerances for E-UTRAN TDD - HRPD handover.

Table 5.3.5.5-1: Cell specific test parameters for E-UTRAN TDD cell#1 for handover to HRPD cell # 2

Parameter	Unit	Cell 1 (E-UTRA)			
		T1	T2	T3	
E-UTRA RF Channel			1		
number					
BW _{channel}	MHz	10			
OCNG Patterns defined in		OP.1	TDD	OP.2	
D.2.1 (OP.1 TDD) and in				TDD	
D.2.2 (OP.2 TDD)					
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB		0		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				
$N_{oc}^{ m Note~2}$	dBm/15		-98		
	kHz				
RSRP Note 3	dBm/15	-98.8	-98.8	-98.8	
	KHz				
\hat{E}_s/N_{oc}	dB	-0.8	-0.8	-0.8	
\hat{E}_s/I_{ot}	dB	-0.8	-0.8	-0.8	
Propagation Condition			AWGN		
Note 1: OCNG shall be us	ed such that	both cells are	fully allocate	ed and a	
constant total tran	smitted powe	r spectral dei	nsity is achiev	ved for all	
OFDM symbols.	DFDM symbols.				
	om other cells and noise sources not specified in the				
test is assumed to	to be constant over subcarriers and time and shall				
be modelled as AWGN of appropriate power for $\ N_{oc}$ to be fulfilled.					
Note 3: RSRP levels have	nave been derived from other parameters for				
information purpos	ses. They are	not settable	parameters t	hemselves.	

Table 5.3.5.5-2: Cell specific test parameters for HRPD (cell # 2) for handover from E-UTRAN TDD cell
(cell #1)

Parameter	Unit	Cell 2 (HRPD)		
		T1	T2	T3
$\frac{\text{Control } E_{b}}{N_{t}} \text{(38.4 kbps)}$	dB		21	
$\frac{\text{Control E}_{\text{b}}}{\text{N}_{\text{t}}} \text{(76.8 kbps)}$	dB		18	
\hat{I}_{or}/I_{oc}	dB	-infinity	0	0
I_{oc}	dBm/1.2288 MHz		-55	
CDMA2000 HRPD Pilot Strength	dB	-infinity	-3	-3
Propagation Condition			AWGN	

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the reverse control channel in HRPD to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

 $Handover \ delay \ D_{handover} = maximum \ RRC \ procedure \ delay + T_{interrupt}$

$$T_{interrupt} = T_{IU} + 40 + 10*KC*SW_K + 10*OC*SW_O ms$$

 $T_{IU} = 26.66$ ms; T_{IU} can be up to one HRPD frame (26.66 ms).

$$SW_K = 1$$
; $SW_K = \left\lceil \frac{srch_win_k}{60} \right\rceil$ where $srch_win_k$ is the number of HRPD chips (60) indicated by the search

window for known target HRPD cells in the message

KC = 1; 1 known cell; HRPD cell is identified during T2 and is therefore known before T3

OC = 0; OC is the number of unknown target HRPD cells (0).

Maximum RRC procedure delay = 50 ms as defined in TS 36.133 [4].

The handover delay $D_{handover}$ shall be less than a total of 127 ms in this test case (note: this gives a total of 50 ms for maximum RRC procedure delay plus 76.66 ms for Tinterrupt - allow 127 ms in the test).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.3.6 E-UTRAN TDD - cdma2000 1xRTT handover

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

5.3.6.1 Test purpose

To verify the UE's ability to transfer a connection between the UE and E-UTRAN to cdma2000 1xRTT in RRC_CONNECTED state by meeting the UE RRC procedure delay and interruption time requirements.

5.3.6.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 9 and forward that support cdma2000 1xRTT. Applicability requires support for FGI bits 11 and 24.

5.3.6.3 Minimum conformance requirements

The handover delay $D_{handover}$ shall be less than maximum RRC procedure delay (which is 130 ms) + $T_{interrupt}$ in RRC_CONNECTED state.

When the UE receives a RRC message implying handover to cdma2000 1xRTT, the UE shall be ready to start the transmission of the new reverse control channel in cdma2000 1xRTT within $D_{handover}$ from the end of the last E-UTRAN TTI containing the RRC command.

The interruption time is the time between the end of the last TTI containing the RRC command on the E-UTRAN PDSCH and the time the UE starts transmission of the reverse control channel in cdma2000 1xRTT, excluding the RRC procedure delay. The interruption time depends on whether the target cell is known to the UE or not.

A cdma2000 1xRTT cell is known if it has been measured by the UE during the last 5 seconds otherwise it is unknown. Under the reference conditions specified in sub-clause 4.2.1 of [19], the interruption time shall be less than $T_{interrupt}$:

$$T_{interrupt} = T_{IU} + 40 + 10*KC*SW_K + 10*OC*SW_O ms$$

Where:

 T_{IU} It is the interruption uncertainty when changing the timing from the E-UTRAN to the new cdma2000 1xRTT cell. T_{IU} can be up to one cdma2000 1xRTT frame (20 ms).

$$SW_{K} \hspace{1cm} \text{is} \hspace{1cm} SW_{K} = \left \lceil \frac{srch_win_k}{60} \right \rceil \hspace{1cm} \text{where srch_win_k is the number of cdma2000 1xRTT chips}$$

indicated by the search window for known target cdma2000 1xRTT cells in the message

SW_O is SW_O =
$$\left[\frac{\text{srch_win_o}}{60}\right]$$
 where srch_win_o is the number of cdma2000 1xRTT chips

indicated by the search window for unknown target cdma2000 1xRTT cells in the message

KC It is the number of known target cdma2000 1xRTT cells in the message, and

OC It is the number of unknown target cdma2000 1xRTT cells in the message.

The normative reference for this requirement is TS 36.133 [4] clause 5.4.2 and A.5.3.6.

5.3.6.4 Test description

5.3.6.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.22.
- 2. The general test parameter settings are set up according to Table 5.3.6.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are defined in clause 5.3.6.4.3.
- 5. There is one E-UTRA TDD serving cell and one cdma2000 1xRTT cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test

Table 5.3.6.4.1-1: General test parameters for E-UTRAN TDD to cdma2000 1xRTT handover test case

Parai	meter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
PCFICH/PDCCH/Ph	•		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Initial conditions	Active cell		Cell 1	E-UTRAN TDD cell
	Neighbouring cell		Cell 2	cdma2000 1X cell
Final condition	Active cell		Cell 2	cdma2000 1X cell
Channel Bandwidth	(BW _{channel})	MHz	10	
Gap Pattern Id			0	As specified in TS 36.133 [4]Table 8.1.2.1-1 started before T2 starts
E-UTRAN TDD mea	surement quantity		RSRP	
Inter-RAT (cdma200 quantity	00 1X) measurement		CDMA2000 1xRTT Pilot Strength	
b2-Threshold1		dBm	-90	Absolute E-UTRAN RSRP threshold for event B2
b2-Threshold2-CDM	IA2000	dB	-14	Absolute 'CDMA2000 1xRTT Pilot Strength' threshold for event B2
Hysteresis		dB	0	_
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
E-UTRA RF Channe	el Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Ba	andwidth	MHz	10	,
cdma2000 1X RF C	hannel Number		1	One cdma2000 1X carrier frequency is used.
cdma2000 1X neighbour cell list size			8	cdma2000 1X cells on cdma2000 1X RF channel 1 provided in the cell list before T2.
cdma2000-SearchWindowSize			8 (60 PN chips)	Search window size as defined in section 6.3.5 in 3GPP TS 36.331 [5]
T1		S	5	
T2		S	≤10	
T3		S	1	

5.3.6.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. The RRC message implying handover shall be sent to the UE during T2, after the UE has reported Event B2. T3 is defined as the end of the last E-UTRAN TTI containing the RRC message implying handover.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Tables 5.3.6.5-1 and 5.3.6.5-2. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. The neighbour cell shall broadcast its own PN offset and the measurement cell list of Cell 1 shall contain the PN offset of Cell 2. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Tables 5.3.6.5-1 and 5.3.6.5-2.
- 6. The UE shall transmit a MeasurementReport message triggered by Event B2.

- 7. The SS transmits a *HandoverFromEUTRAPreparationRequest* on Cell 1.
- 8. The UE transmits tunnelled *1xRTT GCSNA Encapsulated Page Response* messages contained in an *ULHandoverPreparationTransfer* message on Cell 1.
- 9. The SS transmits a tunnelled *1xRTT GCSNA Encapsulated Handoff Direction* message contained in a *MobilityFromEUTRACommand* on Cell1 to order the UE to perform inter RAT to Cell 2.
- 10. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Tables 5.3.6.5-1 and 5.3.6.5-2.
- 11. If the UE starts to transmit the Reverse Control Channel to Cell 2 in less than 200 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 12. After T3 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 13. The SS shall set a different PN Offset on Cell 2 so that the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 14. Repeat steps 2-13 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.3.6.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions.

Table 5.3.6.4.3-1: Common Exception messages for E-UTRAN TDD - cdma2000 1xRTT handover

Default Message Contents		
Common contents of system information		
blocks exceptions		
Default RRC messages and information	Table H.3.1-1	
elements contents exceptions	Table H.3.1-7	

Table 5.3.6.4.3-2: MeasConfig (Table 5.3.6.4.3-1)

Derivation Path: 36.508, Table 4.6.6-1			
Information Element	Value/remark	Comment	Condition
MeasConfig ::= SEQUENCE {			
measObjectToAddModList SEQUENCE (SIZE	2 entries		
(1maxObjectId)) OF SEQUENCE {			
measObjectId[1]	IdMeasObject-f17		
measObject[1]	MeasObjectCDMA2000- GENERIC		
measObjectId[2]	IdMeasObject-f1		
measObject[2]	MeasObjectEUTRA- GENERIC(f1)		
}	, ,		
reportConfigToAddModList SEQUENCE (SIZE (1maxReportConfigId)) OF SEQUENCE {	1 entry		
reportConfigId[1]	IdReportConfig-B2- CDMA2000		
reportConfig[1]	ReportConfigInterRAT- B2-CDMA2000(-90, -14)		
}			
measIdToAddModList SEQUENCE (SIZE (1maxMeasId)) OF SEQUENCE {	1 entry		
measId[1]	1		
measObjectId[1]	IdMeasObject-f17		
reportConfigId[1]	IdReportConfig-B2- CDMA2000		
}			
measGapConfig CHOICE {			
Setup SEQUENCE {			
gapOffset CHOICE {			
gp0	60		
}			
}			
}			
}			

Table 5.3.6.4.3-3: MeasObjectCDMA2000: Additional E-UTRAN TDD - cdma2000 1xRTT handover

Derivation Path: 36.508, Table 4.6.6-1C Information Element	Value/remark	Comment	Condition
MeasObjectCDMA2000-GENERIC ::= SEQUENCE {	Taras, Torriar N		Containon
cdma2000-Type	type1XRTT		
carrierFreq SEQUENCE {	sypo		
bandClass	Band Class of frequency		
	under test		
Arfcn	f14		
}			
searchWindowSize	8		
offsetFreq	db0		
cellsToRemoveList	Not present		
cellsToAddModList CHOICE {			
cellsToAddModListCDMA2000 ::= SEQUENCE (SIZE			
(1 maxCellMeas)) OF SEQUENCE {			
cellIndex [1]	1		
physCellId [1]	PN offset of Cell 2		
cellIndex [2]	2		
physCellId [2]	PN offset of Cell 2 + 4		
cellIndex [3]	3		
physCellId [3]	PN offset of Cell 2 + 8		
cellIndex [4]	4		
physCellId [4]	PN offset of Cell 2 + 12		
cellIndex [5]	5		
physCellId [5]	PN offset of Cell 2 + 16		
cellIndex [6]	6		
physCellId [6]	PN offset of Cell 2 + 20		
cellIndex [7]	7		
physCellId [7]	PN offset of Cell 2 + 24		
cellIndex [8]	8		
physCellId [8]	PN offset of Cell 2 + 28		
}			
}			
cellForWhichToReportCGI	Not present		

Table 5.3.6.4.3-4: ReportConfigInterRAT-B2-CDMA2000: Additional E-UTRAN TDD - cdma2000 1xRTT handover

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6.6	6-7C ReportConfigInterRA	T-B2-CDMA2000(EUTR	A-Thres,
CDMA2000-Thres)	-		
Information Element	Value/remark	Comment	Condition
ReportConfigInterRAT-B2-CDMA2000(EUTRA-Thres,			
CDMA2000-Thres) ::= SEQUENCE {			
triggerType CHOICE {			
event SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
threshold-RSRP	50(-90 dBm)	-90 dBm EUTRA- Thres is actual threshold value in dBm (50 - 140 dBm)	
}			
b2-Threshold2 CHOICE {			
b2-Threshold2CDMA2000	28 (-14 dB)	Integer (063)	
}			
}			
}			
hysteresis	0		
timeToTrigger	ms0		
}			
}			
maxReportCells	1		
reportInterval	ms2048		
reportAmount	r1		
<u> </u>			

Table 5.3.6.4.3-5: MeasuredResults: Additional E-UTRAN TDD - cdma2000 1xRTT handover

Information Element	Value/remark	Comment	Condition
MeasuredResults ::= SEQUENCE {			
measId	1	Identifies the measurement id for the reporting being performed	
measResultServCell SEQUENCE {			
rsrpResult		Set according to specific test	
rsrqResult		Set according to specific test	
}			
measResultNeighCells CHOICE {			
measResultsCDMA2000 }	MeasResultsCDMA2000		
}			

Table 5.3.6.4.3-6: MeasResultsCDMA2000: Additional E-UTRAN TDD - cdma2000 1xRTT handover

Derivation Path: 36.331 clause 6.3.5			
Information Element	Value/remark	Comment	Condition
MeasResultsCDMA2000 ::= SEQUENCE {			
preRegistrationStatusHRPD	FALSE		
measResultListCDMA2000 ::=SEQUENCE (SIZE			
(1maxCellReport)) OF SEQUENCE {			
physCellId	PhysicalCellIdentity of Cell		
	2		
cgi-Info	Not present		
measResult SEQUENCE {			
pilotStrength		Set according to	
		specific test	
}			
}			
}			

Table 5.3.6.4.3-7: HandoverFromEUTRAPreparationRequest

Derivation Path: 36.508 Table 4.6.1-4			
Information Element	Value/remark	Comment	Condition
HandoverFromEUTRAPreparationRequest ::=			
SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
handoverFromEUTRAPreparationRequest-r8			
SEQUENCE {			
cdma2000-Type	type1XRTT		
Rand	Set by SS	Random Challenge Data as broadcast on Cell 2	
mobilityParameters	Set according to 36.508 Table 4.5.2C.4-6	CDMA2000Param eters	
}			
}			•
}			•
}			

Table 5.3.6.4.3-8: *ULHandoverPreparationTransfer*

Derivation Path: 36.508 Table 4.6.1-24			
Information Element	Value/remark	Comment	Condition
ULHandoverPreparationTransfer ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
ulHandoverPreparationTransfer-r8			
SEQUENCE {			
cdma2000-Type	type1XRTT		
Meid	UE's meid		
dedicatedInfo	Set according to Table	1xRTT GCSNA	
	5.3.6.4.3-8	Encapsulated	
		Page Response	
1		message	
}			
}			
,			
1 }			I

Table 5.3.6.4.3-9: 1xRTT GCSNA Encapsulated Page Response (Table 5.3.6.4.3-7)

Information Element	Value/remark	Comment	Condition
MessageID	'00000001'B		
		ervice message	
GCSNAOption	'00000001'B		
AlternativeGCSNAOption_INCL	'0'B		
IWSIDIncl	'0'B		
AckRequired	'0'B		
StopDupDetect	'0'B		
MessageSequence	6 bits, Set by UE		
NumTLACEncapsulated1xL3PDU	'00'B		
Reserved	'0000'B		
1xLogicalChannel	'0'B		
1xProtocolRevision	'00000110'B		
MsgType	'00000101'B	Page Response message	
NumTLACHeaderRecords	'0001'B	_	
TLACHeaderRecordType	'0000'B		
TLACHeaderRecordLength	8 bits, Set by UE		
MSID_TYPE	3 bits, Set by UE	Should be matched with PREF_MSID_TYP E	
MSID_LEN	4 bits, Set by UE		
MSID	Variable, Set by UE		
Reserved	'0000000'B		
1xL3PDULength	16 bits, Set by UE		
MOB_TERM	'1'B		
SLOT_CYCLE_INDEX	'010'B		
MOB_P_REV	8 bits, Set by UE		
SCM	8 bits, Set by UE		
REQUEST_MODE	'001'B		
SERVICE_OPTION	16 bits, Set by UE		
PM	'0'B		
NAR_AN_CAP	'0'B		
ENCRYPTION_SUPPORTED	'0000'B		
NUM_ALT_SO	'000'B		
UZID_INCL	'0'B		
CH_IND	'0'B		
OTD_SUPPORTED	'0000'B		
QPCH_SUPPORTED	'0'B		
ENHANCED_RC	'0'B		
FOR_RC_PREF	'0000'B		
REV_RC_PREF	'0'B		
FCH_SUPPORTED	'0'B		
FCH Capability Type-specific fields	Variable		
DCCH_SUPPORTED	'1'B		
REV_FCH_GATING_REQ	'0'B		

Table 5.3.6.4.3-10: MobilityFromEUTRACommand

Derivation Path: 36.508, Table 4.6.1-6			
Information Element	Value/remark	Comment	Condition
MobilityFromEUTRACommand ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE{			
mobilityFromEUTRACommand-r9 SEQUENCE			
{			
cs-FallbackIndicator	False		
purpose CHOICE{			
e-CSFB-r9 SEQUENCE {			
messageContCDMA2000-1XRTT-r9	Set according to Table 5.3.6.4.3-10	1xRTT GCSNA Encapsulated Handoff Direction message	
}			
}			
}			
}			
}			
}			

Table 5.3.6.4.3-11: 1xRTT GCSNA Encapsulated Handoff Direction (Table5.3.6.4.3-9)

Information Element	Value/remark	Comment	Condition
MessageID	'00000001'B		
GCSNAOption	'0000001'B		
AlternativeGCSNAOption_INCL	'0'B		
IWSIDIncl	'0'B		
AckRequired	'0'B		
StopDupDetect	'0'B		
MessageSequence	Set by SS		
NumTLACEncapsulated1xL3PDU	'00'B		
Reserved	'0000'B		
1xLogicalChannel	'1'B		
1xProtocolRevision	'00000110'B		
MsgType	'00100010'B	Universal Handoff Direction message	
NumTLACHeaderRecords	'0000'B		
Reserved	'000'B		
1xL3PDULength	16 bits, Set by SS		
USE_TIME	'0'B		
ACTION_TIME	'000000'B		
HDM_SEQ	2 bits, Set by SS		
PARMS_INCL	'1'B		
P_REV	'00000110'B		
SERV_NEG_TYPE	'1'B		
SEARCH_INCLUDED	'1'B		
SRCH WIN A	'1000'B		
SRCH_WIN_N	'1001'B		
SRCH_WIN_R	'1011'B		
T_ADD	'010100'B		
T_DROP	'011110'B		
T_COMP	'1010'B		
T_TDROP	'0100'B		
SOFT_SLOPE	'000000'B		
ADD_INTERCEPT	'000000'B		
DROP_INTERCEPT	'000000'B		
EXTRA_PARMS	'1'B		
PACKET_ZONE_ID	'00000000'B		
	4 bits, Set by SS		
FRAME_OFFSET PRIVATE LCM	'0'B		
RESET_L2	'1'B		
RESET_FPC	'1'B		
ENCRYPT_MODE	'00'B		
NOM_PWR_EXT	'0'B		
NOM_PWR	'0000'B		
RLGAIN_TRAFFIC_PILOT	'000000'B		
DEFAULT_RLAG	'1'B		
NUM_PREAMBLE	'000'B		
BAND_CLASS	5 bits, Set by SS		
CDMA_FREQ	11 bits, Set by SS		
RETURN_IF_HANDOFF_FAIL	'0'B		
PERIODIC_SEARCH	'0'B		
SCR_INCLUDED	'1'B		
NNSCR_INCLUDED	'1'B		
USE_PWR_CNTL_STEP	'0'B		
CLEAR_RETRY_DELAY	'0'B		
SCH_INCL	'1'B		
FPC_SUBCHAN_GAIN	'01010'B		
USE_PC_TIME	'0'B		
CH_IND	'101'B		
ACTIVE_SET_REC_LEN	8 bits, Set by SS		
NUM_PILOTS	'001'B		
SRCH_OFFSET_INCL	'1'B		
PILOT_PN	'000000000'B		
SRCH_OFFSET	'010'B		
	1 0.00	I	<u> </u>

ADD_PILOT_REC_INCL	'0'B	
PWR_COMB_IND	'0'B	
CODE_CHAN_FCH	11 bits, Set by SS	
QOF_MASK_ID_FCH	'00'B	
RESERVED	0-7 bits	
REV FCH GATING MODE	'0'B	

5.3.6.5 Test requirement

Tables 5.3.6.4.1-1, 5.3.6.5-1 and 5.3.6.5-2 define the primary level settings including test tolerances for E-UTRAN TDD - cdma2000 1xRTT handover test.

Table 5.3.6.5-1: Cell Specific Test requirement Parameters for Cell 1 E-UTRAN TDD cell

Parameter	Unit	Cell 1 (E-UTRA)		
T di dilictoi	O.I.I.	T1 T2		T3
E-UTRA RF Channel			1	
number				
BW _{channel}	MHz		10	
OCNG Patterns defined in		OP.1	TDD	OP.2
D.2.1 (OP.1 TDD) and in				TDD
D.2.2 (OP.2 TDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB		0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
$N_{oc}^{ m Note~2}$	dBm/15 kHz		-98	
RSRP Note 3	dBm/15	-98+TT	-98+TT	-98+TT
KOKF	KHz	-90+11	-90+11	-90+11
A /N	dB	0+TT	0+TT	0+TT
\hat{E}_s/N_{oc}	d B	0111	0111	0111
\hat{E}_s/I_{ot}	dB	0+TT	0+TT	0+TT
Propagation Condition			AWGN	
Note 1: OCNG shall be us				
constant total tran	smitted powe	r spectral dei	nsity is achiev	ved for all
OFDM symbols.				
Note 2: Interference from other cells and noise sources not specified in the				
test is assumed to	test is assumed to be constant over subcarriers and time and shall			
he meddalla da a A	MON of our re		N_{oc}	h a f f: a -
	be modelled as AWGN of appropriate power for $\frac{N_{oc}}{N}$ to be fulfille Note 3: RSRP levels have been derived from other parameters for			be fulfilled.
information purposes. They are not settable parameters themselves.				

Parameter	Unit	Cell 2 (cdma2000 1X)		
		T1 T2		T3
$\frac{\text{Pilot } E_{c}}{I_{\text{or}}}$	dB	-7		
$\frac{\text{Sync } E_c}{I_{\text{or}}}$	dB	-16		
$\frac{\text{Paging } E_{c}}{I_{or}} \text{(4.8 kbps)}$	dB	-12		
\hat{I}_{or}/I_{oc}	dB	-infinity 0+TT 0-		0+TT
I_{oc}	dBm/1.2288 MHz		-55	
CDMA2000 1xRTT Pilot Strength	dB	dB -infinity -10-		-10+TT
Propagation Condition			AWGN	•

Table 5.3.6.5-2: Cell Specific Test requirement Parameters for Cell 2 cdma2000 1xRTT cell

The handover delay is defined as the time from the beginning of time period T3, to the moment the UE start to transmit the reverse control channel in cdma2000 1xRTT to Cell 2.

The handover delay D_{handover} test requirement in this case is expressed as:

Handover delay $D_{handover} = maximum RRC$ procedure delay $+ T_{interrupt}$

$$T_{interrupt} = T_{IU} + 40 + 10*KC*SW_K + 10*OC*SW_O ms$$

 $T_{IU} = 20 \text{ ms}$; T_{IU} can be up to one cdma2000 1xRTT frame (20 ms).

$$SW_K = 1$$
; $SW_K = \left[\frac{srch_win_k}{60}\right]$ where $srch_win_k$ is the number of cdma2000 1xRTT chips (60) indicated

by the search window for known target cdma2000 1xRTT cells in the message

KC = 1; 1 known cell; cdma2000 1xRTT cell is identified during T2 and is therefore known before T3

OC = 0; OC is the number of unknown target cdma2000 1xRTT cells (0).

Maximum RRC procedure delay = 130 ms as defined in TS 36.133 [4].

The handover delay $D_{handover}$ shall be less than a total of 200 ms in this test case (note: this gives a total of 130 ms for maximum RRC procedure delay plus 70 ms for $T_{interrupt}$).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6 RRC Connection Mobility Control

When the UE is in RRC_CONNECTED, for which security has been activated, initiate the RRC re-establishment procedure in order to continue the RRC connection, the RRC re-establishment process takes place. In this process the UE initiates the procedure when one of the following conditions is met: upon re-entry of the service area after having detected radio link failure, upon handover failure or when lower layers detect problems as defined in TS 36.331 [5] clause 5.3.7.2. After selecting the best cell the UE send a 'RRC Connection Re-establishment Request message' to the System Simulator as defined in TS 36.331 [5] clause 5.3.7. The connection re-establishment succeeds only if the concerned cell is prepared i.e. has a valid UE context within the specified UE re-establishment delay period.

When the random access procedure is initiated by a PDCCH order or by the MAC sublayer itself, the random access process takes place. This process allows the PDCCH order or RRC optionally to indicate a random access preamble and PRACH resource as defined in TS 36.321 [11] clause 5.1. In this process from the physical layer perspective, the L1 random access procedure encompasses the transmission of random access preamble and random access response as defined in TS 36.213 [8] clause 6.1. The random access procedure is used when establishing the L1 communication between the UE and E-UTRAN.

SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to Annex A1. The SS sends downlink MAC padding bits on the DL RMC.

Uplink is configured according to Annex A.3. This applies only for Re-establishment tests (subclause 6.1).

6.1 RRC Re-establishment

6.1.1 E-UTRAN FDD Intra-frequency RRC Re-establishment

6.1.1.1 Test purpose

To verify that the UE is able to send a RRC Connection Re-establishment Request message to the System Simulator within the specified re-establishment delay limits from the moment it detects a loss in RRC connection.

6.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

6.1.1.3 Minimum conformance requirements

In RRC connected mode the UE shall be capable of sending RRCConnectionReestablishmentRequest message within $T_{re\text{-establish_delay}}$ seconds from the moment it detects a loss in RRC connection. The total RRC connection delay ($T_{re\text{-establish_delay}}$) shall be less than:

$$T_{re-esta}$$
blish_delay = $TUL_grant + T_{UE_re-establish_delay}$

 T_{UL_grant} : It is the time required to acquire and process uplink grant from the target cell. The uplink grant is required to transmit RRCConnectionReestablishmentRequest message.

The UE re-establishment delay ($T_{UE_re-establish_delay}$) is the time between the moments when any of the conditions requiring RRC re-establishment as defined in section 5.3.7 in TS 36.331 [5] is detected by the UE to the time when the UE sends PRACH to the target cell. The UE re-establishment delay ($T_{UE_re-establish_delay}$) requirement shall be less than:

$$TUE$$
-re-establish_delay = 50 ms + Nfreq*Tsearch + TSI + TPRACH

T_{search}: It is the time required by the UE to search the target cell.

 $T_{\text{search}} = \text{It is [100]}$ ms if the target cell is known by the UE; the target cell is known if it has been measured by the UE in the last 5 seconds.

 $T_{search} = It$ is 800 ms if the target cell is unknown by the UE; the target cell is unknown if it has not been measured by the UE in the last 5 seconds.

 T_{SI} = It is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 36.331 [5] for E-UTRAN cell.

T_{PRACH} = The additional delay caused by the random access procedure; it will be at least 10 ms due to random access occasion and there might be additional delay due to ramping procedure.

 N_{freq} : It is the total number of E-UTRA frequencies to be monitored for RRC re-establishment; $N_{\text{freq}} = 1$ if the target cell is known.

There is no requirement if the target cell does not contain the UE context.

The normative reference for this requirement is TS 36.133 [4] clause 6.1.2.1 and A.6.1.1.

6.1.1.4 Test description

6.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.20.
- 2. The parameter settings for the cells are set up according to Table 6.1.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.1.1.4.3.
- 5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 6.1.1.4.1-1: General test parameters for E-UTRAN FDD intra-frequency RRC Re-establishment test case

Par	ameter	Unit	Value	Comment
PDSCH parameter	rs		DL Reference Measurement Channel R.0 FDD	As specified in section A. 1.1
PCFICH/PDCCH/F	PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chani	nel Number		1	Only one FDD carrier frequency is used.
Channel Bandwidt	h (BW _{channel})	MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Inf	ormation	-	Not Sent	No additional delays in random access procedure.
PRACH configurat	ion index		4	As specified in table 5.7.1-2 in TS 36.211
Time offset between	en cells	ms	3	Asynchronous cells 3ms or 92160*Ts
T1		S	5	
T2		ms	200	
T3		S	3	

6.1.1.4.2 Test procedure

The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.1.1.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.

- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.1.1.5-1. T2 starts
- 6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 6.1.1.5-1. T3 starts
- 7. If the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2 within 1.5 s from the beginning of time period T3, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.1.1.4.3-1: Common Exception messages for E-UTRAN FDD Intra-frequency RRC Reestablishment

Default Message Contents				
Common contents of system information Table H.2.5-1 blocks exceptions				
Default RRC messages and information elements contents exceptions	Table H.3.2-1			

Table 6.1.1.4.3-2: MeasConfig-DEFAULT: Additional E-UTRAN intra frequency RRC Re-establishment requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4.6	6.6-1 MeasConfig-DEFAULT		
Information Element	Value/remark	Comment	Condition
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE (SIZE			
(1maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f1		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA- GENERIC(f1)		
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	Not present		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	Not present		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
speedDependentParameters	Not present		
}			

6.1.1.5 Test requirement

Table 6.1.1.5-1 defines the primary level settings including test tolerances for E-UTRAN FDD Intra-frequency RRC Re-establishment test case.

Table 6.1.1.5-1: Cell specific test parameters for E-UTRAN FDD intra-frequency RRC Reestablishment test case

Parameter	Unit		Cell 1			Cell 2	
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1			1	
Number							
BW _{channel}	MHz		10			10	
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 FDD	OP.2 FDD	OP.1 FDD
defined in D.1.1 (OP.1		FDD	FDD	FDD			
FDD) and in D.1.2							
(OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0			0	
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note 1}	dB						
OCNG_RB ^{Note 1}	dB						
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
N_{oc} Note 2	dBm/15 KHz		•		-98	·	
\hat{E}_s/N_{oc}	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition			•		AWGN	•	•

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the RRCConnectionReestablishmentRequest message to cell 2.

The RRC re-establishment delay to a known E-UTRA FDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re-establish_delay} = T_{UL_grant} + T_{UE_re-establish_delay}$$

Where:

 $T_{UL_grant} = It$ is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$$TUE_re-establish_delay = 50 ms + Nfreq* Tsearch + TSI + TPRACH$$

 $N_{freq} = 1$

 $T_{search} = 100 \text{ ms}$

 $T_{SI} = 1280$ ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 [5] for the target E-UTRAN FDD cell.

T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, within the allowance of 1.5 s in the test case.

6.1.2 E-UTRAN FDD Inter-frequency RRC Re-establishment

6.1.2.1 Test purpose

To verify that the UE is able to send a RRC Connection Re-establishment Request message to the System Simulator within the specified re-establishment delay limits from the moment it detects a loss in RRC connection.

6.1.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward. Applicability requires support for FGI bit 25.

6.1.2.3 Minimum conformance requirements

In RRC connected mode the UE shall be capable of sending RRCConnectionReestablishmentRequest message within $T_{re-establish_delay}$ seconds from the moment it detects a loss in RRC connection. The total RRC connection delay ($T_{re-establish_delay}$) shall be less than:

$$T_{re-establish\ delay} = T_{UL\ grant} + T_{UE\ re-establish\ delay}$$

 T_{UL_grant} : It is the time required to acquire and process uplink grant from the target cell. The uplink grant is required to transmit RRCConnectionReestablishmentRequest message.

The UE re-establishment delay ($T_{UE_re-establish_delay}$) is the time between the moments when any of the conditions requiring RRC re-establishment as defined in section 5.3.7 in TS 36.331 [5] is detected by the UE to the time when the UE sends PRACH to the target cell. The UE re-establishment delay ($T_{UE_re-establish_delay}$) requirement shall be less than:

T_{search}: It is the time required by the UE to search the target cell.

 $T_{search} = It$ is [100] ms if the target cell is known by the UE; the target cell is known if it has been measured by the UE in the last 5 seconds.

 $T_{\text{search}} = \text{It is } 800 \text{ ms if the target cell is unknown by the UE; the target cell is unknown if it has not been measured by the UE in the last 5 seconds.}$

 T_{SI} = It is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 36.331 [5] for E-UTRAN cell.

 T_{PRACH} = The additional delay caused by the random access procedure; it will be at least 10 ms due to random access occasion and there might be additional delay due to ramping procedure.

 N_{freq} : It is the total number of E-UTRA frequencies to be monitored for RRC re-establishment; $N_{\text{freq}} = 1$ if the target cell is known.

There is no requirement if the target cell does not contain the UE context.

The normative reference for this requirement is TS 36.133 [4] clause 6.1.2.1 and A.6.1.2.

6.1.2.4 Test description

6.1.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A
 Figure A.14.
- 2. The parameter settings for the cells are set up according to Table 6.1.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.1.2.4.3.
- 5. There is one E-UTRA FDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 6.1.2.4.1-1: General test parameters for E-UTRAN FDD inter-frequency RRC Re-establishment test case

Parar	neter	Unit	Value	Comment
PDSCH parameters			DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PF	IICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
	Active cell		Cell 1	
1	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Channe	l Number (cell 1)		1	
E-UTRA RF Channe	l Number (cell 2)		2	
E-UTRA FDD inter-fr	requency carrier list		1	2 E-UTRA FDD carrier
size				frequencies in total: 1 intra-
				frequency and 1 inter-frequency
Channel Bandwidth	(BW _{channel})	MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	5000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Infor	mation	-	Not Sent	No additional delays in random access procedure.
PRACH configuration	n index		4	As specified in table 5.7.1-2 in TS 36.211
Time offset between	cells	ms	3	Asynchronous cells 3ms or 92160*Ts
T1		s	5	
T2		ms	200	
T3		S	5	

6.1.2.4.2 Test procedure

The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.1.2.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.

- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.1.2.5-1. T2 starts
- 6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 6.1.2.5-1. T3 starts
- 7. If the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2 within 3 s from the beginning of time period T3, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.1.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.1.2.4.3-1: Common Exception messages for E-UTRAN FDD Inter-frequency RRC Reestablishment

Default Message Contents				
Common contents of system information blocks exceptions	Table H.2.5-2			
	Table H.3.2-1			

Table 6.1.2.4.3-2: MeasConfig-DEFAULT: Additional E-UTRAN inter frequency RRC Re-establishment requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4			1
Information Element	Value/remark	Comment	Condition
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE OF {	2 entry		
MeasObjectToAddMod SEQUENCE {			
measObjectId	IdMeasObject-f1		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA- GENERIC(f1)	serving frequency	
}			
}			
MeasObjectToAddMod SEQUENCE {			
measObjectId	IdMeasObject-f2		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA- GENERIC(f2)	inter frequency	
}			
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	Not present		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
preRegistrationInfoHRPD	Not present		
speedStatePars	Not present		
<u> </u>			

6.1.2.5 Test requirement

Table 6.1.2.5-1 defines the primary level settings including test tolerances for E-UTRAN FDD Inter-frequency RRC Re-establishment test case.

Table 6.1.2.5-1: Cell specific test parameters for E-UTRAN FDD inter-frequency RRC Reestablishment test case

Parameter	Unit		Cell 1			Cell 2	
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1			2	
Number							
BW _{channel}	MHz		10			10	
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 FDD	OP.2 FDD	OP.1 FDD
defined in D.1.1 (OP.1		FDD	FDD	FDD			
FDD) and in D.1.2							
(OP.2 FDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0			0	
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note 1}	dB						
OCNG_RB ^{Note 1}	dB						
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-Infinity	-Infinity	-Infinity	-Infinity	7
N_{oc} Note 2	dBm/15 KHz				-98		
\hat{E}_s/N_{oc}	dB	4	-Infinity	-Infinity	- Infinity	- Infinity	7
RSRP Note 3	dBm/15 KHz	-94	-Infinity	-Infinity	- Infinity	-Infinity	-91
Propagation Condition			•		AWGN	•	•

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown E-UTRA FDD inter frequency cell shall be less than 3 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-establish_delay}} = T_{UL_grant} + T_{UE_re\text{-establish_delay}}.$$

Where:

 $T_{UL_grant} = It$ is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$$TUE_re$$
-establish_delay = 50 ms + Nfreq* Tsearch + TSI + TPRACH

 $N_{\text{freq}} = 2$

 $T_{\text{search}} = 800 \text{ ms}$

 $T_{SI} = 1280$ ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 [5] for the target E-UTRAN FDD cell.

 $T_{PRACH} = 15$ ms; it is the additional delay caused by the random access procedure.

This gives a total of 2945 ms, within the allowance of 3 s in the test case.

6.1.3 E-UTRAN TDD Intra-frequency RRC Re-establishment

6.1.3.1 Test purpose

To verify that the UE is able to send a RRC Connection Re-establishment Request message to the System Simulator within the specified re-establishment delay limits from the moment it detects a loss in RRC connection.

6.1.3.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

6.1.3.3 Minimum conformance requirements

In RRC connected mode the UE shall be capable of sending RRCConnectionReestablishmentRequest message within $T_{re-establish_delay}$ seconds from the moment it detects a loss in RRC connection. The total RRC connection delay ($T_{re-establish_delay}$) shall be less than:

$$T_{re-establish_delay} = T_{UL_grant} + T_{UE_re-establish_delay}$$

 T_{UL_grant} : It is the time required to acquire and process uplink grant from the target cell. The uplink grant is required to transmit *RRCConnectionReestablishmentRequest* message.

The UE re-establishment delay ($T_{UE_re-establish_delay}$) is the time between the moments when any of the conditions requiring RRC re-establishment as defined in section 5.3.7 in TS 36.331 [5] is detected by the UE to the time when the UE sends PRACH to the target cell. The UE re-establishment delay ($T_{UE_re-establish_delay}$) requirement shall be less than:

$$TUE$$
-re-establish_delay = 50 ms + Nfreq*Tsearch + TSI + T_{PRACH}

T_{search} is the time required by the UE to search the target cell.

 T_{search} is [100] ms if the target cell is known by the UE; the target cell is known if it has been measured by the UE in the last 5 seconds.

 $T_{\text{searc}h}$ is 800 ms if the target cell is unknown by the UE; the target cell is unknown if it has not been measured by the UE in the last 5 seconds.

 T_{SI} is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 36.331 [5] for E-UTRAN cell.

 T_{PRACH} is the additional delay caused by the random access procedure; it will be at least 10 ms due to random access occasion and there might be additional delay due to ramping procedure.

 N_{freq} is the total number of E-UTRA frequencies to be monitored for RRC re-establishment; $N_{\text{freq}} = 1$ if the target cell is known.

There is no requirement if the target cell does not contain the UE context.

The normative reference for this requirement is TS 36.133 [4] clause 6.1.2.1 and A.6.1.3.

6.1.3.4 Test description

6.1.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.20.
- 2. The parameter settings for the cells are set up according to Table 6.1.3.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.1.3.4.3.
- 5. There is one E-UTRA TDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 6.1.3.4.1-1: General test parameters for E-UTRAN TDD intra-frequency RRC Re-establishment test case

Pai	rameter	Unit	Value	Comment
PDSCH paramete	PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
PCFICH/PDCCH/	PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
E-UTRA RF Chan	inel Number		1	Only one TDD carrier frequency is used.
Channel Bandwid	th (BW _{channel})	MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	3000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring In	formation	-	Not Sent	No additional delays in random access procedure.
Special subframe	configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink co	onfiguration		1	As specified in table 4.2-2 in TS 36.211
PRACH configura	tion index		53	As specified in table 5.7.1-3 in TS 36.211
Time offset betwe	en cells	μS	3	Synchronous cells 3µs or 92*Ts
T1		S	5	•
T2		ms	200	
T3		S	3	

6.1.3.4.2 Test procedure

The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.1.3.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.1.3.5-1. T2 starts
- 6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 6.1.3.5-1. T3 starts
- 7. If the UE starts to send PRACH preambles to cell 2 within 1.5 s from the beginning of time period T3. then the number of successful tests is increased by one.
- 8. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.1.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.1.3.4.3-1: Common Exception messages for E-UTRAN intra frequency RRC Re-establishment requirement

Default Message Contents						
Common contents of system information	Table H.2.5-1					
blocks exceptions						
Default RRC messages and information	Table H.3.2-2					
elements contents exceptions						

Table 6.1.3.4.3-2: MeasConfig-DEFAULT: Additional E-UTRAN intra frequency RRC Re-establishment requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4	.6.6-1 MeasConfig-DEFAULT		
Information Element	Value/remark	Comment	Condition
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE (SIZE			
(1maxObjectId)) OF SEQUENCE {			
measObjectId	IdMeasObject-f1		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA-		
	GENERIC(f1)		
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	Not present		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	Not present		
s-Measure	Not present		
hrpd-PreRegistrationInfo	Not present		
speedDependentParameters	Not present		
}			

6.1.3.5 Test requirement

Table 6.1.3.5-1 defines the primary level settings including test tolerances for E-UTRAN TDD Intra-frequency RRC Re-establishment test case.

Table 6.1.3.5-1: Cell specific test parameters for E-UTRAN TDD intra-frequency RRC Reestablishment test case

Parameter	Unit		Cell 1			Cell 2	
		T1	T2	T3	T1	T2	Т3
E-UTRA RF Channel			1			1	
Number							
BW _{channel}	MHz		10			10	
OCNG Patterns		OP.1	OP.1	OP.2	OP.2 TDD	OP.2 TDD	OP.1 TDD
defined in D.2.1 (OP.1		TDD	TDD	TDD			
TDD) and in D.2.2							
(OP.2 TDD)							
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PCFICH_RB	dB						
PHICH_RA	dB						
PHICH_RB	dB		0			0	
PDCCH_RA	dB						
PDCCH_RB	dB						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note 1}	dB						
OCNG_RB ^{Note 1}	dB						
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1.54	-Infinity	-Infinity	-3.79	4	4
N_{oc} Note 2	dBm/15 KHz				-98		
\hat{E}_s/N_{oc}	dB	7	-Infinity	-Infinity	4	4	4
RSRP Note 3	dBm/15 KHz	-91	-Infinity	-Infinity	-94	-94	-94
Propagation Condition					AWGN	•	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known E-UTRA TDD intra frequency cell shall be less than 1.5 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{\text{re-establish delay}} = T_{\text{UL grant}} + T_{\text{UE re-establish delay}}$$
.

Where:

 T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$$T_{UE_re\text{-establish_delay}} = 50 \text{ ms} + N_{freq} * T_{search} + T_{SI} + T_{PRACH}$$

 $N_{freq} = 1$

 $T_{\text{search}} = 100 \text{ ms}$

 $T_{SI} = 1280$ ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 [5] for the target E-UTRAN TDD cell.

 $T_{PRACH} = 15$ ms; it is the additional delay caused by the random access procedure.

This gives a total of 1445 ms, within the allowance of 1.5 s in the test case.

6.1.4 E-UTRAN TDD Inter-frequency RRC Re-establishment

6.1.4.1 Test purpose

To verify that the UE is able to send a RRC Connection Re-establishment Request message to the System Simulator within the specified re-establishment delay limits from the moment it detects a loss in RRC connection.

6.1.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward. Applicability requires support for FGI bit 25.

6.1.4.3 Minimum conformance requirements

In RRC connected mode the UE shall be capable of sending RRCConnectionReestablishmentRequest message within $T_{re\text{-establish_delay}}$ seconds from the moment it detects a loss in RRC connection. The total RRC connection delay ($T_{re\text{-establish_delay}}$) shall be less than:

$$T_{re\text{-establish delay}} = T_{UL \text{ grant}} + T_{UE \text{ re-establish delay}}$$

 T_{UL_grant} : It is the time required to acquire and process uplink grant from the target cell. The uplink grant is required to transmit RRCConnectionReestablishmentRequest message.

The UE re-establishment delay ($T_{UE_re-establish_delay}$) is the time between the moments when any of the conditions requiring RRC re-establishment as defined in section 5.3.7 in TS 36.331 [5] is detected by the UE to the time when the UE sends PRACH to the target cell. The UE re-establishment delay ($T_{UE_re-establish_delay}$) requirement shall be less than:

$$TUE$$
-re-establish_delay = 50 ms + Nfreq*Tsearch + TSI + T_{PRACH}

T_{search}: It is the time required by the UE to search the target cell.

 $T_{\text{search}} = \text{It is [100]}$ ms if the target cell is known by the UE; the target cell is known if it has been measured by the UE in the last 5 seconds.

 T_{search} = It is 800 ms if the target cell is unknown by the UE; the target cell is unknown if it has not been measured by the UE in the last 5 seconds.

 T_{SI} = It is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 36.331 [5] for E-UTRAN cell.

T_{PRACH} = The additional delay caused by the random access procedure; it will be at least 10 ms due to random access occasion and there might be additional delay due to ramping procedure.

 N_{freq} : It is the total number of E-UTRA frequencies to be monitored for RRC re-establishment; $N_{\text{freq}} = 1$ if the target cell is known.

There is no requirement if the target cell does not contain the UE context.

The normative reference for this requirement is TS 36.133 [4] clause 6.1.2.1 and A.6.1.4.

6.1.4.4 Test description

6.1.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.
- 2. The parameter settings for the cells are set up according to Table 6.1.4.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.1.4.4.3.
- 5. There is one E-UTRA TDD carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

Table 6.1.4.4.1-1: General test parameters for E-UTRAN TDD inter-frequency RRC Re-establishment test case

Parai	meter	Unit	Value	Comment
PDSCH parameters	PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A. 1.2
PCFICH/PDCCH/Ph	HICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A. 2.2
	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
	Active cell		Cell 2	
E-UTRA RF Channe			1	
E-UTRA RF Channe	el Number (cell 2)		2	
size	requency carrier list		1	2 E-UTRA TDD carrier frequencies in total: 1 intra- frequency and 1 inter-frequency
Channel Bandwidth	(BW _{channel})	MHz	10	
N310		-	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	Minimum consecutive in-sync indications from lower layers
T310		ms	0	Radio link failure timer; T310 is disabled
T311		ms	5000	RRC re-establishment timer
DRX			OFF	
CP length			Normal	
Access Barring Infor	mation	-	Not Sent	No additional delays in random access procedure.
Special subframe co	onfiguration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink con	figuration		1	As specified in table 4.2-2 in TS 36.211
PRACH configuration	n index		53	As specified in table 5.7.1-3 in TS 36.211
Time offset between	cells	μS	3	Synchronous cells 3µs or 92*Ts
T1		s	5	
T2		ms	200	
T3		S	5	

6.1.4.4.2 Test procedure

The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.1.3.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.1.3.5-1. T2 starts.
- 6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 6.1.3.5-1. T3 starts.
- 7. If the UE starts to send PRACH preambles to cell 2 within 3s from the beginning of time period T3. then the number of successful tests is increased by one.
- 8. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.1.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.1.4.4.3-1: Common Exception messages for E-UTRAN inter frequency RRC Re-establishment requirement

Default Message Contents					
	Table H.2.5-2				
blocks exceptions					
Default RRC messages and information	Table H.3.2-2				
elements contents exceptions					

Table 6.1.4.4.3-2: MeasConfig-DEFAULT: Additional E-UTRAN inter frequency RRC Re-establishment requirement

Derivation Path: TS 36.508 [7] clause 4.6.6, Table 4	Value/remark	Comment	Condition
MeasConfig-DEFAULT ::= SEQUENCE {			
measObjectToRemoveList	Not present		
measObjectToAddModList SEQUENCE OF {	2 entry		
MeasObjectToAddMod SEQUENCE {			
measObjectId	IdMeasObject-f1		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA- GENERIC(f1)	serving frequency	
}	, ,		
}			
MeasObjectToAddMod SEQUENCE {			
measObjectId	IdMeasObject-f2		
measObject CHOICE {			
MeasObjectEUTRA	MeasObjectEUTRA- GENERIC(f2)	inter frequency	
}			
}			
}			
reportConfigToRemoveList	Not present		
reportConfigToAddModifyList	Not present		
measIdToRemoveList	Not present		
measIdToAddModifyList	Not present		
quantityConfig	Not present		
measGapConfig	MeasGapConfig-GP1		
s-Measure	Not present		
preRegistrationInfoHRPD	Not present		
speedDependentParameters	Not present		

6.1.4.5 Test requirement

Table 6.1.4.5-1 defines the primary level settings including test tolerances for E-UTRAN TDD Inter-frequency RRC Re-establishment test case.

Table 6.1.4.5-1: Cell specific test parameters for E-UTRAN TDD inter-frequency RRC Reestablishment test case

Parameter	Unit	Cell 1			Cell 2			
		T1	T2	T3	T1	T2	Т3	
E-UTRA RF Channel Number		1 2						
BW _{channel}	MHz		10			10	10	
OCNG Patterns defined in A.2.1 (OP.1 TDD) and in A.2.2 (OP.2 TDD)		OP.1 TDD	OP.1 TDD	OP.2 TDD	OP.2 TDD	OP.2 TDD	OP.1 TDD	
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PCFICH_RB	dB							
PHICH_RA	dB							
PHICH_RB	dB		0			0		
PDCCH_RA	dB							
PDCCH_RB	dB							
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA ^{Note 1}	dB							
OCNG_RB ^{Note 1}	dB							

$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	-Infinity	-Infinity	-Infinity	-Infinity	7
$N_{oc}^{ m Note~2}$	dBm/15 KHz	-98					
\hat{E}_s/N_{oc}	dB	4	-Infinity	-Infinity	- Infinity	- Infinity	7
RSRP Note 3	dBm/15 KHz	-94	-Infinity	-Infinity	- Infinity	-Infinity	-91
Propagation Condition		AWGN					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{ac} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCConnectionReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown E-UTRA TDD inter frequency cell shall be less than 3 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re\text{-establish_delay}} = T_{UL_grant} + T_{UE_re\text{-establish_delay}}.$$

Where:

 T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$$T_{UE_re\text{-establish_delay}} = 50 \text{ ms} + N_{freq} * T_{search} + T_{SI} + T_{PRACH}$$

$$N_{freq} = 2$$

 $T_{search} = 800 \text{ ms}$

 $T_{SI} = 1280$ ms; it is the time required for receiving all the relevant system information as defined in TS 36.331 [5] for the target E-UTRAN TDD cell.

 $T_{PRACH} = 15$ ms; it is the additional delay caused by the random access procedure.

This gives a total of 2945 ms, within the allowance of 3 s in the test case.

6.2 Random Access

6.2.1 E-UTRAN FDD - Contention Based Random Access Test

6.2.1.1 Test purpose

To verify that the UE behaviour of the random access procedure is according to the E-UTRAN FDD contention based random access requirements in an AWGN channel model and that the PRACH power settings and timing are within the specified limits.

6.2.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

6.2.1.3 Minimum conformance requirements

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is as defined in TS 36.213 [8] clause 6 and the control of the RACH transmission is as defined in TS 36.321 [11] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 36.213 [8] clause 6.1 and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preambles transmission counter has been reached.

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires if no Random Access Response is received within the RA Response window defined in clause 5.1.4 TS 36.321.

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3.

The UE shall send ACK if the Contention Resolution is successful.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires if the Contention Resolution Timer expires.

The normative reference for this requirement is TS 36.133 [4] clause 6.2.2.1 and A.6.2.1.

6.2.1.4 Test description

6.2.1.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.
- 2. Propagation conditions are set according to Annex B clause B. 0.
- 3. There is one E-UTRA FDD carrier and one cell specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

6.2.1.4.2 Test procedure

The test consists of a single cell. The UE has a downlink PDSCH allocated centred on the centre sub-carrier. The E-UTRAN shall not explicitly signal a Random Access Preamble ID to the UE.

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to Tables 6.2.1.5-1 and 6.2.1.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
- 3. The UE shall establish a connection setup with SS, the random access procedure within the connection setup is used in the test.
- 4. Test 1: Correct behaviour when receiving random access response reception

- 4.1. In Test 1, the UE shall send the preamble to the SS. In response to the first 4 preambles, the SS shall transmit a random access response not corresponding to the transmitted random access preamble.
- 4.2. The UE shall consider the random access response reception not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received random access response contain random access preamble identifiers that do not match the transmitted random access preamble.
- 4.3. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.
- 4.4. The UE shall consider this random access response reception successful and transmit the msg3.
- 4.5. Measure the power and timing of the first preamble and it shall not exceed the values specified in Tables 6.2.1.5-3 and 6.2.1.5-5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in Tables 6.2.1.5-4 and 6.2.1.5-5.
- 5. Test 2: Correct behaviour when not receiving random access response reception
 - 5.1. Repeat step 1-3.
 - 5.2. In Test 2, the UE shall send the preamble to the SS. The SS shall not respond to the first 4 preambles.
 - 5.3. The UE shall consider the random access response reception not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no random access response is received within the RA Response window of 10 sub-frames.
 - 5.4. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.
 - 5.5. The UE shall consider this random access response reception successful and transmit the msg3.
 - 5.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in Tables 6.2.1.5-3 and 6.2.1.5-5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in Tables 6.2.1.5-4 and 6.2.1.5-5.
- 6. Test 3: Correct behaviour when receiving a NACK on msg3
 - 6.1. Repeat step 1-3.
 - 6.2. In Test 3, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble has been received by the SS.
 - 6.3. The UE shall consider this random access response reception successful and transmit the msg3.
 - 6.4. The SS shall send NACK to all UE msg3 following a successful random access response.
 - 6.5. The UE shall consider this contention resolution not successful then re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ retransmission is reached.
- 7. Test 4: Correct behaviour when receiving an incorrect message over Temporary C-RNTI
 - 7.1. Repeat step 1-3.
 - 7.2. In Test 4, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble has been received by the SS.
 - 7.3. The UE shall consider this random access response reception successful and transmit the msg3.
 - 7.4. The SS shall send a message addressed to the Temporary C-RNTI with a UE contention resolution identity included in the MAC control element not matching the CCCH SDU transmitted in msg3 uplink message.
 - 7.5. The UE shall consider the contention resolution not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires.

- 8. Test 5: Correct behaviour when receiving a correct message over Temporary C-RNTI
 - 8.1. In Test 5, the SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble has been received by the SS.
 - 8.2. The UE shall consider this random access response reception successful and transmit the msg3.
 - 8.3. The SS shall send a message addressed to the Temporary C-RNTI with a UE contention resolution identity included in the MAC control element matching the CCCH SDU transmitted in the msg3 uplink message.
 - 8.4. The UE shall send ACK and consider the contention resolution successful and the random access procedure successfully completed.
- 9. Test 6: Correct behaviour when contention resolution timer expires
 - 9.1. Repeat step 1-3.
 - 9.2. In Test 6, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble has been received by the SS.
 - 9.3. The UE shall consider this random access response reception successful and transmit the msg3.
 - 9.4. The SS shall send an ACK for msg3 but not send msg4 allowing the contention resolution timer to expire.
 - 9.5. The UE shall consider the contention resolution not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires.
 - 9.6. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble has been received by the SS.
 - 9.7. The UE shall consider this random access response reception successful and transmit the msg3.

6.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.2.1.4.3-1: Common Exception messages for E-UTRAN FDD - Contention Based Random Access test requirement

Default Message Contents				
Common contents of system information	H.2.6-1			
blocks exceptions	H.2.6-2			
·	H.2.6-3			
Default RRC messages and information	Table H.3.2-1			
elements contents exceptions				

Table 6.2.1.4.3-2: *UplinkPowerControlCommon-DEFAULT*: Additional E-UTRAN FDD - Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT						
Information Element	Value/remark	Comment	Condition			
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE {						
p0-NominalPUSCH	-101 (-101 dBm)					
}						

6.2.1.5 Test requirement

Tables 6.2.1.5-1 and 6.2.1.5-2 define the primary level settings for E-UTRAN FDD - contention based random access test. Table 6.2.1.5-5 defines the uplink timing error limit including test tolerances.

Table 6.2.1.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD - Contention Based Random Access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number		1	
BW _{channel}	MHz	10	
OCNG Pattern Note 1		OP.1/2 FDD Note 1	As defined in D.1.1/2.
PDSCH parameters Note 4		DL Reference Measurement	As defined in A.1.1.
·		Channel R.0 FDD Note 4	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As defined in A.1.2.
parameters		Channel R.6 FDD	
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
\hat{E}_s/N_{oc}	dB	3	
lo Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331 [5].
Configured UE transmitted	dBm	23	As defined in clause 6.2.5
power ($P_{ m CMAX}$)			in 3GPP TS 36.101 [2].
PRACH Configuration Index	-	4	As defined in table 5.7.1-2 in 3GPP TS 36.211 [9].
Back off Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321 [11].
Propagation Condition	-	AWGN	
- -	l	ell is fully allocated and a consta	l

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.

Note 2: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.

Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.

Table 6.2.1.5-2: RACH-Configuration parameters for E-UTRAN FDD - Contention Based Random Access test

Field	Value	Comment	
powerRampingStep	dB2		
preambleInitialReceivedTargetPower	dBm-120		
preambleTransMax	n6		
ra-ResponseWindowSize	sf10	10 sub-frames	
mac-ContentionResolutionTimer	sf48	48 sub-frames	
maxHARQ-Msg3Tx	4		
Note: For further information see Section 6.3.2 in 3GPP TS 36.331 [5].			

Test 1: Correct behaviour when receiving random access response reception

- The power of the first preamble shall be -30 dBm to within the accuracy specified in Table 6.2.1.5-3.
- The relative power for preamble ramping step shall be 2 dB to within the accuracy specified in Table 6.2.1.5-4.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.2.1.5-5.

Test 2: Correct behaviour when not receiving random access response reception-

- The power of the first preamble shall be -30 dBm to within the accuracy specified in Table 6.2.1.5-3.
- The relative power for preamble ramping step shall be 2 dB to within the accuracy specified in Table 6.2.1.5-4.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.2.1.5-5.

Test 3: Correct behaviour when receiving a NACK on msg3

 The UE shall re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ retransmission is reached.

Test 4: Correct behaviour when receiving an incorrect message over Temporary C-RNTI

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back
off time expires unless the received message includes a UE contention resolution identity MAC control element
and the UE contention resolution identity included in the MAC control element matches the CCCH SDU
transmitted in the uplink message.

Test 5: Correct behaviour when receiving a correct message over Temporary C-RNTI

- The UE shall send ACK if the contention resolution is successful.

Test 6: Correct behaviour when contention resolution timer expires

- The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires if the contention resolution timer expires.

Table 6.2.1.5-3: Absolute power tolerance for E-UTRAN FDD - Contention Based Random Access test

Tolerance		
Normal Extreme		
Conditions	Conditions	
± 10.1 dB	± 13.1 dB	

Table 6.2.1.5-4: Relative power tolerance for E-UTRAN FDD - Contention Based Random Access test

power step size (Up or down)	PRACH	
	Normal Conditions	Extreme Conditions
ΔP [dB]	[dB]	[dB]
2 ≤ ΔP < 3	± 3.7	± 5.7
Note 1: For extreme conditions an additional ± 2.0 dB relaxation is allowed for PRACH allocations		

Table 6.2.1.5-5: Test requirements for T_e Timing Error Limit for E-UTRAN FDD – Contention Based Random Access test

Downlink Bandwidth (MHz)	T _e	
≥3	15*T _S	
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

6.2.2 E-UTRAN FDD - Non-Contention Based Random Access Test

6.2.2.1 Test purpose

To verify that the UE behaviour of the random access procedure is according to the E-UTRAN FDD non-contention based random access requirements in an AWGN channel model and that the PRACH power settings and timing are within the specified limits.

6.2.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

6.2.2.3 Minimum conformance requirements

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is as defined in TS 36.213 [8] clause 6 and the control of the RACH transmission is as defined in TS 36.321 [11] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 36.213 [8] clause 6.1 and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preambles transmission counter has been reached.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power.

The normative reference for this requirement is TS 36.133 [4] clause 6.2.2.2 and A.6.2.2.

6.2.2.4 Test description

6.2.2.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.
- 2. Propagation conditions are set according to Annex B clause B. 0.
- 3. There is one E-UTRA FDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

6.2.2.4.2 Test procedure

The test consists of a single cell. The UE has a downlink PDSCH allocated centred on the centre sub-carrier. The E-UTRAN shall signal a Random Access Preamble ID to the UE via a PDCCH order.

1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.

- 2. Set the parameters according to Tables 6.2.2.5-1 and 6.2.2.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
- 3. The SS shall signal a Random Access Preamble ID via a PDCCH order to the UE and initiate a Non-contention based Random Access procedure.
- 4. Test 1: Correct behaviour when receiving Random Access Response
 - 4.1 In Test 1, the UE shall send the signalled preamble to the SS. In response to the first 4 preambles, the SS shall transmit a random access response not corresponding to the transmitted random access preamble.
 - 4.2. The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power if all received random access response contain random access preamble identifiers that do not match the transmitted random access preamble.
 - 4.3. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.
 - 4.4. The UE shall consider this random access response reception successful.
 - 4.5. Measure the power and timing of the first preamble and it shall not exceed the values specified in Tables 6.2.2.5-3 and 6.2.2.5-5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in Tables 6.2.2.5-4 and 6.2.2.5-5.
- 5. Test 2: Correct behaviour when not receiving Random Access Response
 - 5.1. Repeat step 1-3.
 - 5.2. In Test 2, the UE shall send the signalled preamble to the SS. The SS shall not respond to the first 4 preamble.
 - 5.3. The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power.
 - 5.4. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.
 - 5.5. The UE shall consider this random access response reception successful.
 - 5.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in Tables 6.2.2.5-3 and 6.2.2.5-5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in Tables 6.2.2.5-4 and 6.2.2.5-5.

6.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.2.2.4.3-1: Common Exception messages for E-UTRAN FDD - Non-Contention Based Random Access test requirement

Default Message Contents				
Common contents of system information	H.2.6-1			
blocks exceptions	H.2.6-2			
·	H.2.6-3			
Default RRC messages and information	Table H.3.2-1			
elements contents exceptions				

Table 6.2.2.4.3-2: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN FDD - Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	Value/remark	Comment	Condition
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
cqi-ReportConfig	CQI-ReportConfig- DEFAULT		RBC
soundingRS-LU-ConfigDedicated	Not present		RBC

Table 6.2.2.4.3-3: MAC-MainConfig-RBC: Additional E-UTRAN FDD - Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.5-1 MAC-MainConfig-RBC			
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
timeAlignmentTimerDedicated	Infinity		

Table 6.2.2.4.3-4: *UplinkPowerControlCommon-DEFAULT*: Additional E-UTRAN FDD - Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	Value/remark	Comment	Condition
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE {			
p0-NominalPUSCH	-101 (-101 dBm)		
}			

6.2.2.5 Test requirement

Tables 6.2.2.5-1 and 6.2.2.5-2 define the primary level settings for E-UTRAN FDD - non-contention based random access test. Table 6.2.2.5-5 defines the uplink timing error limit including test tolerances.

Table 6.2.2.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD - Non-Contention Based Random Access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number		1	
BW _{channel}	MHz	10	
OCNG Pattern		OP.1 FDD	As defined in D.1.1.
PDSCH parameters		DL Reference Measurement	As defined in A.1.1.
		Channel R.0 FDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As defined in A.1.2.
parameters		Channel R.6 FDD	
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
\hat{E}_{s}/I_{ot}	dB	3	
N_{oc}	dBm/15 KHz	-98	
\hat{E}_s/N_{oc}	dB	3	
lo Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331 [5].
Configured UE transmitted	dBm	23	As defined in clause 6.2.5
power ($P_{ m CMAX}$)			in 3GPP TS 36.101 [2].
PRACH Configuration Index	-	4	As defined in table 5.7.1-2 in 3GPP TS 36.211 [9].
Back off Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321 [11].
Propagation Condition	-	AWGN	

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.

Table 6.2.2.5-2: RACH-Configuration parameters for E-UTRAN FDD - Non-Contention Based Random Access test

Field	Value	Comment	
powerRampingStep	dB2		
preambleInitialReceivedTargetPower	dBm-120		
preambleTransMax	n6		
Ra-ResponseWindowSize	sf10	10 sub-frames	
Note: For further information see Section 6.3.2 in 3GPP TS 36.331 [5].			

Test 1: Correct behaviour when receiving Random Access Response

- The power of the first preamble shall be -30 dBm to within the accuracy specified Table 6.2.2.5-3.
- The relative power for preamble ramping step shall be 2 dB to within the accuracy specified in Table 6.2.2.5-4.

- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.2.2.5-5.

Test 2: Correct behaviour when not receiving Random Access Response

- The power of the first preamble shall be -30 dBm to within the accuracy specified in Table 6.2.2.5-3..
- The relative power for preamble ramping step shall be 2 dB to within the accuracy specified in Table 6.2.2.5-4.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.2.2.5-5.

Table 6.2.2.5-3: Absolute power tolerance for E-UTRAN FDD - Non-Contention Based Random Access test

Tolerance		
Normal Extreme		
Conditions	Conditions	
± 10.1 dB	± 13.1 dB	

Table 6.2.2.5-4: Relative power tolerance for E-UTRAN FDD - Non-Contention Based Random Access test

power step size (Up or down)	PRACH		
	Normal Conditions	Extreme Conditions	
ΔP [dB]	[dB]	[dB]	
2 ≤ ΔP < 3	± 3.7	± 5.7	
Note 1: For extreme conditional allocations	ons an additional ± 2.0 dB relax	ation is allowed for PRACH	

Table 6.2.2.5-5: Test requirements for Te Timing Error Limit for E-UTRAN FDD – Non-Contention Based Random Access test

Downlink Bandwidth (MHz)	T _e	
≥3	15*T _S	
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

6.2.3 E-UTRAN TDD - Contention Based Random Access Test

6.2.3.1 Test purpose

To verify that the UE behaviour of the random access procedure is according to the E-UTRAN TDD contention based random access requirements in an AWGN channel model and that the PRACH power settings and timing are within the specified limits.

6.2.3.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

6.2.3.3 Minimum conformance requirements

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is as defined in TS 36.213 [8] clause 6 and the control of the RACH transmission is as defined in TS 36.321 [11] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 36.213 [8] clause 6.1 and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preambles transmission counter has been reached.

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires if no Random Access Response is received within the RA Response window defined in clause 5.1.4 TS 36.321.

The UE shall re-transmit the msg3 upon the reception of a NACK on msg3.

The UE shall send ACK if the Contention Resolution is successful.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires if the Contention Resolution Timer expires.

The normative reference for this requirement is TS 36.133 [4] clause 6.2.2.1 and A.6.2.3.

6.2.3.4 Test description

6.2.3.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.
- 2. Propagation conditions are set according to Annex B clause B. 0.
- 3. There is one E-UTRA TDD carrier and one cell specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.0 and C.1 for this test.

6.2.3.4.2 Test procedure

The test consists of a single cell. The UE has a downlink PDSCH allocated on the centre sub-carrier. The E-UTRAN shall not explicitly signal a Random Access Preamble ID to the UE.

- 1. Ensure the UE is in State 2A according to TS 36.508 [7] clause 7.2A.2.
- 2. Set the parameters according to Tables 6.2.3.5-1 and 6.2.3.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
- 3. The UE set up a connection with SS, and the random access procedure used in the connection setup is used in the test.
- 4. Test 1: Correct behaviour when receiving random access response reception
 - 4.1 In Test 1, the UE shall send the preamble to the SS. In response to the first 4 preambles, the SS shall transmit a random access response not corresponding to the transmitted random access preamble.
 - 4.2 The UE shall consider the random access response reception not successful then re- select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if all received

- random access response contain random access preamble identifiers that do not match the transmitted random access preamble.
- 4.3 The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.
- 4.4 The UE shall consider this random access response reception successful and transmit the msg3.
- 4.5 Measure the power and timing of the first preamble and it shall not exceed the values specified in Tables 6.2.3.5-3 and 6.2.3.5-5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in Tables 6.2.3.5-4 and 6.2.3.5-5.
- 5. Test 2: Correct behaviour when not receiving random access response reception
 - 5.1 Repeat step 1-3.
 - 5.2 In Test 2, the UE shall send the preamble to the SS. The SS shall not respond to the first 4 preambles.
 - 5.3 The UE shall consider the random access response reception not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if no random access response is received within the RA Response window of 10 sub-frames.
 - 5.4 The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.
 - 5.5 The UE shall consider this random access response reception successful and transmit the msg3.
 - 5.6 Measure the power and timing of the first preamble and it shall not exceed the values specified in Tables 6.2.3.5-3 and 6.2.3.5-5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in Tables 6.2.3.5-4 and 6.2.3.5-5.
- 6. Test 3: Correct behaviour when receiving a NACK on msg3
 - 6.1 Repeat step 1-3.
 - 6.2 In Test 3, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preambles have been received by the SS.
 - 6.3 The UE shall consider this random access response reception successful and transmit the msg3.
 - 6.4 The SS shall send NACK all UE msg3 following a successful random access response.
 - 6.5 The UE shall consider this contention resolution not successful then re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ retransmission is reached.
- 7. Test 4: Correct behaviour when receiving an incorrect message over Temporary C-RNTI
 - 7.1 Repeat step 1-3.
 - 7.2 In Test 4, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after first preambles have been received by the SS.
 - 7.3 The UE shall consider this random access response reception successful and transmit the msg3.
 - 7.4 The SS shall send a message addressed to the Temporary C-RNTI with a UE contention resolution identity included in the MAC control element not matching the CCCH SDU transmitted in msg3 uplink message.
 - 7.5 The UE shall consider the contention resolution not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires.
- 8. Test 5: Correct behaviour when receiving a correct message over Temporary C-RNTI
 - 8.1 Repeat step 1-3

- 8.2 In Test 5, the SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preambles have been received by the SS.
- 8.3 The UE shall consider this random access response reception successful and transmit the msg3.
- 8.4 The SS shall send a message addressed to the Temporary C-RNTI with a UE contention resolution identity included in the MAC control element matching the CCCH SDU transmitted in the msg3 uplink message.
- 8.5 The UE shall send ACK and consider the contention resolution successful and the random access procedure successfully completed.
- 9. Test 6: Correct behaviour when contention resolution timer expires
 - 9.1 Repeat step 1-3.
 - 9.2 In Test 6, the UE shall send the preamble to the SS. The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after the first preamble have been received by the SS.
 - 9.3 The UE shall consider this random access response reception successful and transmit the msg3.
 - 9.4 The SS shall send an ACK for msg3 but not send msg4 allowing the contention resolution timer to expire.
 - 9.5 The UE shall consider the contention resolution not successful then re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires.

6.2.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.2.3.4.3-1: Common Exception messages for E-UTRAN TDD -Contention Based Random Access test requirement

Default Message Contents		
Common contents of system information	H.2.6-1	
blocks exceptions	H.2.6-2	
·	H.2.6-3	
Default RRC messages and information	Table H.3.2-2	
elements contents exceptions		

Table 6.2.3.4.3-2: *UplinkPowerControlCommon-DEFAULT*: Additional E-UTRAN TDD - Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	Value/remark	Comment	Condition
UplinkPowerControlCommon-DEFAULT ::=			
SEQUENCE {			
p0-NominalPUSCH	-101 (-101 dBm)		
}			

6.2.3.5 Test requirement

Tables 6.2.3.5-1 and 6.2.3.5-2 define the primary level settings for E-UTRAN TDD - contention based random access test. Table 6.2.3.5-5 defines the uplink timing error limit including test tolerances.

Table 6.2.3.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD - Contention Based Random Access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number		1	
BW _{channel}	MHz	10	
OCNG Pattern Note 1		OP.1/2 TDD Note 1	As defined in D.2.1/2.
PDSCH parameters Note 4		DL Reference Measurement Channel R.0 TDD Note 4	As defined in A.1.2.
PCFICH/PDCCH/PHICH		DL Reference Measurement	As defined in A.2.2.
parameters		Channel R.6 TDD	
Special subframe configuration	-	6	As specified in table 4.2-1 in 3GPP TS 36.211[9].
Uplink-downlink configuration	-	1	As specified in table 4.2-2 in 3GPP TS 36.211[9].
PBCH_RA	dB		• •
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
\hat{E}_{s}/I_{ot}	dB	3	
N_{oc}	dBm/15 KHz	-98	
\hat{E}_s/N_{oc}	dB	3	
lo Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331 [5].
Configured UE transmitted	dBm	23	As defined in clause 6.2.5
power ($P_{ m CMAX}$)			in 3GPP TS 36.101 [2].
PRACH Configuration Index	-	53	As defined in table 5.7.1-3 in 3GPP TS 36.211 [9].
Back off Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321 [11].
Propagation Condition	-	AWGN	F - 11-

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.

Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.

Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the DUT is required.

Table 6.2.3.5-2: RACH-Configuration parameters for E-UTRAN TDD - Contention Based Random Access test

Field	Value	Comment
numberOfRA-Preambles	n52	
sizeOfRA-PreamblesGroupA	n52	No group B.
powerRampingStep	dB2	
preambleInitialReceivedTargetPower	dBm-120	
preambleTransMax	n6	
ra-ResponseWindowSize	sf10	10 sub-frames
mac-ContentionResolutionTimer	sf48	48 sub-frames
maxHARQ-Msg3Tx	4	
Note: For further information see Section 6	6.3.2 in 3GPP TS 36.331	[5].

Test 1: Correct behaviour when receiving random access response reception

- The power of the first preamble shall be -22 dBm to within the accuracy specified in Table 6.2.3.5-3.
- The relative power for preamble ramping step shall be 2 dB to within the accuracy specified in Table 6.2.3.5-4.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.2.3.5-5.

Test 2: Correct behaviour when not receiving random access response reception

- The power of the first preamble shall be -22 dBm to within the accuracy specified in Table 6.2.3.5-3.
- The relative power for preamble ramping step shall be 2 dB to within the accuracy specified in Table 6.2.3.5-4.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.2.3.5-5.

Test 3: Correct behaviour when receiving a NACK on msg3

- The UE shall re-transmit the msg3 upon the reception of a NACK on msg3 until the maximum number of HARQ retransmission is reached.

Test 4: Correct behaviour when receiving an incorrect message over Temporary C-RNTI

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back
off time expires unless the received message includes a UE contention resolution identity MAC control element
and the UE contention resolution identity included in the MAC control element matches the CCCH SDU
transmitted in the uplink message.

Test 5: Correct behaviour when receiving a correct message over Temporary C-RNTI

- The UE shall send ACK if the contention resolution is successful.

Test 6: Correct behaviour when contention resolution timer expires

- The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires if the contention resolution timer expires.

Table 6.2.3.5-3: Absolute power tolerance for E-UTRAN TDD - Contention Based Random Access test

Tolerance		
Normal Extreme		
Conditions	Conditions	
± 10.1 dB	± 13.1 dB	

Table 6.2.3.5-4: Relative power tolerance for E-UTRAN TDD - Contention Based Random Access test

power step size (Up or down)	PRACH		
	Normal Conditions	Extreme Conditions	
ΔP [dB]	[dB]	[dB]	
2 ≤ ∆P < 3	± 3.7	± 5.7	
Note 1: For extreme conditions an additional ± 2.0 dB relaxation is allowed for PRACH allocations			

Table 6.2.3.5-5: Test requirements for T_e Timing Error Limit for E-UTRAN TDD – Contention Based Random Access test

Downlink Bandwidth (MHz)	T _e	
≥3 15*T _S		
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

6.2.4 E-UTRAN TDD - Non-Contention Based Random Access Test

6.2.4.1 Test purpose

To verify that the UE behaviour of the random access procedure is according to the E-UTRAN TDD non-contention based random access requirements in an AWGN model and that the PRACH power settings and timing are within the specified limits.

6.2.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

6.2.4.3 Minimum conformance requirements

The random access procedure is used when establishing the layer 1 communication between the UE and E-UTRAN. The random access is as defined in TS 36.213 [8] clause 6 and the control of the RACH transmission is as defined in TS 36.321 [11] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 36.213 [8] clause 6.1 and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as defined in table 6.3.5.1.1-1 of TS 36.101 [2] clause 6.3.5.1.1. The relative power applied to additional preambles shall have an accuracy as specified in table 6.3.5.2.1-1 of TS 36.101 [2] clause 6.3.5.2.1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preambles transmission counter has been reached.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

The UE shall re-transmit the preamble with the calculated PRACH transmission power if no Random Access Response is received within the RA response window.

The normative reference for this requirement is TS 36.133 [4] clause 6.2.2.2 and A.6.2.4.

6.2.4.4 Test description

6.2.4.4.1 Initial conditions

Test Environment: Normal, TL/VL, TL/VH, TH/VL, TH/VH; as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.
- 2. Propagation conditions are set according to Annex B clause B. 0.
- 3. There is one E-UTRA TDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

6.2.4.4.2 Test procedure

The test consists of a single cell. The UE has a downlink PDSCH allocated centred on the centre sub-carrier. The E-UTRAN shall signal a Random Access Preamble ID to the UE via a PDCCH order.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to Tables 6.2.4.5-1 and 6.2.4.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
- 3. The SS shall signal a Random Access Preamble ID via a PDCCH order to the UE and initiate a Non-contention based Random Access procedure.
- 4. Test 1: Correct behaviour when receiving Random Access Response
- 4.1. In Test 1, the UE shall send the signalled preamble to the SS. In response to the first 4 preambles, the SS shall transmit a random access response not corresponding to the transmitted random access preamble.
- 4.2 The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power if all received random access response contain random access preamble identifiers that do not match the transmitted random access preamble.
- 4.3 The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.
- 4.4 The UE shall consider this random access response reception successful.
- 4.5 Measure the power and timing of the first preamble and it shall not exceed the values specified in Tables 6.2.4.5-3 and 6.2.4.5-5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in Tables 6.2.4.5-4 and 6.2.4.5-5.
- 5. Test 2: Correct behaviour when *not* receiving Random Access Response
- 5.1 Repeat step 1-3.
- 5.2 In Test 2, the UE shall send the signalled preamble to the SS. The SS shall not respond to the first 4 preambles.
- 5.3 The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRACH transmission power.
- 5.4 The SS shall transmit a random access response containing a random access preamble identifier corresponding to the transmitted random access after 5 preambles have been received by the SS.
- 5.5 The UE shall consider this random access response reception successful.
- 5.6 Measure the power and timing of the first preamble and it shall not exceed the values specified in clause Tables 6.2.4.5-3 and 6.2.4.5-5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in Tables 6.2.4.5-4 and 6.2.4.5-5.

6.2.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.2.4.4.3-1: Common Exception messages for E-UTRAN TDD - Non-Contention Based Random Access test requirement

Default Message Contents		
Common contents of system information	H.2.6-1	
blocks exceptions	H.2.6-2	
·	H.2.6-3	
Default RRC messages and information	Table H.3.2-2	
elements contents exceptions		

Table 6.2.4.4.3-2: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN TDD - Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	Value/remark	Comment	Condition
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
cqi-ReportConfig	CQI-ReportConfig-		RBC
	DEFAULT		
soundingRS-LU-ConfigDedicated	Not present		RBC
}			

Table 6.2.4.4.3-3: MAC-MainConfig-RBC: Additional E-UTRAN TDD - Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.5-1 MAC-MainConfig-RBC			
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
timeAlignmentTimerDedicated	Infinity		
}			

Table 6.2.4.4.3-4: *UplinkPowerControlCommon-DEFAULT*: Additional E-UTRAN TDD - Non-Contention Based Random Access test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT				
Information Element	Value/remark	Comment	Condition	
UplinkPowerControlCommon-DEFAULT ::=				
SEQUENCE {				
p0-NominalPUSCH	-101 (-101 dBm)			
}				

6.2.4.5 Test requirement

Tables 6.2.4.5-1 and 6.2.4.5-2 define the primary level settings for E-UTRAN TDD - non-contention based random access test. Table 6.2.4.5-5 defines the uplink timing error limit including test tolerances.

Table 6.2.4.5-1: Cell Specific Test requirement Parameters for E-UTRAN TDD - Non-Contention Based Random Access test

Parameter	Unit	Value	Comments
E-UTRA RF Channel Number		1	
BW _{channel}	MHz	10	
OCNG Pattern		OP.1 TDD	As defined in D.2.1.
PDSCH parameters		DL Reference Measurement	As defined in A.1.2.
·		Channel R.0 TDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As defined in A.2.2.
parameters		Channel R.6 TDD	
Special subframe	-	6	As specified in table 4.2-1
configuration			in 3GPP TS 36.211[9].
Uplink-downlink configuration	-	1	As specified in table 4.2-2 in 3GPP TS 36.211[9].
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA Note 1	dB		
OCNG_RB Note 1	dB		
$\hat{\mathrm{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	3	
N_{oc}	dBm/15 KHz	-98	
\hat{E}_s/N_{oc}	dB	3	
lo Note 2	dBm/9 MHz	-65.5	
RSRP Note 3	dBm/15 KHz	-95	
referenceSignalPower	dBm/15 KHz	-5	As defined in clause 6.3.2 in 3GPP TS 36.331 [5].
Configured UE transmitted	dBm	23	As defined in clause 6.2.5
power ($P_{ m CMAX}$)			in 3GPP TS 36.101 [2].
PRACH Configuration Index	-	53	As defined in table 5.7.1-3 in 3GPP TS 36.211 [9].
Back off Parameter Index	-	2	As defined in table 7.2-1 in 3GPP TS 36.321 [11].
Propagation Condition	-	AWGN	
N (A CONO I III I			tatal topo a poitta di provincio

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 3: RSRP level has been derived from other parameters for information purposes. It is not a settable parameter.

Table 6.2.4.5-2: RACH-Configuration parameters for E-UTRAN TDD – Non-Contention Based Random Access test

Field	Value	Comment		
powerRampingStep	dB2			
preambleInitialReceivedTargetPower	dBm-120			
preambleTransMax	n6			
Ra-ResponseWindowSize sf10 10 sub-frames				
Note: For further information see Section 6.3.2 in 3GPP TS 36.331 [5].				

Test 1: Correct behaviour when receiving Random Access Response

- The power of the first preamble shall be -22 dBm to within the accuracy specified in Table 6.2.4.5-3.
- The relative power for preamble ramping step shall be 2 dB to within the accuracy specified in Table 6.2.4.5-4.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.2.4.5-5.

Test 2: Correct behaviour when not receiving Random Access Response

- The power of the first preamble shall be -22 dBm to within the accuracy specified in Table 6.2.4.5-3.
- The relative power for preamble ramping step shall be 2 dB to within the accuracy specified in Table 6.2.4.5-4.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.2.4.5-5.

Table 6.2.4.5-3: Absolute power tolerance for E-UTRAN TDD - Non-Contention Based Random Access test

Tolerance			
Normal	Normal Extreme		
Conditions Conditions			
± 10.1 dB	± 13.1 dB		

Table 6.2.4.5-4: Relative power tolerance for E-UTRAN TDD - Non-Contention Based Random Access test

power step size (Up or down)	PRACH			
	Normal Conditions Extreme Conditions			
ΔP [dB]	[dB]	[dB]		
2 ≤ ΔP < 3 ± 3.7 ± 5.7				
Note 1: For extreme conditions an additional ± 2.0 dB relaxation is allowed for PRACH				

Note 1: For extreme conditions an additional ± 2.0 dB relaxation is allowed for PRACH allocations

Table 6.2.4.5-5: Test requirements for T_e Timing Error Limit for E-UTRAN TDD – Non-Contention Based Random Access test

Downlink Bandwidth (MHz)	T _e		
≥3	15*T _S		
Note: T _S is the basic timing unit defined in TS 36.211 [9]			

6.3 RRC Connection Release with Redirection

6.3.1 Redirection from E-UTRAN FDD to UTRAN FDD

6.3.1.1 Test purpose

The purpose of this test is to verify that the UE makes correct performing the RRC connection release with redirection to the target UTRAN FDD cell. This test will partly verify the RRC connection release with redirection to UTRAN FDD cell requirements in section 6.3.2.1.

6.3.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 9 and forward that support UTRA FDD.

6.3.1.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN FDD cell within $T_{connection_release_redirect_UTRA\ FDD}$.

The time delay (T_{connection_release_redirect_UTRA FDD}) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS 36.331 [5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA FDD cell. The time delay (T_{connection_release_redirect_UTRA FDD}) shall be less than:

$$T_{connection_release_redirect_UTRA\ FDD} = T_{RRC_procedure_delay} + T_{identify_UTRA\ FDD} + T_{SI_UTRA\ FDD} + T_{RA}$$

The target UTRA FDD cell shall be considered detectable when:

- CPICH Ec/Io > -15 dB,
- SCH_Ec/Io ≥ -15 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

Tidentify-UTRA FDD: It is the time to identify the target UTRA FDD cell. It shall be less than 500 ms.

 $T_{SI\text{-}UTRA\ FDD}$: It is the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released.

T_{RA}: It is the delay caused due to the random access procedure when sending random access to the target UTRA FDD cell

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.1 and A.6.3.1.

6.3.1.4 Test description

6.3.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.22.
- 2. The general test parameter settings are set up according to Table 6.3.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.3.1.4.3.
- 5. There is one E-UTRA FDD cell and one UTRA FDD cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.1.4.1-1: General test parameters for RRC Connection Release with Redirection from E-UTRAN FDD to UTRAN FDD under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW _{channel})	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/Io	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	_
UTRA FDD cell list size		16	UTRA cells on UTRA RF channel 1 provided in the "RRCConnectionRelease" message from the E-UTRAN
T1	S	≤5	
T2	S	1	

6.3.1.4.2 Test procedure

The test comprises of one active cell and one neighbour cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "RRCConnectionRelease" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.1.5-1 and 6.3.1.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. SS shall transmit an *RRCConnectionRelease* containing the relevant system information of Cell 2 during period T1
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.1.5-1 for Cell 1, and Table 6.3.1.5-2 for Cell 2.
- 6. If the UE transmits the PRACH to Cell 2 less than 650 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.Cell 1 is the active cell.
- 8. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code 50) mod 200 + 100) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.1.4.3-1: RRCConnectionRelease: Additional Redirection from E-UTRAN FDD to UTRAN FDD test requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1				
Information Element	Value/remark	Comment	Condition	
criticalExtensions CHOICE {				
c1 CHOICE {				
rrcConnectionRelease-r8 SEQUENCE {				
releaseCause	other			
redirectedCarrierInfo CHOICE {				
utra-FDD	Cell 2 Carrier Information			
}				
idleModeMobilityControlInfo	Not present			
nonCriticalExtension SEQUENCE {				
lateNonCriticalExtension	Not present			
nonCriticalExtension {				
cellInfoList-r9 CHOICE {				
utra-FDD-r9	CellInfoListUTRA-FDD-r9			
}				
nonCriticalExtension	Not present			
}				
}				
}				
}				
}		<u>-</u>		

Table 6.3.1.4.3-2: CellInfoListUTRA-FDD-r9: Additional Redirection from E-UTRAN FDD to UTRAN FDD test requirement (step3)

Derivation Path: TS 36.331 [5] clause 6.6.2			
Information Element	Value/remark	Comment	Condition
CellInfoListUTRA-FDD-r9 ::= SEQUENCE (SIZE (116)) OF SEQUENCE {			
physCellId-r9	Cell 2 physical cell identity		
utra-BCCH-Container-r9	Cell 2 Relevant System Information		
}			

6.3.1.5 Test requirement

Tables 6.3.1.4.1-1, 6.3.1.5-1 and 6.3.1.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN FDD to UTRAN FDD test.

Table 6.3.1.5-1: Cell Specific Test requirement Parameters for cell #1 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 1		
		T1	T2	
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10		
OCNG Pattern defined in		OP.11	EDD	
D.1.1 (OP.1 FDD)		OF.11		
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB	1		
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
\hat{E}_{s}/I_{ot}	dB	4	4	
$N_{_{\mathit{OC}}}^{}$ Note 3	dBm/15 kHz	-98	3	
\hat{E}_s/N_{oc}	dB	4	4	
RSRP Note 4	dBm/15 kHz	-94	-94	
SCH_RP	dBm/15 kHz	-94	-94	
Propagation Condition		AWGN		
Note 1: OCNG shall be used spectral density is ac	hieved for all OF	l is fully allocated and a constant DM symbols. are assigned to the LIE prior to the	·	

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.1.5-2: Cell Specific Test Parameters for cell #2 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 2		
		T1	T2	
UTRA RF Channel Number		1		
CPICH_Ec/lor	dB	-10		
PCCPCH_Ec/lor	dB	-12		
SCH_Ec/lor	dB	-12		
PICH_Ec/lor	dB	-15		
DPCH_Ec/lor	dB	N/A		
OCNS		-0.941		
\hat{I}_{or}/I_{oc}	dB	-∞	0.42	
I_{oc}	dBm/3.84 MHz	-70		
CPICH_Ec/Io ^{Note 3}	dB	-∞ -12.81		
Propagation Condition		AWGN		

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{\rm or}$

Note 3: This gives an SCH Ec/lo of -15dB

The UE shall start to transmit random access to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRAN FDD observed during repeated tests shall be at least 90%.

The overall delays measured test requirement can be expressed as

 $Test\ Requirement = T_{RRC_procedure_delay} + T_{identify_UTRA\ FDD} + T_{SI_UTRA\ FDD} + T_{RA}$

 $T_{RRC_procedure_delay} = 110 \text{ ms}$

 $T_{identify-UTRA\ FDD} = 500\ ms$

 $T_{SI\text{-}UTRA\ FDD}$ = the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released. 0 ms is assumed in this test case.

 T_{RA} = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

This gives a total of 650 ms for overall delays measured.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.2 Redirection from E-UTRAN TDD to UTRAN FDD

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

6.3.2.1 Test purpose

The purpose of this test is to verify that the UE performs the RRC connection release with redirection to the target UTRAN FDD cell. This test will partly verify the RRC connection release with redirection to UTRAN FDD cell requirements.

6.3.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 9 and forward that support UTRA FDD.

6.3.2.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN FDD cell within $T_{connection_release_redirect_UTRA\ FDD}$.

The time delay ($T_{connection_release_redirect_UTRA\ FDD}$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS 36.331 [5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA FDD cell. The time delay ($T_{connection_release_redirect_UTRA\ FDD}$) shall be less than:

$$T_{connection_release_redirect_UTRA\ FDD} = T_{RRC_procedure_delay} + T_{identify_UTRA\ FDD} + T_{SI_UTRA\ FDD} + T_{RA}$$

The target UTRA FDD cell shall be considered detectable when:

- CPICH Ec/Io \geq -15 dB,
- SCH_Ec/Io ≥ -15 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

Tidentify-UTRA FDD: It is the time to identify the target UTRA FDD cell. It shall be less than 500 ms.

 $T_{SI\text{-}UTRA\ FDD}$: It is the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access to the target UTRA FDD cell.

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.1 and A.6.3.2.

6.3.2.4 Test description

6.3.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.22.
- 2. The general test parameter settings are set up according to Table 6.3.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.3.2.4.3.
- 5. There is one E-UTRA TDD cell and one UTRA FDD cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.2.4.1-1: General test parameters for RRC Connection Release with Redirection from E-UTRAN TDD to UTRAN FDD under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
PCFICH/PDCCH/PHICH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW _{channel})			
Special subframe configuration		6	As specified in table 4.2-1 in TS 36.211
Uplink-downlink configuration		1	As specified in table 4.2-2 in TS 36.211
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD)		CPICH Ec/lo	
measurement quantity			
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
UTRA FDD cell list size		16	UTRA cells on UTRA RF channel 1 provided in the "RRCConnectionRelease" message from the E-UTRAN
T1	S	≤5	
T2	S	1	

6.3.2.4.2 Test procedure

The test comprises of one active cell and one neighbour cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "RRCConnectionRelease" message containing the relevant system information

of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.2.5-1 and 6.3.2.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. SS shall transmit an *RRCConnectionRelease* containing the relevant system information of Cell 2 during period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.2.5-1 for Cell 1, and Table 6.3.2.5-2 for Cell 2.
- 6. If the UE transmits the PRACH to Cell 2 less than 650 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.Cell 1 is the active cell.
- 8. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code 50) mod 200 + 100) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.2.4.3-1: RRCConnectionRelease: Additional Redirection from E-UTRAN TDD to UTRAN FDD test requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
redirectedCarrierInfo CHOICE {			
utra-FDD	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
nonCriticalExtension {			
cellInfoList-r9 CHOICE {			
utra-FDD-r9	CellInfoListUTRA-FDD-r9		
}			
nonCriticalExtension	Not present		
}			
}			
}			
}			
}			

Table 6.3.2.4.3-2: CellInfoListUTRA-FDD-r9: Additional Redirection from E-UTRAN TDD to UTRAN FDD test requirement (step3)

Derivation Path: TS 36.331 [5] clause 6.6.2			
Information Element	Value/remark	Comment	Condition
CellInfoListUTRA-FDD-r9 ::= SEQUENCE (SIZE			
(116)) OF SEQUENCE {			
physCellId-r9	Cell 2 physical cell		
	identity		
utra-BCCH-Container-r9	Cell 2 Relevant System		
	Information		
}			

6.3.2.5 Test requirement

Tables 6.3.2.4.1-1, 6.3.2.5-1 and 6.3.2.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN TDD to UTRAN FDD test.

Table 6.3.2.5-1: Cell Specific Test requirement Parameters for cell #1 E-UTRAN TDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 1		
		T1	T2	
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10		
OCNG Pattern defined in		OP.1 7	רטט	
D.2.1 (OP.1 TDD)		OF.11	100	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
\hat{E}_{s}/I_{ot}	dB	4+TT	4+TT	
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98	3	
\hat{E}_s/N_{oc}	dB	4+TT	4+TT	
RSRP Note 4	dBm/15 kHz	-94+TT	-94+TT	
SCH_RP	dBm/15 kHz	-94+TT	-94+TT	
Propagation Condition		AWG	N	
	such that the cell	is fully allocated and a constant	total transmitted power	

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.2.5-2: Cell Specific Test Parameters for cell #2 E-UTRAN TDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 2		
		T1	T2	
UTRA RF Channel Number		1		
CPICH_Ec/lor	dB	-10		
PCCPCH_Ec/lor	dB	-12		
SCH_Ec/lor	dB	-12		
PICH_Ec/lor	dB	-15		
DPCH_Ec/lor	dB	N/A		
OCNS		-0.94	1	
\hat{I}_{or}/I_{oc}	dB	-∞	0.02+TT	
I_{oc}	dBm/3.84 MHz	-70		
CPICH_Ec/Io ^{Note 3}	dB	-∞	-13+TT	
Propagation Condition		AWGN		

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal

to I_{or} .

Note 3: This gives an SCH Ec/lo of -15dB

The UE shall start to transmit random access to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRAN FDD observed during repeated tests shall be at least 90%.

The overall delays measured test requirement can be expressed as

 $Test \ Requirement = T_{RRC_procedure_delay} + T_{identify_UTRA\ FDD} + T_{SI_UTRA\ FDD} + T_{RA}$

 $T_{RRC procedure delay} = 110 \text{ ms}$

 $T_{identify-UTRA\ FDD} = 500\ ms$

 $T_{SI\text{-}UTRA\ FDD}$ = the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released. 0 ms is assumed in this test case.

 T_{RA} = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

This gives a total of 650 ms for overall delays measured.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.3 Redirection from E-UTRAN FDD to GERAN when System Information is provided

6.3.3.1 Test Purpose

To verify that the UE is able to performs the RRC connection release with redirection from the E-UTRA FDD to the target GERAN cell to meet the RRC connection release with redirection to GERAN requirements.

6.3.3.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 9 and forward that support GERAN.

6.3.3.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target GERAN cell within $T_{connection_release_redirect_GERAN}$.

The time delay ($T_{connection_release_redirect_GERAN$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS36.331[5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target GERAN cell. The time delay ($T_{connection_release_redirect_GERAN$) shall be less than:

$$T_{connection_release_redirect_\ GERAN} = T_{RRC_procedure_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$$

The target GERAN cell shall be considered detectable when the UE receives the GERAN cell at levels down to 10 dB + the reference sensitivity level or reference interference levels as specified in TS 45.005[16].

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

 $T_{identify-UTRA\;GERAN}$: It is the time to identify the BSIC of the target GERAN cell. It shall be less than 1 second.

 $T_{SI\text{-}UTRA\ GERAN}$: It is the time required for acquiring all the relevant system information of the target GERAN cell. This time depends upon whether the UE is provided with the relevant system information of the target GERAN cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access burst to the target GERAN cell.

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.2 and A.6.3.3.

6.3.3.4 Test description

6.3.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.
- 2. The parameter settings for the cells are set up according to Table 6.3.3.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.3.3.4.3.
- 5. There is one E-UTRA FDD cell and one GERAN cell specified in the test. Cell 1(E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.3.4.1-1: General test parameters for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW _{channel})	MHz	10	
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including ARFCN 1	GSM cells are provided in the "RRCConnectionRelease" message.
T1	S	5	
T2	S	2	

6.3.3.4.2 Test procedure

The test comprises of one active cell and one neighbour cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall contain all the relevant system information of cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.3.5-1 and 6.3.3.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. SS shall transmit an *RRCConnectionRelease* containing the relevant system information of Cell 2 during period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.3.5-1 for Cell 1, and Table 6.3.3.5-2 for Cell 2.

- 6. If the UE transmits the random access burst on RACH of the target GERAN Cell 2 less than 1120 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 8. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.3.4.3-1: RRCConnectionRelease: Additional Redirection from E-UTRAN FDD to GERAN test requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
redirectedCarrierInfo CHOICE {			
geran	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
nonCriticalExtension {			
cellInfoList-r9 CHOICE {			
geran-r9	CellInfoListGERAN-r9		
}			
nonCriticalExtension	Not present		
}			
}			
}			
}			
}		·	

Table 6.3.3.4.3-2: CellInfoListGERAN-r9: Additional Redirection from E-UTRAN FDD to GERAN test requirement (step3)

Information Element	Value/remark	Comment	Condition
CellInfoListGERAN-r9 ::= SEQUENCE (SIZE (16)) OF SEQUENCE {			
physCellId-r9	Cell 2 physical cell identity		
carrierFreq-r9	Cell 2 carrier frequency		
systemInformation-r9	Cell 2 relevant system information		

6.3.3.5 Test requirement

Tables 6.3.3.4.1-1, 6.3.3.5-1 and 6.3.3.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN FDD to GERAN test.

Table 6.3.3.5-1: Cell specific test parameters for E-UTRA FDD cell (cell #1) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 1		
		T1	T2	
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10		
OCNG Pattern defined in		OP.1 F	EDD	
D.1.1 (OP.1 FDD)		OF.11		
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
\hat{E}_{s}/I_{ot}	dB	4	4	
\hat{E}_s/N_{oc}	dB	4	4	
N_{oc}	dBm/15 kHz	-98	3	
RSRP	dBm/15 kHz	-94	-94	
SCH_RP	dBm/15 kHz	-94	-94	
Propagation Condition		AWG	3N	
Note 1: OCNG shall be used	such that the cell	is fully allocated and a constant	t total transmitted power	

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.3.5-2: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 2		
		T1	T2	
Absolute RF Channel Number		ARFNC 1		
RXLEV	dBm	-Infinity	-75	
GSM BSIC		N/A	Valid	

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 1120 ms from the beginning of time period T2.

The rate of correct "RRC connection release with redirection to GERAN" observed during repeated tests shall be at least 90%.

The overall delays measured test requirement can be expressed as:

 $T_{connection_release_redirect_\ GERAN} = T_{RRC_procedure_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$

 $T_{RRC_procedure_delay} = 110$ ms, which is the time for processing the received message "RRCConnectionRelease."

 $T_{identify-GERAN} = 1000$ ms, which is the time for identifying the target GERAN cell.

 $T_{SI\text{-}GERAN} = 0$; UE does not have to read the system information of the GERAN cell since all relevant SI is provided to the UE in the "RRCConnectionRelease" message.

 $T_{RA} = 10$ ms, which is about 2 GSM frames (2*4.65 ms) to account for the GSM timing uncertainty.

This gives a total of 1120 ms for overall delays measured.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.4 Redirection from E-UTRAN TDD to GERAN when System Information is provided

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

6.3.4.1 Test Purpose

To verify that the UE is able to performs the RRC connection release with redirection from the E-UTRA TDD to the target GERAN cell to meet the RRC connection release with redirection to GERAN requirements.

6.3.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 9 and forward that support GERAN.

6.3.4.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target GERAN cell within $T_{\text{connection release redirect GERAN}$.

The time delay ($T_{connection_release_redirect_GERAN$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS36.331[5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target GERAN cell. The time delay ($T_{connection_release_redirect_GERAN$) shall be less than:

$$T_{connection_release_redirect_\ GERAN} = T_{RRC_procedure_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$$

The target GERAN cell shall be considered detectable when the UE receives the GERAN cell at levels down to 10 dB + the reference sensitivity level or reference interference levels as specified in TS 45.005[16].

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

 $T_{identify-UTRA\;GERAN}$: It is the time to identify the BSIC of the target GERAN cell. It shall be less than 1 second.

 $T_{SI\text{-}UTRA\ GERAN}$: It is the time required for acquiring all the relevant system information of the target GERAN cell. This time depends upon whether the UE is provided with the relevant system information of the target GERAN cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access burst to the target GERAN cell.

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.2 and A.6.3.4.

6.3.4.4 Test description

6.3.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.
- 2. The parameter settings for the cells are set up according to Table 6.3.4.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.3.4.4.3.
- 5. There is one E-UTRA TDD cell and one GERAN cell specified in the test. Cell 1(E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.4.4.1-1: General test parameters for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement	As specified in section A.1.2.
		Channel R.0 TDD	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in section A.2.2.
(E-UTRAN TDD)		Channel R.6 TDD	
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1
			(GSM cell)
CP length		Normal	Applicable to cell 1
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The
		0	same configuration applies to all cells.
Uplink-downlink configuration		1	
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW _{channel})			
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including	GSM cells are provided in the
		ARFCN 1	"RRCConnectionRelease" message.
T1	S	5	
T2	S	2	

6.3.4.4.2 Test procedure

The test comprises of one active cell and one neighbour cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall contain all the relevant system information of cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.4.5-1 and 6.3.4.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. SS shall transmit an *RRCConnectionRelease* containing the relevant system information of Cell 2 during period T1
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.4.5-1 for Cell 1, and Table 6.3.4.5-2 for Cell 2.
- 6. If the UE transmits the random access burst on RACH of the target GERAN Cell 2 less than 1120 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 8. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.

9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.4.4.3-1: RRCConnectionRelease: Additional Redirection from E-UTRAN TDD to GERAN test requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
RedirectedCarrierInfo CHOICE {			
geran	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
nonCriticalExtension {			
cellInfoList-r9 CHOICE {			
geran-r9	CellInfoListGERAN-r9		
}			
nonCriticalExtension	Not present		
}			
}			
}			
}			
}			

Table 6.3.4.4.3-2: CellInfoListGERAN-r9: Additional Redirection from E-UTRAN TDD to GERAN test requirement (step3)

Derivation Path: TS 36.331 [5] clause 6.6.2			
Information Element	Value/remark	Comment	Condition
CellInfoListGERAN-r9 ::= SEQUENCE (SIZE (16)) OF SEQUENCE {			
physCellId-r9	Cell 2 physical cell identity		
carrierFreq-r9	Cell 2 carrier frequency		
systemInformation-r9	Cell 2 relevant system information		
}			

6.3.4.5 Test requirement

Tables 6.3.4.4.1-1, 6.3.4.5-1 and 6.3.4.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN TDD to GERAN test.

Table 6.3.4.5-1: Cell specific test parameters for E-UTRA TDD cell (cell #1) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 1		
		T1	T2	
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10		
OCNG Pattern defined in		OP.1 TDD		
D.2.1 (OP.1 TDD)		01.1	100	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
\hat{E}_{s}/I_{ot}	dB	4+TT	4+TT	
\hat{E}_s/N_{oc}	dB	4+TT	4+TT	
N_{oc}	dBm/15 kHz	-98		
RSRP	dBm/15 kHz	-94+TT	-94+TT	
SCH_RP	dBm/15 kHz	-94+TT	-94+TT	
Propagation Condition		AWGN		

spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{ac} to be

RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.4.3.5-2: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		AF	RFNC 1
RXLEV	dBm	-Infinity	-75+TT
GSM BSIC		N/A	Valid

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 1120 ms from the beginning of time period T2.

The rate of correct "RRC connection release with redirection to GERAN" observed during repeated tests shall be at least 90%.

The overall delays measured test requirement can be expressed as:

 $T_{connection_release_redirect_\ GERAN} = T_{RRC_procedure_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$

 $T_{RRC_procedure_delay} = 110$ ms, which is the time for processing the received message "RRCConnectionRelease."

 $T_{identify-GERAN} = 1000$ ms, which is the time for identifying the target GERAN cell.

T_{SI-GERAN} = 0; UE does not have to read the system information of the GERAN cell since all relevant SI is provided to the UE in the "RRCConnectionRelease" message.

 $T_{RA} = 10$ ms, which is about 2 GSM frames (2*4.65 ms) to account for the GSM timing uncertainty.

This gives a total of 1120 ms for overall delays measured.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.5 E-UTRA TDD RRC connection release redirection to UTRA TDD

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

6.3.5.1 Test purpose

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA TDD to the target UTRA TDD cell within $T_{connection_release_redirect_UTRA\ TDD}$. This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in TS 36.133[4] section 6.3.2.3.

6.3.5.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 9 and forward that support UTRA TDD.

6.3.5.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN TDD cell within $T_{connection_release_redirect_UTRA\ TDD}$.

The time delay ($T_{connection_release_redirect_UTRA\ TDD}$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS 36.331 [5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA TDD cell. The time delay ($T_{connection_release_redirect_UTRA\ TDD}$) shall be less than:

$$T_{connection_release_redirect_UTRA\ TDD} = T_{RRC_procedure_delay} + T_{identify\text{-}UTRA\ TDD} + T_{SI\text{-}UTRA\ TDD} + T_{RA}$$

The target UTRA TDD cell shall be considered detectable when:

- P-CCPCH Ec/Io \geq -6 dB,
- DwPCH_Ec/Io \geq -1 dB.

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

T_{identify-UTRA TDD}: It is the time to identify the target UTRA TDD cell. It shall be less than 500 ms.

 $T_{SI\text{-}UTRA\ TDD}$: It is the time required for acquiring all the relevant system information of the target UTRA TDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA TDD cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access to the target UTRA TDD cell.

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.3 and A.6.3.5.

6.3.5.4 Test description

6.3.5.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.23.
- 2. The general test parameter settings are set up according to Table 6.3.5.4.1-1.
- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 6.3.5.4.3.
- 5. There is one E-UTRA TDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.5.4.1-1: General test parameters for E-UTRA TDD RRC connection release redirection to UTRA TDD

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in section A.2.2
parameters (E-UTRAN TDD)		Channel R.6 TDD	
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is
			used.
E-UTRA Channel Bandwidth (BW _{channel})	MHz	10	
CP length		Normal	Applicable to cell 1
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		16	UTRA cells on UTRA RF channel 1
			provided in the "RRCConnectionRelease"
			message from the E-UTRAN
T1	S	5	
T2	S	1	

6.3.5.4.2 Test procedure

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "RRCConnectionRelease" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall contain all the relevant system information of Cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.5.5-1 and 6.3.5.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. SS shall transmit an *RRCConnectionRelease* containing the relevant system information of Cell 2 during period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to UE.

- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.5.5-1 for Cell 1, and Table 6.3.5.5-2 for Cell 2.
- 6. If the UE transmits the PRACH to Cell 2 less than 650 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 8. The SS shall set Cell 2 cell parameter id = (current cell 2 cell parameter id +4) mod 16 for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.5.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.5.4.3-1: RRCConnectionRelease: E-UTRA TDD RRC connection release redirection to UTRA TDD test requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
redirectedCarrierInfo CHOICE {			
utra-TDD	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
nonCriticalExtension {			
cellInfoList-r9 CHOICE {			
utra-TDD-r9	CellInfoListUTRA-TDD-r9		
}			
nonCriticalExtension	Not present		
}			
}			
}			
}			
}			

Table 6.3.5.4.3-2: *CellInfoListUTRA-TDD-r9*: E-UTRA TDD RRC connection release redirection to UTRA TDD test requirement (step3)

Derivation Path: TS 36.331 [5] clause 6.6.2			
Information Element	Value/remark	Comment	Condition
CellInfoListUTRA-TDD-r9 ::= SEQUENCE (SIZE			
(116)) OF SEQUENCE {			
physCellId-r9	Cell 2 physical cell		
	identity		
utra-BCCH-Container-r9	Cell 2 Relevant System		
	Information		
}			

6.3.5.5 Test requirement

Tables 6.3.5.4.1-1, 6.3.5.5-1 and 6.3.5.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN TDD to UTRAN TDD test.

Table 6.3.5.5-1: Cell specific test parameters for cell 1 in E-UTRA TDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	Cell 1		
		T1	T2	
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10)	
OCNG Pattern defined in		OP.1	TDD	
D.2.1 (OP.1 TDD)		01.1	100	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB	0		
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
\hat{E}_{s}/I_{ot}	dB	4+TT	4+TT	
N_{oc} Note 3	dBm/15 kHz	-98		
\hat{E}_s/N_{oc}	dB	4+TT 4+TT		
RSRP Note 4	dBm/15 kHz	-94+TT	-94+TT	
SCH_RP	dBm/15 kHz	-94+TT	-94+TT	
Propagation Condition		AWGN		

- Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled
- Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.5.5-2: Cell specific test parameters for cell 2 in E-UTRA TDD RRC connection release redirection to UTRA TDD test

Parameter	Unit		Cell 2 (UT	ra TDD)		
Timeslot Number			0 Dv		wPTS	
		T1	T2	T1	T2	
UTRA RF Channel Number Note1			Char	nel 1		
PCCPCH_Ec/lor	dB	-4.77	-4.77			
DwPCH_Ec/lor	dB			0	0	
OCNS_Ec/Ior ^{Note2}	dB	-1.76	-1.76			
\hat{I}_{or}/I_{oc}	dB	-inf	8+TT	-inf	8+TT	
I_{oc}	dBm/1.28 MHz	-80				
PCCPCH RSCP Note3	dBm	-inf	- 76.77+T T	n.a.	n.a.	
PCCPCH_Ec/Io Note3	dB	-inf	- 5.41+TT	n.a.	n.a.	
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	- 0.64+TT	
Propagation Condition		AWGN				

- Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.
- Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to l_{or} .
- cell to be equal to I_{or}.

 Note 3: P-CCPCH RSRP, PCCPCH_Ec/lo and DwPCH_Ec/lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA TDD observed during repeated tests shall be at least 90%.

The time delay can be expressed as: $T_{RRC_procedure_delay} + T_{identify_UTRA\ TDD} + T_{SI_UTRA\ TDD} + T_{RA}$, where:

 $T_{RRC\ procedure\ delay} = 110$ ms, which is specified in TS 36.133 [4] section 6.3.2.3.

 $T_{identify-UTRA\ TDD} = 500$ ms; which is defined in TS 36.133 [4] section 6.3.2.3.

 $T_{SI\text{-}UTRA\ TDD} = 0$ ms, UE does not have to read the system information of the UTRAN TDD since all relevant SI is provided to the UE in the "RRCConnectionRelease" message.

 $T_{RA} = 40$ ms. This is the additional delay caused by the random access procedure

It gives a total delay of 650 ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.6 E-UTRA FDD RRC connection release redirection to UTRA TDD

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

6.3.6.1 Test purpose

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA FDD to the target UTRA TDD cell within $T_{connection_release_redirect_UTRA\ TDD}$. This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in TS 36.133[4] section 6.3.2.3.

6.3.6.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 9 and forward that support UTRA TDD.

6.3.6.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN TDD cell within $T_{connection_release_redirect_UTRA\ TDD}$.

The time delay ($T_{connection_release_redirect_UTRA\ TDD}$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS 36.331 [5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA TDD cell. The time delay ($T_{connection_release_redirect_UTRA\ TDD}$) shall be less than:

$$T_{connection_release_redirect_UTRA\ TDD} = T_{RRC_procedure_delay} + T_{identify_UTRA\ TDD} + T_{SI_UTRA\ TDD} + T_{RA}$$

The target UTRA TDD cell shall be considered detectable when:

- P-CCPCH Ec/Io \geq -6 dB,
- DwPCH_Ec/Io > -1 dB.

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

Tidentify-UTRA TDD: It is the time to identify the target UTRA TDD cell. It shall be less than 500 ms.

 $T_{SI\text{-}UTRA\ TDD}$: It is the time required for acquiring all the relevant system information of the target UTRA TDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA TDD cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access to the target UTRA TDD cell.

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.3 and A.6.3.6.

6.3.6.4 Test description

6.3.6.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.23.
- 2. The general test parameter settings are set up according to Table 6.3.6.4.1-1.
- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 6.3.6.4.3.
- 5. There is one E-UTRA FDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.6.4.1-1: General test parameters for E-UTRA FDD RRC connection release redirection to UTRA TDD

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW _{channel})	MHz	10	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		16	UTRA cells on UTRA RF channel 1 provided in the "RRCConnectionRelease" message from the E-UTRAN
T1	S	5	
T2	S	1	

6.3.6.4.2 Test procedure

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "RRCConnectionRelease" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall contain all the relevant system information of Cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.6.5-1 and 6.3.6.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. SS shall transmit an *RRCConnectionRelease* containing the relevant system information of Cell 2 during period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.6.5-1 for Cell 1, and Table 6.3.6.5-2 for Cell 2.
- 6. If the UE transmits the PRACH to Cell 2 less than 650 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3 .Cell 1 is the active cell.
- 8. The SS shall set Cell 2 cell parameter id = (current cell 2 cell parameter id +4) mod 16 for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.6.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.6.4.3-1: RRCConnectionRelease: E-UTRA FDD RRC connection release redirection to UTRA TDD test requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
redirectedCarrierInfo CHOICE {			
utra-TDD	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
nonCriticalExtension {			
cellInfoList-r9 CHOICE {			
utra-TDD-r9	CellInfoListUTRA-TDD-r9		
}			
nonCriticalExtension	Not present		
}			
}			
}			
}		·	
}			

Table 6.3.6.4.3-2: CellInfoListUTRA-TDD-r9: E-UTRA FDD RRC connection release redirection to UTRA TDD test requirement (step3)

Derivation Path: TS 36.331 [5] clause 6.6.2			
Information Element	Value/remark	Comment	Condition
CellInfoListUTRA-TDD-r9 ::= SEQUENCE (SIZE			
(116)) OF SEQUENCE {			
physCellId-r9	Cell 2 physical cell		
	identity		
utra-BCCH-Container-r9	Cell 2 Relevant System	_	
	Information		
}			

6.3.6.5 Test requirement

Tables 6.3.6.4.1-1, 6.3.6.5-1 and 6.3.6.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN FDD to UTRAN TDD test.

Table 6.3.6.1-2: Cell specific test parameters for cell 1 in E-UTRA FDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	Cell 1		
		T1	T2	
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10		
OCNG Patterns defined in D.2.1 (OP.1 FDD)		OP.1 FDD		
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
\hat{E}_{s}/I_{ot}	dB	4+TT	4+TT	
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98		
\hat{E}_s/N_{oc}	dB	4+TT	4+TT	
RSRP Note 4	dBm/15 kHz	-94+TT	-94+TT	
SCH_RP	dBm/15 kHz	-94+TT	-94+TT	
Propagation Condition		AWGI	N	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.6.1-3: Cell specific test parameters for cell 2 in E-UTRA FDD RRC connection release redirection to UTRA TDD test

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		0		DwPTS	
		T1	T2	T1	T2
UTRA RF Channel Number ^{Note1}			Chan	nel 1	
PCCPCH_Ec/lor	dB	-4.77	-4.77		
DwPCH_Ec/lor	dB			0	0
OCNS_Ec/Ior ^{Note2}	dB	-1.76	-1.76		
\hat{I}_{or}/I_{oc}	dB	-inf	8+TT	-inf	8+TT
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP Note3	dBm	-inf	- 76.77+T T	n.a.	n.a.
PCCPCH_Ec/Io Note3	dB	-inf	- 5.41+TT	n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	- 0.64+TT
Propagation Condition	AWGN				
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number.					

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or} .

Note 3: P-CCPCH RSRP, PCCPCH_Ec/lo and DwPCH_Ec/lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 650 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRA TDD observed during repeated tests shall be at least

The time delay can be expressed as: $T_{RRC_procedure_delay} + T_{identify_UTRA\ TDD} + T_{SI_UTRA\ TDD} + T_{RA}$, where:

 $T_{RRC procedure delay} = 110 \text{ ms}$, which is specified in TS 36.133 [4] section 6.3.2.3.

 $T_{identify-UTRA\ TDD}$ = 500 ms; which is defined in TS 36.133 [4] section 6.3.2.3.

 $T_{SI\text{-}UTRA\ TDD} = 0$ ms, UE does not have to read the system information of the UTRAN TDD since all relevant SI is provided to the UE in the "RRCConnectionRelease" message.

 $T_{RA} = 40$ ms. This is the additional delay caused by the random access procedure.

This gives a total delay of 650 ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.7 E-UTRA TDD RRC connection release redirection to UTRA TDD without SI provided

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

6.3.7.1 Test purpose

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA TDD to the target UTRA TDD cell within $T_{connection_release_redirect_UTRA\ TDD}$. This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in TS 36.133[4] section 6.3.2.3.

6.3.7.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 9 and forward that support UTRA TDD.

6.3.7.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN TDD cell within $T_{connection_release_redirect_UTRA\ TDD}$.

The time delay ($T_{connection_release_redirect_UTRA\ TDD}$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS 36.331 [5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA TDD cell. The time delay ($T_{connection_release_redirect_UTRA\ TDD}$) shall be less than:

$$T_{connection_release_redirect_UTRA\ TDD} = T_{RRC_procedure_delay} + T_{identify_UTRA\ TDD} + T_{SI_UTRA\ TDD} + T_{RA}$$

The target UTRA TDD cell shall be considered detectable when:

- P-CCPCH Ec/Io \geq -6 dB,
- DwPCH_Ec/Io \geq -1 dB.

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

Tidentify-UTRA TDD: It is the time to identify the target UTRA TDD cell. It shall be less than 500 ms.

T_{SI-UTRA TDD}: It is the time required for acquiring all the relevant system information of the target UTRA TDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA TDD cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access to the target UTRA TDD cell.

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.3 and A.6.3.7.

6.3.7.4 Test description

6.3.7.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.22.
- 2. The general test parameter settings are set up according to Table 6.3.7.4.1-1.
- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 6.3.7.4.3.
- 5. There is one E-UTRA TDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.7.4.1-1: General test parameters for E-UTRA TDD RRC connection release redirection to UTRA TDD without SI provided

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2.
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in section A.2.2.
parameters (E-UTRAN TDD)		Channel R.6 TDD	
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is
			used.
E-UTRA Channel Bandwidth	MHz	10	
(BW _{channel})			
CP length		Normal	Applicable to cell 1
Uplink-downlink configuration of cell 1		1	As specified in table 4.2.2 in TS 36.211
Special subframe configuration of cell 1		6	As specified in table 4.2.1 in TS 36.211
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	_
Monitored UTRA TDD cell list size		none	No explicit neighbour list is provided to the UE
T1	S	5	
T2	S	2	

6.3.7.4.2 Test procedure

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2. The "RRCConnectionRelease" message not containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from Cell 1. The "RRCConnectionRelease" message shall not contain all the relevant system information of Cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.7.5-1 and 6.3.7.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. The SS shall transmit an *RRCConnectionRelease* not containing the relevant system information of Cell 2 during period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to the UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.7.5-1 for Cell 1, and Table 6.3.7.5-2 for Cell 2.
- 6. If the UE transmits the PRACH to Cell 2 less than 1930 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 8. The SS shall set Cell 2 cell parameter id = (current cell 2 cell parameter id +4) mod 16 for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.7.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.7.4.3-1: RRCConnectionRelease: E-UTRA TDD RRC connection release redirection to UTRA TDD without SI provided test requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
redirectedCarrierInfo CHOICE {			
utra-TDD	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
}			
}			
}			
}			

6.3.7.5 Test requirement

Tables 6.3.7.4.1-1, 6.3.7.5-1 and 6.3.7.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN TDD to UTRAN TDD test without SI provided.

Table 6.3.7.5-1: Cell specific test parameters for cell 1 in E-UTRA TDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 1		
		T1	T2	
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10		
OCNG Pattern defined in		OP.1 ⁻	TDD	
D.2.1 (OP.1 TDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB	0		
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
\hat{E}_{s}/I_{ot}	dB	4+TT	4+TT	
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98		
\hat{E}_s/N_{oc}	dB	4	4	
RSRP Note 4	dBm/15 kHz	-94+TT	-94+TT	
SCH_RP	dBm/15 kHz	-94+TT	-94+TT	
Propagation Condition		AWGN		

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled
- Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.7.5-2: Cell specific test parameters for cell 2 in E-UTRA TDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 2 (UTRA TDD)			
Timeslot Number		0 DwPTS		PTS	
		T1	T2	T1	T2
UTRA RF Channel Number Note1			Chan	nel 1	
PCCPCH_Ec/lor	dB	-4.77	-4.77		
DwPCH_Ec/lor	dB			0	0
OCNS_Ec/Ior ^{Note2}	dB	-1.76	-1.76		
\hat{I}_{or}/I_{oc}	dB	-inf	8+TT	-inf	8+TT
I_{oc}	dBm/1.28 MHz	-80			
PCCPCH RSCP Note3	dBm	-inf	- 76.77+T T	n.a.	n.a.
PCCPCH_Ec/Io Note3	dB	-inf	- 5.41+TT	n.a.	n.a.
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	- 0.64+TT
Propagation Condition	agation Condition AWGN				
Note 1: In the case of multi-frequency's channel num	nber.			•	•

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or} .

Note 3: P-CCPCH RSRP, PCCPCH_Ec/lo and DwPCH_Ec/lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 1930 ms from the beginning of time period T2.

The time delay can be expressed as: $T_{RRC_procedure_delay} + T_{identify_UTRA\ TDD} + T_{SI_UTRA\ TDD} + T_{RA}$, where:

T_{RRC} procedure delay = 110 ms; It is the RRC procedure for processing the received message "RRCConnectionRelease".

 $T_{identify\text{-}UTRA\ TDD}$ = 500 ms; It is the time to identify the target UTRA TDD cell.

T_{SI-UTRA TDD}: Maximum repetition period of relevant system info blocks that need to be received by the UE during RRC connection release redirection to UTRA TDD cell. 1280 ms is assumed in this test case.

 $T_{RA} = 40$ ms, this is the additional delay caused by the random access procedure.

This gives a total delay of 1930 ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.8 E-UTRA FDD RRC connection release redirection to UTRA TDD without SI provided

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

6.3.8.1 Test purpose

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRA FDD to the target UTRA TDD cell within $T_{connection_release_redirect_UTRA\ TDD}$. This test will partly verify the RRC connection release with redirection to UTRA TDD requirements in TS 36.133[4] section 6.3.2.3.

6.3.8.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 9 and forward that support UTRA TDD.

6.3.8.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN TDD cell within $T_{connection_release_redirect_UTRA\ TDD}$.

The time delay ($T_{connection_release_redirect_UTRA\ TDD}$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS 36.331 [5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA TDD cell. The time delay ($T_{connection_release_redirect_UTRA\ TDD}$) shall be less than:

$$T_{connection_release_redirect_UTRA\ TDD} = T_{RRC_procedure_delay} + T_{identify_UTRA\ TDD} + T_{SI_UTRA\ TDD} + T_{RA}$$

The target UTRA TDD cell shall be considered detectable when:

- P-CCPCH Ec/Io \geq -6 dB,
- DwPCH_Ec/Io \geq -1 dB.

T_{RRC_procedure_delay}: It is the RRC procedure for processing the received message "*RRCConnectionRelease*". It shall be less than 110 ms.

T_{identify-UTRA TDD}: It is the time to identify the target UTRA TDD cell. It shall be less than 500 ms.

 $T_{SI\text{-}UTRA\ TDD}$: It is the time required for acquiring all the relevant system information of the target UTRA TDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA TDD cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access to the target UTRA TDD cell

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.3 and A.6.3.8.

6.3.8.4 Test description

6.3.8.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.22.
- 2. The general test parameter settings are set up according to Table 6.3.8.4.1-1.
- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 6.3.8.4.3.
- 5. There is one E-UTRA FDD serving cell and one UTRA TDD cell specified in the test. Cell 1 (E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.8.4.1-1: General test parameters for E-UTRA FDD RRC connection release redirection to UTRA TDD without SI provided

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
Time offset between cells	ms	3	Asynchronous cells
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW _{channel})	MHz	10	
CP length		Normal	Applicable to cell 1
UTRA RF Channel Number		1	One UTRA TDD carrier frequency is used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRA TDD cell list size		none	No explicit neighbour list is provided to the UE
T1	S	5	
T2	S	2	

6.3.8.4.2 Test procedure

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The "RRCConnectionRelease" message not containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall not contain all the relevant system information of Cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.8.5-1 and 6.3.8.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. The SS shall transmit an *RRCConnectionRelease* not containing the relevant system information of Cell 2 during time period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to the UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.8.5-1 for Cell 1 and Table 6.3.8.5-2 for Cell 2.
- 6. If the UE transmits the PRACH to Cell 2 less than 1930 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3 .Cell 1 is the active cell.
- 8. The SS shall set Cell 2 cell parameter id = (current cell 2 cell parameter id +4) mod 16 for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.8.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.8.4.3-1: RRCConnectionRelease: E-UTRA FDD RRC connection release redirection to UTRA TDD test without SI provided requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
redirectedCarrierInfo CHOICE {			
utra-TDD	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
}			
}			
}			
}			

6.3.8.5 Test requirement

Tables 6.3.8.4.1-1, 6.3.8.5-1 and 6.3.8.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN FDD to UTRAN TDD test.

Table 6.3.8.5-1: Cell specific test parameters for cell 1 in E-UTRA FDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 1		
		T1 T2		
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10		
OCNG Patterns defined in		OP.1 FDD		
D.1.1 (OP.1 FDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
\hat{E}_{s}/I_{ot}	dB	4+TT 4+TT		
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98		
\hat{E}_s/N_{oc}	dB	4 4		
RSRP Note 4	dBm/15 kHz	-94+TT -94+TT		
SCH_RP	dBm/15 kHz	-94+TT -94+TT		
Propagation Condition		AWGN		

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.
- Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled
- Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.8.5-2: Cell specific test parameters for cell 2 in E-UTRA FDD RRC connection release redirection to UTRA TDD test without SI provided

Parameter	Unit	Cell 2 (UTRA TDD)				
Timeslot Number	0 Dv		0		PTS	
		T1	T2	T1	T2	
UTRA RF Channel Number Note1			Chan	nel 1		
PCCPCH_Ec/lor	dB	-4.77	-4.77			
DwPCH_Ec/lor	dB			0	0	
OCNS_Ec/Ior ^{Note2}	dB	-1.76	-1.76			
\hat{I}_{or}/I_{oc}	dB	-inf	8+TT	-inf	8+TT	
I_{oc}	dBm/1.28 MHz	-80				
PCCPCH RSCP Note3	dBm	-inf	- 76.77+T T	n.a.	n.a.	
PCCPCH_Ec/Io Note3	dB	-inf	- 5.41+TT	n.a.	n.a.	
DwPCH_Ec/Io Note3	dB	n.a.	n.a.	-inf	- 0.64+TT	
Propagation Condition	Propagation Condition AWGN					
Note 1: In the case of multi-frequency cell, the UTRA RF Channel Number is the primary frequency's channel number. Note 2: The power of the OCNS channel that is added shall make the total power from the						

cell to be equal to Ior.

Note 3: P-CCPCH RSRP, PCCPCH_Ec/lo and DwPCH_Ec/lo levels have been derived from other parameters for information purposes. They are not settable parameters

The UE shall start to transmit the SYNCH-UL sequence in the UpPTS to Cell 2 less than 1930 ms from the beginning of time period T2.

The time delay can be expressed as: $T_{RRC_procedure_delay} + T_{identify_UTRA\ TDD} + T_{SI_UTRA\ TDD} + T_{RA}$, where:

T_{RRC} procedure delay = 110 ms; It is the RRC procedure for processing the received message "RRCConnectionRelease".

 $T_{identify-UTRA\ TDD} = 500$ ms; It is the time to identify the target UTRA TDD cell.

Maximum repetition period of relevant system info blocks that need to be received by the UE during $T_{SI-UTRA\ TDD}$: RRC connection release redirection to UTRA TDD cell. 1280 ms is assumed in this test case.

 $T_{RA} = 40$ ms, this is the additional delay caused by the random access procedure.

This gives a total delay of 1930 ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.9 Redirection from E-UTRAN FDD to UTRAN FDD without System Information

6.3.9.1 Test purpose

The purpose of this test is to verify that the UE makes correct performing the RRC connection release with redirection to the target UTRAN FDD cell without system information. This test will partly verify the RRC connection release with redirection to UTRAN FDD cell requirements in section 6.3.2.1.

6.3.9.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 9 and forward that support UTRA FDD.

6.3.9.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN FDD cell within $T_{connection\ release\ redirect\ UTRA\ FDD}$.

The time delay ($T_{connection_release_redirect_UTRA\ FDD}$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS 36.331 [5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA FDD cell. The time delay ($T_{connection_release_redirect_UTRA\ FDD}$) shall be less than:

$$T_{connection_release_redirect_UTRA\ FDD} = T_{RRC_procedure_delay} + T_{identify_UTRA\ FDD} + T_{SI_UTRA\ FDD} + T_{RA}$$

The target UTRA FDD cell shall be considered detectable when:

- CPICH Ec/Io \geq -15 dB,
- SCH_Ec/Io ≥ -15 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

T_{identify-UTRA FDD}: It is the time to identify the target UTRA FDD cell. It shall be less than 500 ms.

 $T_{SI\text{-}UTRA\ FDD}$: It is the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access to the target UTRA FDD cell.

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.1 and A.6.3.1.

6.3.9.4 Test description

6.3.9.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.22.
- 2. The general test parameter settings are set up according to Table 6.3.9.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.3.9.4.3.
- 5. There is one E-UTRA FDD cell and one UTRA FDD cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.9.4.1-1: General test parameters for RRC Connection Release with Redirection from E-UTRAN FDD to UTRAN FDD under AWGN propagation conditions

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRA RF channel number 1.
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth (BW _{channel})	MHz	10	
UTRA RF Channel Number		1	One UTRA FDD carrier frequency is used.
Inter-RAT (UTRA FDD) measurement quantity		CPICH Ec/lo	
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
UTRA FDD cell list size		None	No explicit neighbour list is provided to the UE
T1	S	≤5	
T2	S	2	

6.3.9.4.2 Test procedure

The test comprises of one active cell and one neighbour cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "RRCConnectionRelease" message not containing any system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.9.5-1 and 6.3.9.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. SS shall transmit an *RRCConnectionRelease* not containing the relevant system information of Cell 2 during period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.9.5-1 for Cell 1, and Table 6.3.9.5-2 for Cell 2.
- 6. If the UE transmits the PRACH to Cell 2 less than 1930 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 8. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code 50) mod 200 + 100) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.9.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.9.4.3-1: RRCConnectionRelease: Additional Redirection from E-UTRAN FDD to UTRAN FDD test requirement without system information (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			T
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
redirectedCarrierInfo CHOICE {			
utra-FDD	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
}			
}			
}			
}			

6.3.9.5 Test requirement

Tables 6.3.9.4.1-1, 6.3.9.5-1 and 6.3.9.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN FDD to UTRAN FDD without system information test.

Table 6.3.9.5-1: Cell Specific Test requirement Parameters for cell #1 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Parameter Unit Cell 1			
		T1	T2	
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10		
OCNG Pattern defined in		OP.1 I	EDD	
D.1.1 (OP.1 FDD)		01:11		
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note 1}	dB			
OCNG_RB ^{Note 1}	dB			
\hat{E}_{s}/I_{ot}	dB	4	4	
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98	3	
\hat{E}_s/N_{oc}	dB	4	4	
RSRP Note 4	dBm/15 kHz	-94	-94	
SCH_RP	dBm/15 kHz	-94	-94	
Propagation Condition		AWC	3N	
Note 1: OCNG shall be used spectral density is ac	hieved for all OF	I is fully allocated and a constant DM symbols. are assigned to the UE prior to t		

Interference from other cells and noise sources not specified in the test is assumed to be constant Note 3: over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{ac} to be

RSRP levels have been derived from other parameters for information purposes. They are not Note 4: settable parameters themselves.

Table 6.3.9.5-2: Cell Specific Test Parameters for cell #2 E-UTRAN FDD to UTRAN FDD RRC release with redirection under AWGN propagation conditions

Parameter	Unit	Cell 2			
		T1	T2		
UTRA RF Channel Number		1			
CPICH_Ec/lor	dB	-10			
PCCPCH_Ec/lor	dB	-12			
SCH_Ec/lor	dB	-12			
PICH_Ec/lor	dB	-15			
DPCH_Ec/lor	dB	N/A			
OCNS		-0.94	1		
\hat{I}_{or}/I_{oc}	dB	-∞	0.42		
I_{oc}	dBm/3.84 MHz	-70			
CPICH_Ec/Io ^{Note 3}	dB	-∞	12.81		
Propagation Condition		AWG	N		

Note 1: The DPCH level is controlled by the power control loop.

The power of the OCNS channel that is added shall make the total power from the cell to be equal Note 2: to I_{or}

This gives an SCH Ec/lo of -15dB Note 3:

The UE shall start to transmit random access to Cell 2 less than 1930 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to UTRAN FDD observed during repeated tests shall be at least 90%.

The overall delays measured test requirement can be expressed as

 $Test\ Requirement = T_{RRC_procedure_delay} + T_{identify_UTRA\ FDD} + T_{SI_UTRA\ FDD} + T_{RA}$

 $T_{RRC_procedure_delay} = 110 \text{ ms}$

 $T_{identify-UTRA\ FDD} = 500\ ms$

 $T_{SI\text{-}UTRA\ FDD}$ = the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released. 1280 ms is assumed in this test case.

 T_{RA} = The additional delay caused by the random access procedure. 40 ms is assumed in this test case.

This gives a total of 1930 ms for overall delays measured.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.10 Redirection from E-UTRAN FDD to GERAN when System Information is not provided

6.3.10.1 Test Purpose

To verify that the UE is able to performs the RRC connection release with redirection from the E-UTRA FDD to the target GERAN cell when system information is not provided to meet the RRC connection release with redirection to GERAN requirements.

6.3.10.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 9 and forward that support GERAN.

6.3.10.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target GERAN cell within $T_{\text{connection_release_redirect_GERAN}$.

The time delay ($T_{connection_release_redirect_GERAN$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS36.331[5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target GERAN cell. The time delay ($T_{connection_release_redirect_GERAN$) shall be less than:

$$T_{connection_release_redirect_GERAN} = T_{RRC_procedure_delay} + T_{identify_GERAN} + T_{SI_GERAN} + T_{RA}$$

The target GERAN cell shall be considered detectable when the UE receives the GERAN cell at levels down to 10 dB + the reference sensitivity level or reference interference levels as specified in TS 45.005[16].

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

 $T_{identify-UTRA\;GERAN}$: It is the time to identify the BSIC of the target GERAN cell. It shall be less than 1 second.

 $T_{SI\text{-}UTRA\ GERAN}$: It is the time required for acquiring all the relevant system information of the target GERAN cell. This time depends upon whether the UE is provided with the relevant system information of the target GERAN cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access burst to the target GERAN cell.

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.2 and A.6.3.10.

6.3.10.4 Test description

6.3.10.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.22.
- 2. The parameter settings for the cells are set up according to Table 6.3.10.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.3.10.4.3.
- 5. There is one E-UTRA FDD cell and one GERAN cell specified in the test. Cell 1(E-UTRA FDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.10.4.1-1: General test parameters for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1.
PCFICH/PDCCH/PHICH parameters (E-UTRAN FDD)		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1.
Active cell		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1 (GSM cell)
CP length		Normal	Applicable to cell 1
E-UTRA RF Channel Number		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW _{channel})		OFF	
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including ARFCN 1	GSM cells are provided in the "RRCConnectionRelease" message.
T1	S	≤5	
T2	S	4	

6.3.10.4.2 Test procedure

The test comprises of one active cell and one neighbour cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall not contain the relevant system information of cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.10.5-1 and 6.3.10.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionRelease without the relevant system information of Cell 2 during period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.10.5-1 for Cell 1, and Table 6.3.10.5-2 for Cell 2.

- 6. If the UE transmits the random access burst on RACH of the target GERAN Cell 2 less than 3020 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3 .Cell 1 is the active cell.
- 8. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.10.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.10.4.3-1: RRCConnectionRelease: Additional Redirection from E-UTRAN FDD to GERAN test requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
redirectedCarrierInfo CHOICE {			
geran	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
}			
}			
}			
}			

6.3.10.5 Test requirement

Tables 6.3.10.4.1-1, 6.3.10.5-1 and 6.3.10.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN FDD to GERAN test.

Table 6.3.10.5-1: Cell specific test parameters for E-UTRA FDD cell (cell #1) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 1			
		T1	T2		
E-UTRA RF Channel Number		1			
BW _{channel}	MHz	10			
OCNG Pattern defined in D.1.1 (OP.1 FDD)		OP.1 FDI	D		
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB	0			
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4	4		
\hat{E}_s/N_{oc}	dB	4	4		
N_{oc}	dBm/15 kHz	-98			
RSRP	dBm/15 kHz	-94	-94		
SCH_RP	dBm/15 kHz	-94	-94		
Propagation Condition		AWGN			

spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{ac} to be

RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.10.5-2: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN FDD to GERAN in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		AF	RFNC 1
RXLEV	dBm	-Infinity	-75
GSM BSIC		N/A	Valid

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 3020 ms from the beginning of time period T2.

The overall delays measured test requirement can be expressed as:

 $T_{connection_release_redirect_\ GERAN} = T_{RRC_procedure_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$

 $T_{RRC_procedure_delay} = 110$ ms, which is the time for processing the received message "RRCConnectionRelease."

 $T_{identify-GERAN} = 1000$ ms, which is the time for identifying the target GERAN cell.

T_{SI-GERAN} = 1900 ms; which is the maximum time allowed to read BCCH data from the target GERAN cell.

 $T_{RA} = 10$ ms, which is about 2 GSM frames (2*4.65 ms) to account for the GSM timing uncertainty.

This gives a total of 3020 ms for overall delays measured.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.11 Redirection from E-UTRAN TDD to GERAN when System Information is not provided

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

6.3.11.1 Test Purpose

To verify that the UE is able to performs the RRC connection release with redirection from the E-UTRA TDD to the target GERAN cell when system information is not provided to meet the RRC connection release with redirection to GERAN requirements.

6.3.11.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 9 and forward that support GERAN.

6.3.11.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target GERAN cell within $T_{connection_release_redirect_GERAN}$.

The time delay ($T_{connection_release_redirect_GERAN}$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS36.331[5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target GERAN cell. The time delay ($T_{connection_release_redirect_GERAN}$) shall be less than:

$$T_{connection_release_redirect__GERAN} = T_{RRC_procedure_delay} + T_{identify_GERAN} + T_{SI_GERAN} + T_{RA}$$

The target GERAN cell shall be considered detectable when the UE receives the GERAN cell at levels down to 10 dB + the reference sensitivity level or reference interference levels as specified in TS 45.005[16].

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

Tidentify-UTRA GERAN: It is the time to identify the BSIC of the target GERAN cell. It shall be less than 1 second.

 $T_{SI\text{-}UTRA\ GERAN}$: It is the time required for acquiring all the relevant system information of the target GERAN cell. This time depends upon whether the UE is provided with the relevant system information of the target GERAN cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access burst to the target GERAN cell.

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.2 and A.6.3.11.

6.3.11.4 Test description

6.3.11.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

1. Connect the SS and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.14.

- 2. The parameter settings for the cells are set up according to Table 6.3.11.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.3.11.4.3.
- 5. There is one E-UTRA TDD cell and one GERAN cell specified in the test. Cell 1(E-UTRA TDD cell) is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.11.4.1-1: General test parameters for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN TDD)		DL Reference Measurement	As specified in section A.1.2.
		Channel R.0 TDD	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement	As specified in section A.2.2.
(E-UTRAN TDD)		Channel R.6 TDD	
Active		Cell 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Cell 2	Cell 2 is on Absolute RF Channel Number 1
			(GSM cell)
CP length		Normal	Applicable to cell 1
Special subframe configuration		6	As specified in table 4.2.1 in TS 36.211. The
		0	same configuration applies to all cells.
Uplink-downlink configuration		1	
E-UTRA RF Channel Number		1	One E-UTRA TDD carrier frequency is used.
E-UTRA Channel Bandwidth	MHz	10	
(BW _{channel})			
DRX		OFF	
Monitored GSM cell list size		6 GSM neighbour including	GSM cells are provided in the
		ARFCN 1	"RRCConnectionRelease" message.
T1	S	≤5	
T2	S	4	

6.3.11.4.2 Test procedure

The test comprises of one active cell and one neighbour cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. The start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from cell 1. The "RRCConnectionRelease" message shall not contain the relevant system information of cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.11.5-1 and 6.3.11.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. The SS shall transmit an *RRCConnectionRelease* not containing the relevant system information of Cell 2 during time period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to the UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.11.5-1 for Cell 1 and Table 6.3.11.5-2 for Cell 2.
- 6. If the UE transmits the random access burst on RACH of the target GERAN Cell 2 less than 3020 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. .Cell 1 is the active cell.
- 8. The SS shall set a different BSIC on Cell 2, as the previous timing information of Cell 2 is invalid in the UE for the next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.11.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.11.4.3-1: RRCConnectionRelease: Additional Redirection from E-UTRAN FDD to GERAN test requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
redirectedCarrierInfo CHOICE {			
geran	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
}			
}		_	
}			
}		•	

6.3.11.5 Test requirement

Tables 6.3.11.4.1-1, 6.3.11.5-1 and 6.3.11.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN TDD to GERAN test.

Table 6.3.11.5-1: Cell specific test parameters for E-UTRA TDD cell (cell #1) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
BW _{channel}	MHz	10	
OCNG Pattern defined in		OP.1 T	TDD
D.2.1 (OP.1 TDD)			
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA ^{Note 1}	dB		
OCNG_RB ^{Note 1}	dB		
\hat{E}_{s}/I_{ot}	dB	4+TT	4+TT
\hat{E}_s/N_{oc}	dB	4+TT	4+TT
N_{oc}	dBm/15 kHz	-98	
RSRP	dBm/15 kHz	-94+TT	-94+TT
SCH_RP	dBm/15 kHz	-94+TT	-94+TT
Propagation Condition		AWG	SN
Note 1: OCNG shall be used spectral density is ac			total transmitted power

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be

Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.11.5-2: Cell specific test parameters for GERAN cell (cell #2) for RRC connection release with redirection from E-UTRAN TDD to GERAN in AWGN

Parameter	Unit	Cell 2	
		T1	T2
Absolute RF Channel Number		AF	RFNC 1
RXLEV	dBm	-Infinity	-75+TT
GSM BSIC		N/A	Valid

The UE shall begin to send access bursts on RACH of the target GERAN cell (cell #2) less than 3020 ms from the beginning of time period T2.

The overall delays measured test requirement can be expressed as:

 $T_{connection_release_redirect_\ GERAN} = T_{RRC_procedure_delay} + T_{identify\text{-}GERAN} + T_{SI\text{-}GERAN} + T_{RA}$

 $T_{RRC_procedure_delay} = 110$ ms, which is the time for processing the received message "RRCConnectionRelease."

 $T_{identify-GERAN} = 1000$ ms, which is the time for identifying the target GERAN cell.

 $T_{SI\text{-}GERAN} = 1900 \text{ ms}$; which is the maximum time allowed to read BCCH data from the target GERAN cell.

 $T_{RA} = 10$ ms, which is about 2 GSM frames (2*4.65 ms) to account for the GSM timing uncertainty.

This gives a total of 3020 ms for overall delays measured.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.3.12 E-UTRAN TDD RRC connection release redirection to UTRAN FDD without SI provided

Editor's note: This section is incomplete. The following aspects are either missing or not yet determined:

- The Test system uncertainties applicable to this test are undefined
- The Test tolerances applicable to this test are undefined

6.3.12.1 Test purpose

The purpose of this test is to verify that the UE performs the RRC connection release with redirection from the E-UTRAN TDD to the target UTRAN FDD cell within $T_{connection_release_redirect_UTRAN\ FDD}$. This test will partly verify the RRC connection release with redirection to UTRAN FDD requirements.

6.3.12.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 9 and forward that support UTRA FDD.

6.3.12.3 Minimum conformance requirements

The UE shall be capable of performing the RRC connection release with redirection to the target UTRAN FDD cell within $T_{connection\ release\ redirect\ UTRAFDD}$.

The time delay ($T_{connection_release_redirect_UTRA\ FDD}$) is the time between the end of the last TTI containing the RRC command, "RRCConnectionRelease" as defined in section 5.3.8 in TS 36.331 [5] on the E-UTRAN PDSCH and the time the UE starts to send random access to the target UTRA FDD cell. The time delay ($T_{connection_release_redirect_UTRA\ FDD}$) shall be less than:

$$T_{connection_release_redirect_UTRA\ FDD} = T_{RRC_procedure_delay} + T_{identify_UTRA\ FDD} + T_{SI_UTRA\ FDD} + T_{RA}$$

The target UTRA FDD cell shall be considered detectable when:

- CPICH Ec/Io \geq -15 dB,
- SCH_Ec/Io ≥ -15 dB for at least one channel tap and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

 $T_{RRC_procedure_delay}$: It is the RRC procedure for processing the received message "RRCConnectionRelease". It shall be less than 110 ms.

Tidentify-UTRA FDD: It is the time to identify the target UTRA FDD cell. It shall be less than 500 ms.

 $T_{SI\text{-}UTRA\ FDD}$: It is the time required for acquiring all the relevant system information of the target UTRA FDD cell. This time depends upon whether the UE is provided with the relevant system information of the target UTRA FDD cell or not by the E-UTRAN before the RRC connection is released.

 T_{RA} : It is the delay caused due to the random access procedure when sending random access to the target UTRA FDD cell.

The normative reference for this requirement is TS 36.133 [4] clause 6.3.2.1 and A.6.3.12.

6.3.12.4 Test description

6.3.12.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A Figure A.22.
- 2. The general test parameter settings are set up according to Table 6.3.12.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. Message contents are as defined in clause 6.3.12.4.3.
- 5. There is one E-UTRA TDD cell and one UTRA FDD cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 6.3.12.4.1-1: General test parameters for E-UTRAN TDD RRC connection release redirection to UTRAN FDD without SI provided

Parameter	Unit	Value	Comment
PDSCH parameters (E-UTRAN		DL Reference Measurement	As specified in section A.1.2.
TDD)		Channel R.0 TDD	
PCFICH/PDCCH/PHICH		DL Reference Measurement	As specified in section A.2.2.
parameters (E-UTRAN TDD)		Channel R.6 TDD	
Active cell		Cell 1	Cell 1 is on E-UTRAN RF channel
			number 1.
Neighbour cell		Cell 2	Cell 2 is on UTRAN RF channel number
			1.
E-UTRAN RF Channel Number		1	One E-UTRAN TDD carrier frequency is
			used.
E-UTRAN Channel Bandwidth	MHz	10	
(BW _{channel})			
Uplink-downlink configuration of		1	As specified in table 4.2.2 in TS 36.211
cell 1			
Special subframe configuration of		6	As specified in table 4.2.1 in TS 36.211
cell 1			
CP length		Normal	Applicable to cell 1
UTRAN RF Channel Number		1	One UTRAN TDD carrier frequency is
			used.
Filter coefficient		0	L3 filtering is not used.
DRX		OFF	
Monitored UTRAN FDD cell list		None	No explicit neighbour list is provided to
size			the UE
T1	S	≤5	
T2	S	2	

6.3.12.4.2 Test procedure

The test comprises of one active cell and one neighbour cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. Cell 2 is powered up at the beginning of the T2. The "RRCConnectionRelease" message not containing any system information of Cell 2 shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message, "RRCConnectionRelease", is received by the UE from Cell 1.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.12.5-1 and 6.3.12.5-2. Propagation conditions are set according to Annex B clauses B.1.1. T1 starts.
- 3. The SS shall transmit an *RRCConnectionRelease* not containing the relevant system information of Cell 2 during period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCConnectionRelease message is sent to the UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.12.5-1for Cell 1, and Table 6.3.12.5-2 for Cell 2.

- 6. If the UE transmits the PRACH to Cell 2 less than 1930 ms from the beginning of time period T2 then the number of successful tests are increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3 .Cell 1 is the active cell.
- 8. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code 50) mod 200 + 100) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.12.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.3.12.4.3-1: RRCConnectionRelease: Additional E-UTRAN TDD RRC connection release redirection to UTRAN FDD without SI provided test requirement (step3)

Derivation Path: TS 36.508 [7] clause 4.6.1			
Information Element	Value/remark	Comment	Condition
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
releaseCause	other		
redirectedCarrierInfo CHOICE {			
utra-FDD	Cell 2 Carrier Information		
}			
idleModeMobilityControlInfo	Not present		
nonCriticalExtension SEQUENCE {			
lateNonCriticalExtension	Not present		
}			
}		_	
}			
}			

6.3.12.5 Test requirement

Tables 6.3.12.4.1-1, 6.3.12.5-1 and 6.3.12.5-2 define the primary level settings including test tolerances for Redirection from E-UTRAN TDD to UTRAN FDD test.

Table 6.3.12.5-1: Cell Specific Test requirement Parameters for cell #1 E-UTRAN TDD RRC connection release redirection to UTRAN FDD without SI provided under AWGN propagation conditions

Parameter	Unit	Cell 1	
		T1	T2
E-UTRA RF Channel Number		1	
BW _{channel}	MHz	10	
OCNG Pattern defined in		OP.1 TI	
D.2.1 (OP.1 TDD)		OP.111	טכ
PBCH_RA	dB		
PBCH_RB	dB		
PSS_RA	dB		
SSS_RA	dB		
PCFICH_RB	dB		
PHICH_RA	dB		
PHICH_RB	dB	0	
PDCCH_RA	dB		
PDCCH_RB	dB		
PDSCH_RA	dB		
PDSCH_RB	dB		
OCNG_RA ^{Note 1}	dB		
OCNG_RB ^{Note 1}	dB		
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	4+TT	4+TT
$N_{oc}^{ m Note~3}$	dBm/15 kHz	-98	
\hat{E}_s/N_{oc}	dB	4	4
RSRP Note 4	dBm/15 kHz	-94+TT	-94+TT
SCH_RP	dBm/15 kHz	-94+TT	-94+TT
Propagation Condition		AWG!	V
spectral density is ac	hieved for all OFI	I is fully allocated and a constant to DM symbols. are assigned to the UE prior to the	·

Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 3: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be

Note 4: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.12.5-2: Cell Specific Test Parameters for cell #2 E-UTRAN TDD RRC connection release redirection to UTRAN FDD without SI provided under AWGN propagation conditions

Parameter	Unit	Cell 2		
		T1	T2	
UTRA RF Channel Number		1		
CPICH_Ec/lor	dB	-10		
PCCPCH_Ec/lor	dB	-12+TT	-	
SCH_Ec/lor	dB	-12		
PICH_Ec/lor	dB	-15		
DPCH_Ec/lor	dB	N/A		
OCNS		-0.941		
\hat{I}_{or}/I_{oc}	dB	-∞	0.02	
I_{oc}	dBm/3.84 MHz	-70		
CPICH_Ec/Io ^{Note 3}	dB	-∞	-13+TT	
Propagation Condition		AWGN		

Note 1: The DPCH level is controlled by the power control loop.

Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to $I_{\rm or}$.

Note 3: This gives an SCH Ec/lo of -15dB

The UE shall start to send random access to the target UTRAN FDD cell (Cell 2) less than 1930 ms from the beginning of time period T2.

The time delay can be expressed as: $T_{RRC_procedure_delay} + T_{identify_UTRAN\ FDD} + T_{SI_UTRAN\ FDD} + T_{RA}$, where:

 $T_{RRC_procedure_delay} = 110 \text{ ms}$, which is specified in TS36.133 [4] section 6.3.2.1.

 $T_{identify-UTRAN FDD} = 500 \text{ ms}$; which is defined in TS36.133 [4] section 6.3.2.1.

T_{SI-UTRAN FDD}: Maximum repetition period of relevant system info blocks that need to be received by the UE during RRC connection release redirection to UTRAN FDD cell. 1280 ms is assumed in this test case.

 $T_{RA} = 40$ ms, this is the additional delay caused by the random access procedure.

This gives a total delay of 1930 ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

7 Timing and Signalling Characteristics

The timing requirements are applicable for the uplink physical channels and signals specified in TS 36.211 [9] clause 5 (for uplink physical channels) as defined.

SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to Annex A1. The SS sends downlink MAC padding bits on the DL RMC.

Uplink is configured according to Annex A.3.

7.1 UE Transmit Timing

7.1.1 E-UTRAN FDD - UE Transmit Timing Accuracy

7.1.1.1 Test purpose

To verify the UE have the capability to follow the frame timing change of the connected System Simulator. The method used is that the UE initial transmit timing accuracy, the maximum amount of timing change in one adjustment, and the minimum and maximum adjustment rate are within the specified limits based on the requirements.

7.1.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward. Applicability requires support for FGI bit 5.

7.1.1.3 Minimum conformance requirements

The UE initial transmission timing error shall be less than or equal to $\pm T_e$ where the timing error limit value T_e is defined in TS 36.133 [4] clause 7.1.2 and shown in table 7.1.1.3-1. This requirement applies when it is the first transmission in a DRX cycle for PUCCH, PUSCH and SRS or it is the PRACH transmission. The uplink frame transmission takes place $(N_{TA} + N_{TA \, offset}) \times T_s$ before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell. The reference point for the UE initial transmit timing control requirement shall be the downlink timing minus $(N_{TA \, Ref} + N_{TA \, offset}) \times T_s$.

where:

 N_{TA} is $0 \le N_{TA} \le 20512$

 N_{TA_Ref} is 0 for PRACH; $(N_{TA_Ref} + N_{TA \text{ offset}})$ (in T_s units) for other channels is the difference between UE transmission timing and the downlink timing immediately after when the last timing advance in TS 36.133 [4]

clause 7.3 was applied. $N_{\text{TA_Ref}}(N_{\text{TA_Ref}} + N_{\text{TA offset}})$ (in T_s units) for other channels is not changed until next timing advance is received.

 $N_{TA~offset}$ is 0 for frame structure type 1 as defined in TS 36.211 [9] clause 8.1. T_S denotes the basic time unit. The size of various fields in the time domain is expressed as a number of time units $T_S = 1/(15000~x~2048)$ seconds.

Table 7.1.1.3-1: Te Timing Error Limit

Downlink Bandwidth (MHz)	T _e _	
1.4	24*T _S	
≥3 12*T _S		
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

When it is not the first transmission in a DRX cycle or there is no DRX cycle, and when it is the transmission for PUCCH, PUSCH and SRS transmission, the UE shall be capable of changing the transmission timing according to the received downlink frame except when the timing advance in TS 36.133 [4] clause 7.3 is applied. When the transmission timing error between the UE and the reference timing exceeds $\pm T_e$ the UE is required to adjust its timing to within $\pm T_e$. The reference timing shall be $(N_{TA,Ref} + N_{TA offset}) \times T_s$ before the downlink timing.

All adjustments made to the UE uplink timing shall follow these rules:

- 1) The maximum amount of the magnitude of the timing change in one adjustment shall be Tq.
- 2) The minimum aggregate adjustment rate shall be 7 * \times T_S per second.
- 3) The maximum aggregate adjustment rate shall be T_a per 200 ms.

Where the maximum autonomous time adjustment step T_q is defined in TS 36.133 [4] clause 7.1.2 and shown in table 7.1.1.3-2.

Table 7.1.1.3-2: T_q Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	T _{q_}	
1.4	17.5*T _S	
3	9.5*T _S	
5	5.5*T _S	
≥10 3.5*T _S		
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

The normative reference for this requirement is TS 36.133 [4] clause 7.1 and A.7.1.1.

NOTE 1: Both the allowed UE frequency error and the UE time adjustment quantisation can affect the result of the test, and it is not possible to test the UE Transmit Timing Accuracy in isolation from these core requirements. They are therefore taken into account when setting the Test Tolerances and the Test Requirements

7.1.1.4 Test description

7.1.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz and 1.4 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.
- 2. Propagation conditions are set according to Annex B clause B. 0.

3. There is one E-UTRA FDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

7.1.1.4.2 Test procedure

The test consists of a single cell. The transmit timing accuracy is verified related to the downlink frame timing of Cell 1. The downlink timing of Cell 1 is changed and the changes in UE transmit timing are observed. The transmit timing is verified by the UE transmitting SRS (Sounding Reference Symbols) used as a measurement reference facilitating the SS timing estimation.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to Test 1, Test 2, or Test 3 in Tables 7.1.1.5-1, 7.1.1.5-2 and 7.1.1.5-3 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. The SS shall check that the UE transmit timing offset is within the limits specified in Table 7.1.1.5-4 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 6. The SS adjusts the downlink timing for Cell 1 to a delay of $+64 \times T_S$ (approximately $+2 \mu s$) for ≥ 3 MHz downlink bandwidth (Test 1, Test 2) and a delay of $+128 \times T_S$ (approximately $+4 \mu s$) for 1.4MHz downlink bandwidth (Test 3) compared to that in step 5.
- 7. Step 7 applies for Test 1 and Test 3, but is omitted for Test 2. The test system samples the UE Transmit Timing once per SRS transmission (periodicity 2 subframes). To check Rule 1, the SS shall check that the maximum time adjustment step size Tq between one SRS transmission (subframe n) to next (subframe n+2) is within Rule 1 as specified in clause 7.1.1.5. To check that the minimum adjustment rate is within Rule 2 as specified in clause 7.1.1.5, the SS shall measure the change in SRS transmission timing over a 1.002s sliding window, with step size 2ms. To check that the maximum adjustment rate is within Rule 3 as specified in clause 7.1.1.5, the SS shall measure the change in SRS transmission timing over a 198ms sliding window, with step size 2ms. The three rules apply until the UE transmit timing offset is within the limits specified in Table 7.1.1.5-4 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 8. In case for Test 1 and Test 3, the SS shall check that the UE transmit timing offset stays within the limits specified in Table 7.1.1.5-4 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1. In case for Test 2, the SS shall check that the UE transmit timing offset stays within the limits specified in Table 7.1.1.5-4 with respect to the first timing adjustment after downlink frame of Cell 1 is changed.
- 9. The SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 10. After the RRC connection release, the SS switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 11. Repeat step 1-10 for each sub-test in Tables 7.1.1.5-1, 7.1.1.5-2 and 7.1.1.5-3 as appropriate.

7.1.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.1.1.4.3-1: Common Exception messages for UE transmit timing accuracy for E-UTRAN FDD test requirement

Default Message Contents		
Common contents of system information		
blocks exceptions		
Default RRC messages and information	Table H.3.4-2	
elements contents exceptions		

Table 7.1.1.4.3-2: RRCConnectionReconfiguration: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement

Derivation Path: TS 36.331 [5] clause 6.2.2			
Information Element	Value/remark	Comment	Condition
RRCConnectionReconfiguration ::= SEQUENCE {			
rrc-TransactionIdentifier	RRC-		
	TransactionIdentifier-DL		
criticalExtensions CHOICE {			
c1 CHOICE{			
rrcConnectionReconfiguration-r8 SEQUENCE {			
radioResourceConfigDedicated SEQUENCE			
{			
mac-MainConfig CHOICE {			
explicitValue	MAC-MainConfig-RBC		
}			
physicalConfigDedicated	PhysicalConfigDedicated		RBC
	- DEFAULT		
}			
nonCriticalExtension SEQUENCE {}	Not present		
}			
}			
}			
}			

Table 7.1.1.4.3-3: SoundingRS-RL-ConfigCommon-DEFAULT: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Tab	le 4.6.3-21 SoundingRS-L	JL-ConfigCommon-DEFAUL	T
Information Element	Value/remark	Comment	Condition
SoundingRS-UL-ConfigCommon-DEFAULT ::=			
SEQUENCE {			
setup SEQUENCE {			
srs-BandwidthConfig		Set according to specific test; bw5 for Test 1 and Test 2 and bw7 for Test 3	
srs-SubframeConfig		Set according to specific test; sc1 for Test 1 and Test 3 and sc3 for Test 2	FDD
ackNackSRS-SimultaneousTransmission	FALSE		
srsMaxUpPts }	Not present		FDD

Table 7.1.1.4.3-4: SoudingRS-UL-ConfigDedicated-DEFAULT: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-22 SoundingRS-UL-ConfigDedicated-DEFAULT			Т
Information Element	Value/remark	Comment	Condition
SoundingRS-UL-ConfigDedicated-DEFAULT ::=			
CHOICE {			
setup SEQUENCE {			
srs-Bandwidth	bw0	bw0 used with no	
		frequency hopping.	
		bw3 used with	
		frequency hopping	
srs-HoppingBandwidth	hbw0		
freqDomainPosition	0		
duration	TRUE	Indefinite duration	
srs-ConfigIndex		Set according to	
		specific test; 0 for	
		Test 1 and 77 for	
		Test 2 and 0 for	
		Test 3	
transmissionComb	0		
cyclicShift	cs0	No cyclic shift	
}			
}			

Table 7.1.1.4.3-5: MAC-MainConfig-RBC: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement for Test 2

Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			DRX_S
setup SEQUENCE {			
onDurationTimer	psf1		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset CHOICE {		sf80 typical value in simulations	
sf80	0		
}			
shortDRX	Not present		
}			
}			
}			

Table 7.1.1.4.3-6: CQI-ReportConfig-DEFAULT: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-2 CQI-ReportConfig-DEFAULT				
Information Element	Value/remark	Comment	Condition	
CQI-ReportConfig-DEFAULT ::= SEQUENCE {				
cqi-ReportModeAperiodic	rm30	This IE should be		
		omitted for test 3		
nomPDSCH-RS-EPRE-Offset	0			
cqi-ReportPeriodic CHOICE {				
release	NULL			
}				

Table 7.1.1.4.3-7: MAC-MainConfig-RBC: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.5-1 MAC-MainConfig-RBC				
Information Element	Value/remark	Comment	Condition	
MAC-MainConfig-RBC ::= SEQUENCE {				
timeAlignmentTimerDedicated	Infinity			
}				

7.1.1.5 Test requirement

Tables 7.1.1.5-1, 7.1.1.5-2 and 7.1.1.5-3 define the primary settings including test tolerances for UE transmit timing accuracy for E-UTRAN FDD test.

Tables 7.1.1.5-4, 7.1.1.5-5 and 7.1.1.5-6 define the rules for adjustments made to the UE uplink timing include Test Tolerances.

Table 7.1.1.5-1: Cell Specific Test requirement Parameters for UE transmit timing accuracy for E-**UTRAN FDD test case**

Danamatan	l limit		Value	
Parameter	Unit	Test 1	Test 2	Test 3
E-UTRA RF Channel Number		1	1	1
Channel Bandwidth (BW _{channel})	MHz	10	10	1.4
DRX cycle	ms	OFF	80 ^{Note5}	OFF
PDCCH/PCFICH/PHICH				
Reference measurement		R.6 FDD	R.6 FDD	R.8 FDD
channel ^{Note1}				
OCNG Pattern ^{Note2}		OP.2 FDD	OP.2 FDD	OP.4 FDD
PBCH_RA				
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA	dB	0	0	0
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
OCNG_RA ^{Note3}				
OCNG_RB ^{Note3}				
N_{oc}	dBm/15 kHz	-98	-98	-98
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	3.30	3.30	3.30
\hat{E}_s/N_{oc}	dB	3.30	3.30	3.30
Io ^{Note4}	dBm/9 MHz	-65.25	-65.25	N/A
IU	dBm/1.08 MHz	N/A	N/A	-74.46
Propagation condition	-	AWGN	AWGN	AWGN

For the reference measurement channels, see section A.2.1. Note 1:

Note 2: For the OCNG pattern, see section D.1.2.

Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

lo level has been derived from other parameters for information purpose. It is not a Note 4: settable parameter.

DRX related parameters are defined in Table 7.1.1.5-3. Note 5:

Table 7.1.1.5-2: Sounding Reference Symbol Configuration to be used in UE transmit timing accuracy for E-UTRAN FDD test case

Field	Test 1	Test 2	Test 3	Comment
rieiu		Value		
srs-BandwidthConfig	bw5	bw5	bw7	
srs-SubframeConfig	sc1	sc3	sc1	
ackNackSRS- SimultaneousTransmission	FALSE	FALSE	FALSE	
srsMaxUpPts	N/A	N/A	N/A	Not applicable for FDD
srs-Bandwidth	0	0	0	No hopping
srs-HoppingBandwidth	hbw0	hbw0	hbw0	
freqDomainPosition	0	0	0	
duration	TRUE	TRUE	TRUE	Indefinite duration
srs-ConfigIndex	0	77	0	SRS periodicity of 2ms and 80 ms for Test 1 and 2, respectively.
transmissionComb	0	0	0	
cyclicShift	cs0	cs0	cs0	No cyclic shift
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].				

Table 7.1.1.5-3: DRX Configuration to be used in UE transmit timing accuracy for E-UTRAN FDD test case

Field	Test2	Comment		
rieid	Value			
onDurationTimer	psf1			
drx-InactivityTimer	psf1			
drx-RetransmissionTimer	psf1			
longDRX-CycleStartOffset	sf80			
shortDRX	disable			
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].				

The UE transmit timing offset shall be within the requirements in Table 7.1.1.5-4.

The reference point for the UE initial transmit timing control test requirement shall be the downlink timing minus $(N_{\text{TA},\text{Ref}} + N_{\text{TA},\text{offset}}) \times T_{\text{s}}$.

Table 7.1.1.5-4: Test requirement for T_e Timing Error Limit

Downlink Bandwidth (MHz)	T _{e_}
1.4	27*T _S
≥3	15*T _S
Note: T _S is the basic timing unit defined in TS 36.211 [9]	

The UE shall be capable of changing the transmission timing according to the received downlink frame. When the transmission timing error between the UE and the reference cell exceeds $\pm T_e$ the UE is required to adjust its timing to within $\pm T_e$.

All adjustments made to the UE uplink timing shall follow these rules:

- 1) For tests 1 and 3, the maximum adjustment step size T_q shall be within the requirements in Table 7.1.1.5-5
- 2) For test 1, the minimum aggregate adjustment rate shall be $3.4 \times T_S$ per second
- 3) For tests 1 and 3, the maximum aggregate adjustment rate shall be T_q per 200 ms, with T_q as defined in Table 7.1.1.5-5.

Table 7.1.1.5-5: Test requirement for Tq Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	T _q _	
1.4	18*T _S	
≥10	4*T _S	
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

Table 7.1.1.5-6: Test requirement for maximum aggregate adjustment rate per 200 ms

Downlink Bandwidth (MHz)	Maximum adjustment per 200 ms	
1.4	18.6*T _S	
≥10 4.6*T _S		
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

An illustration of the measurement principle is shown in Figure 7.1.1.5-1.

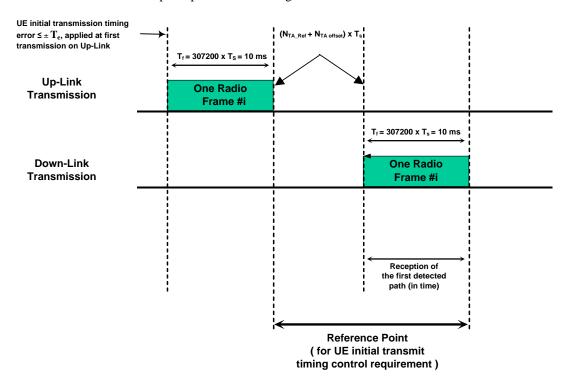


Figure 7.1.1.5-1: Illustration of measurement principle

7.1.1_1 E-UTRAN FDD - UE Transmit Timing Accuracy (Non DRx UE)

7.1.1_1.1 Test purpose

Same test purpose as in clause 7.1.1.1

7.1.1_1.2 Test applicability

This test applies to all types of E-UTRA FDD release 8 UE's not supporting FGI bit 5.

7.1.1_1.3 Minimum conformance requirements

Same minimum conformance requirement as 7.1.1.3

7.1.1_1.4 Test description

7.1.1 1.4.1 Initial conditions

Same initial condition as in clause 7.1.1.4.1

7.1.1 1.4.2 Test procedure

The test consists of a single cell. The transmit timing accuracy is verified related to the downlink frame timing of Cell 1. The downlink timing of Cell 1 is changed and the changes in UE transmit timing are observed. The transmit timing is verified by the UE transmitting SRS (Sounding Reference Symbols) used as a measurement reference facilitating the SS timing estimation.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to Test 1 or Test 3 in Tables 7.1.1_1.5-1 and 7.1.1_1.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. The SS shall check that the UE transmit timing offset is within the limits specified in Table 7.1.1_1.5-3 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 6. The SS adjusts the downlink timing for Cell 1 to a delay of $+64 \times T_S$ (approximately $+2 \mu s$) for ≥ 3 MHz downlink bandwidth (Test 1) and a delay of $+128 \times T_S$ (approximately $+4 \mu s$) for 1.4MHz downlink bandwidth (Test 3) compared to that in step 5.
- 7. The test system samples the UE Transmit Timing once per SRS transmission (periodicity 2 subframes). To check Rule 1, the SS shall check that the maximum time adjustment step size T_q between one SRS transmission (subframe n) to next (subframe n+2) is within Rule 1 as specified in clause 7.1.1_1.5. To check that the minimum adjustment rate is within Rule 2 as specified in clause 7.1.1_1.5, the SS shall measure the change in SRS transmission timing over a 1.002s sliding window, with step size 2ms. To check that the maximum adjustment rate is within Rule 3 as specified in clause 7.1.1_1.5, the SS shall measure the change in SRS transmission timing over a 198ms sliding window, with step size 2ms. The three rules apply until the UE transmit timing offset is within the limits specified in Table 7.1.1_1.5-3 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 8. The SS shall check that the UE transmit timing offset stays within the limits specified in Table 7.1.1_1.5-3 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 9. The SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 10. After the RRC connection release, the SS switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 11. Repeat step 1-10 for each sub-test in Tables 7.1.1_1.5-1 and 7.1.1_1.5-2 as appropriate.

7.1.1_1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with exceptions listed in Tables 7.1.1.4.3-1, 7.1.1.4.3-2, 7.1.1.4.3-6, and 7.1.1.4.3-7 of section 7.1.1.4.3 and the following:

Table 7.1.1_1.4.3-1: SoundingRS-RL-ConfigCommon-DEFAULT: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-21 SoundingRS-UL-ConfigCommon-DEFAULT					
Information Element	Value/remark Comment Condition				
SoundingRS-UL-ConfigCommon-DEFAULT ::=					
SEQUENCE {					
setup SEQUENCE {					
srs-BandwidthConfig srs-SubframeConfig		Set according to specific test; bw5 for Test 1 and bw7 for Test 3 Set according to	FDD		
sis-oubitameComig		specific test; sc1 for Test 1 and Test 3	FDD		
ackNackSRS-SimultaneousTransmission	FALSE				
srsMaxUpPts	Not present		FDD		
}					

Table 7.1.1_1.4.3-2: SoudingRS-UL-ConfigDedicated-DEFAULT: Additional UE transmit timing accuracy for E-UTRAN FDD test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-22 SoundingRS-UL-ConfigDedicated-DEFAULT				
Information Element	Value/remark Comment Condition			
SoundingRS-UL-ConfigDedicated-DEFAULT ::=				
CHOICE {				
setup SEQUENCE {				
srs-Bandwidth	bw0	bw0 used with no frequency hopping. bw3 used with frequency hopping		
srs-HoppingBandwidth	hbw0			
freqDomainPosition	0			
Duration	TRUE	Indefinite duration		
srs-ConfigIndex		Set according to specific test; 0 for Test 1 and Test 3		
transmissionComb	0			
cyclicShift }	cs0	No cyclic shift		
}				

7.1.1_1.5 Test requirement

Tables 7.1.1_1.5-1 and 7.1.1_1.5-2 define the primary settings including test tolerances for UE transmit timing accuracy for E-UTRAN FDD test.

Tables 7.1.1_1.5-3, 7.1.1_1.5-4 and 7.1.1_1.5-5 define the rules for adjustments made to the UE uplink timing including Test Tolerances.

Table 7.1.1_1.5-1: Cell Specific Test requirement Parameters for UE transmit timing accuracy for E-**UTRAN FDD test case**

Davamatar	l lm is	Value		
Parameter	Unit	Test 1	Test 2	Test 3
E-UTRA RF Channel Number		1	N/A	1
Channel Bandwidth (BW _{channel})	MHz	10	N/A	1.4
DRX cycle	ms	OFF	N/A	OFF
PDCCH/PCFICH/PHICH				
Reference measurement channel ^{Note1}		R.6 FDD	N/A	R.8 FDD
OCNG Pattern ^{Note2}		OP.2 FDD	N/A	OP.4 FDD
PBCH_RA				
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA	dB	0	N/A	0
PHICH_RB	1			
PDCCH_RA				
PDCCH_RB	1			
OCNG_RA ^{Note3}				
OCNG_RB ^{Note3}	1			
N_{oc}	dBm/15 kHz	-98	N/A	-98
\hat{E}_{s}/I_{ot}	dB	3.30	N/A	3.30
\hat{E}_s/N_{oc}	dB	3.30	N/A	3.30
lo ^{Note4}	dBm/9 MHz	-65.25	N/A	N/A
IU	dBm/1.08 MHz	N/A	N/A	-74.46
Propagation condition	-	AWGN	N/A	AWGN

Note 1: For the reference measurement channels, see section A.2.1.

Note 2:

For the OCNG pattern, see section D.1.2. OCNG shall be used such that both cells are fully allocated and a constant total Note 3: transmitted power spectral density is achieved for all OFDM symbols.

Note 4: lo level has been derived from other parameters for information purpose. It is not a

settable parameter.

Table 7.1.1_1.5-2: Sounding Reference Symbol Configuration to be used in UE transmit timing accuracy for E-UTRAN FDD test case

Field	Test 1	Test 2	Test 3	Comment
Fleiu		Value		
srs-BandwidthConfig	bw5	N/A	bw7	
srs-SubframeConfig	sc1	N/A	sc1	
ackNackSRS- SimultaneousTransmission	FALSE	N/A	FALSE	
srsMaxUpPts	N/A	N/A	N/A	Not applicable for FDD
srs-Bandwidth	0	N/A	0	No hopping
srs-HoppingBandwidth	hbw0	N/A	hbw0	
freqDomainPosition	0	N/A	0	
Duration	TRUE	N/A	TRUE	Indefinite duration
srs-ConfigIndex	0	N/A	0	SRS periodicity of 2ms for Test 1 and Test 3, respectively.
transmissionComb	0	N/A	0	
cyclicShift	cs0	N/A	cs0	No cyclic shift
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].				

The UE transmit timing offset shall be within the requirements in Table 7.1.1_1.5-3.

The reference point for the UE initial transmit timing control test requirement shall be the downlink timing minus $(N_{\text{TA,Ref}} + N_{\text{TA offset}}) \times T_{\text{s}}$.

Table 7.1.1_1.5-3: Test requirement for T_e Timing Error Limit

Downlink Bandwidth (MHz)	T _{e_}	
1.4	27*T _S	
≥3 15*T _S		
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

The UE shall be capable of changing the transmission timing according to the received downlink frame. When the transmission timing error between the UE and the reference cell exceeds $\pm T_e$ the UE is required to adjust its timing to within $\pm T_e$.

All adjustments made to the UE uplink timing shall follow these rules:

- 1) The maximum adjustment step size T_q shall be within the requirements in Table 7.1.1_1.5-4.
- 2) For test 1, the minimum aggregate adjustment rate shall be $3.4 \times T_S$ per second.
- 3) The maximum aggregate adjustment rate shall be T_q per 200 ms, with T_q as defined in Table 7.1.1_1.5-4.

Table 7.1.1_1.5-4: Test requirement for T_q Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	T _{q_}
1.4	18*T _S
≥10 4*T _S	
Note: T _S is the basic timing unit defined in TS 36.211 [9]	

Table 7.1.1_1.5-5: Test requirement for maximum aggregate adjustment rate per 200 ms

Downlink Bandwidth (MHz)	Maximum adjustment per 200 ms	
1.4	18.6*T _S	
≥10	4.6*T _S	
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

An illustration of the measurement principle is shown in Figure 7.1.1.5-1 in section 7.1.1.5.

7.1.2 E-UTRAN TDD - UE Transmit Timing Accuracy

7.1.2.1 Test purpose

To verify the UE have the capability to follow the frame timing change of the connected System Simulator. The method used is that the UE initial transmit timing accuracy, the maximum amount of timing change in one adjustment, and the minimum and maximum adjustment rate are within the specified limits based on the requirements.

7.1.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward. Applicability requires support for FGI bit 5.

7.1.2.3 Minimum conformance requirements

The UE initial transmission timing error shall be less than or equal to $\pm T_e$ where the timing error limit value T_e as defined in table 7.1.2-1 of TS 36.133 [4] clause 7.1.2. This requirement applies when it is the first transmission in a DRX cycle for PUCCH, PUSCH and SRS or it is the PRACH transmission. The uplink frame transmission takes place $(N_{\rm TA} + N_{\rm TA\,offset}) \times T_s$ before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell. The reference point for the UE initial transmit timing control requirement shall be the downlink timing minus $(N_{\rm TA\,Ref} + N_{\rm TA\,offset}) \times T_s$.

where:

 N_{TA} is $0 \le N_{TA} \le 20512$

 N_{TA_Ref} is 0 for PRACH; $N_{(N_{TA_Ref} + N_{TA \text{ offset}})}$ (in T_s units) for other channels is the difference between UE transmission timing and the downlink timing immediately after when the last timing advance in TS 36.133 [4] clause 7.3 was applied. N_{TA_Ref} in T_s units) for other channels is not changed until next timing advance is received.

 $N_{TA~offset}$ is 624 for frame structure type 2 as defined in TS 36.211 [9] clause 8.1. T_S denotes the basic time unit. The size of various fields in the time domain is expressed as a number of time units $T_S = 1/(15000~x~2048)$ seconds.

When it is not the first transmission in a DRX cycle or there is no DRX cycle, and when it is the transmission for PUCCH, PUSCH and SRS transmission, the UE shall be capable of changing the transmission timing according to the received downlink frame except when the timing advance in TS 36.133 [4] clause 7.3 is applied. When the transmission timing error between the UE and the reference timing exceeds $\pm T_e$ the UE is required to adjust its timing to within $\pm T_e$. The reference timing shall be $(N_{TA Ref} + N_{TA offset}) \times T_s$ before the downlink timing.

All adjustments made to the UE uplink timing $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_{\text{s}}$ shall follow these rules:

- 1) The maximum amount of the magnitude of the timing change in one adjustment shall be T_q
- 2) The minimum aggregate adjustment rate shall be $7 \times T_S$ per second.
- 3) The maximum aggregate adjustment rate shall be T_a per 200 ms.

Where the maximum timing error value T_e is specified in table 7.1.2.3-1 and maximum autonomous time adjustment step T_q is specified in table 7.1.2.3-2.

The normative reference for this requirement is TS 36.133 [4] clause 7.1 and A.7.1.2.

Table 7.1.2.3-1: Te Timing Error Limit

Downlink Bandwidth (MHz)	T _e _	
1.4	24*T _S	
≥3	12*T _S	
Note: T _S is the basic timing unit defined in TS 36.211		

Table 7.1.2.3-2: T_q Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	T _{q_}	
1.4	17.5*T _S	
3	9.5*T _S	
5	5.5*T _S	
≥10	3.5*T _S	
Note: T _S is the basic timing unit defined in TS 36.211		

NOTE 1: Both the allowed UE frequency error and the UE time adjustment quantisation can affect the result of the test, and it is not possible to test the UE Transmit Timing Accuracy in isolation from these core requirements. They are therefore taken into account when setting the Test Tolerances and the Test Requirements

7.1.2.4 Test description

7.1.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and

Channel Bandwidth to be tested: 10 MHz and 1.4 MHz as defined in TS 36.508 [7] clause 4.3.1.

- Connect the SS (node B emulator) and AWGN noises source to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.
- 2. Propagation conditions are set according to Annex B clause B.0.
- 3. There is one E-UTRA TDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

7.1.2.4.2 Test procedure

The test consists of a single cell. The transmit timing accuracy is verified related to the downlink frame timing of Cell 1. The downlink timing of Cell 1 is changed and the changes in UE transmit timing are observed. The transmit timing is verified by the UE transmitting SRS (Sounding Reference Symbols) used as a measurement reference facilitating the SS timing estimation.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to Test 1, Test 2, or Test 3 in Tables 7.1.2.5-1 and 7.1.2.5-2 and 7.1.2.5-3 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. The SS shall check that the UE transmit timing offset is $624 \times T_S$ to within the T_e limits specified in Table 7.1.2.5-4 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 6. The SS adjusts the downlink timing for Cell 1 to a delay of $+64 \times T_S$ (approximately $+2 \mu s$) for ≥ 3 MHz downlink bandwidth (Test 1, Test 2) and a delay of $+128 \times T_S$ (approximately $+4 \mu s$) for 1.4MHz downlink (Test 3) bandwidth compared to that in step 5.

- 7. Step 7 applies for Test 1 and Test 3, but is omitted for Test 2. The test system samples the UE Transmit Timing once per SRS transmission (periodicity 10 subframes). To check Rule 1, the SS shall check that the maximum time adjustment step size T_q between one SRS transmission (subframe n) to next (subframe n+10) is within Rule 1 as specified in clause 7.1.2.5. To check that the minimum adjustment rate is within Rule 2 as specified in clause 7.1.2.5, the SS shall measure the change in SRS transmission timing over a 1.01s sliding window, with step size 10ms. To check that the maximum adjustment rate is within Rule 3 as specified in clause 7.1.2.5, the SS shall measure the change in SRS transmission timing over a 190ms sliding window, with step size 10ms. The three rules apply until the UE transmit timing offset is $(624 \times T_S)$ to within the limits specified in Table 7.1.2.5-4 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 8. In case for Test 1 and Test 3, the SS shall check that the UE transmit timing offset stays at $624 \times T_S$ to within the T_e limits specified in Table 7.1.2.5-4 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1. In case for Test 2, the SS shall check that the UE transmit timing offset stays within the limits specified in Table 7.1.2.5-4 with respect to the first timing adjustment after downlink frame of Cell 1 is changed.
- 9. The SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 10. After the RRC connection release, the SS switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 11. Repeat step 1-10 for each sub-test in Tables 7.1.2.5-1, 7.1.2.5-2 and 7.1.2.5-3 as appropriate.

7.1.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.1.2.4.3-1: Common Exception messages for UE transmit timing accuracy for E-UTRAN TDD test requirement

Default Message Contents	
Common contents of system information	
blocks exceptions	
Default RRC messages and information	Table H.3.4-2
elements contents exceptions	

Table 7.1.2.4.3-2: RRCConnectionReconfiguration: Additional UE transmit timing accuracy for E-UTRAN TDD test requirement

Information Element	Value/remark	Comment	Condition
RRCConnectionReconfiguration ::= SEQUENCE {			
rrc-TransactionIdentifier	RRC-		
	TransactionIdentifier-DL		
criticalExtensions CHOICE {			
c1 CHOICE{			
rrcConnectionReconfiguration-r8 SEQUENCE {			
radioResourceConfigDedicated SEQUENCE			
{			
mac-MainConfig CHOICE {			
explicitValue	MAC-MainConfig-RBC		
}			
physicalConfigDedicated	PhysicalConfigDedicated - DEFAULT		RBC
}			
nonCriticalExtension SEQUENCE {}	Not present		
}			
}		•	
}		•	
}			

Table 7.1.2.4.3-3: SoundingRS-UL-ConfigCommon-DEFAULT: Additional UE transmit timing for E-UTRAN TDD test requirement

Derivation Path: TS 36.508 [5] clause 4.6.3			
Information Element	Value/remark	Comment	Condition
SoundingRsUI-ConfigCommon-DEFAULT ::= SEQUENCE {			
setup SEQUENCE {			
srs-BandwidthConfig		Set according to specific test; bw5 for Test 1 and Test 2, bw7 for Test 3	
srs-SubframeConfig	sc3		TDD
ackNackSRS-SimultaneousTransmission	FALSE		
srsMaxUpPts	Not present		

Table 7.1.2.4.3-4: SoundingRS-UL-ConfigDedicated-DEFAULT: Additional UE transmit timing for E-UTRAN TDD test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3			
Information Element	Value/remark	Comment	Condition
SoundingRSUL-ConfigDedicated-DEFAULT ::=			
CHOICE {			
enable SEQUENCE {			
srsBandwidth	bw0	bw0 used with no frequency hopping. bw3 used with frequency hopping	
srsHoppingBandwidth	hbw0		
freqDomainPosition	0		
duration	TRUE	indefinite duration	
srs-ConfigIndex		Set according to specific test; 15 for Test 1, Test3 and 85 for Test 2	
transmissionComb	0		
cyclicShift }	cs0	No cyclic shift	
}			

Table 7.1.2.4.4-5: MAC-MainConfig-RBC: Additional UE transmit timing for E-UTRAN TDD test requirement for Test 2

Derivation Path: TS 36.508 [7] clause 4.8.2			
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			pc_FeatrGrp _5 AND DRX_S
setup SEQUENCE {			
onDurationTimer	psf1		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset CHOICE {		sf80 typical value in simulations	
sf80	1		
}			
shortDRX	Not present		
}			
}			
}			

Table 7.1.2.4.3-6: CQI-ReportConfig-DEFAULT: Additional UE transmit timing accuracy for E-UTRAN TDD test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-2 CQI-ReportConfig-DEFAULT			
Information Element	Value/remark	Comment	Condition
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportModeAperiodic	rm30	This IE should be	
		omitted for test 3	
nomPDSCH-RS-EPRE-Offset	0		
cqi-ReportPeriodic CHOICE {			
release	NULL		
}			

Table 7.1.2.4.3-7: MAC-MainConfig-RBC: Additional UE transmit timing accuracy for E-UTRAN TDD test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.5-1 MAC-MainConfig-RBC			
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
timeAlignmentTimerDedicated	Infinity		
}			

7.1.2.5 Test requirement

Tables 7.1.2.5-1, 7.1.2.5-2 and 7.1.2.5-3 define the primary settings including test tolerances for UE transmit timing for E-UTRAN TDD test.

Tables 7.1.2.5-4, 7.1.2.5-5 and 7.1.2.5-6 define the rules for adjustments made to the UE uplink timing include Test Tolerances.

Table 7.1.2.5-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Danamatan	l lait	Value		
Parameter	Unit	Test 1	Test 2	Test 3
E-UTRA RF Channel Number		1	1	1
Channel Bandwidth (BW _{channel})	MHz	10	10	1.4
Special subframe		6	6	6
configuration Note1				
Uplink-downlink configuration Note2		1	1	1
DRX cycle	ms	OFF	80 ^{Note7}	OFF
PDCCH/PCFICH/PHICH				
Reference measurement		R.6 TDD	R.6 TDD	R.8 TDD
channel ^{Note3}				
OCNG Pattern ^{Note4}		OP.2 TDD	OP.2 TDD	OP.4 TDD
PBCH_RA				
PBCH_RB				
PSS_RA				
SSS_RA	1			
PCFICH_RB	1			
PHICH_RA	dB	0	0	0
PHICH_RB	1			
PDCCH_RA	1			
PDCCH_RB	-			
OCNG_RA ^{Note3}	1			
OCNG_RB ^{Note3}				
N_{oc}	dBm/15 kHz	-98	-98	-98
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	3.30	3.30	3.30
\hat{E}_s/N_{oc}	dB	3.30	3.30	3.30
Io ^{Note6}	dBm/9 MHz	-65.25	-65.25	N/A
IO	dBm/1.08 MHz	N/A	N/A	-74.46
Propagation condition	-	AWGN	AWGN	AWGN

Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211 [9]

Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211 [9]

Note 3: For the reference measurement channels, see section A.2.2.

Note 4 For the OCNG pattern, see section D.2.2(for 10MHz) and D.2.4(for 1.4MHz).

Note 5: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 6: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Note 7: DRX related parameters are defined in Table 7.1.2.5-3.

Table 7.1.2.5-2: Sounding Reference Signal Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Field	Test 1	Test 2 Value	Test 3	Comment	
srsBandwidthConfiguration	bw5	bw5	bw7		
srsSubframeConfiguration	sc3	sc3	sc3	Once every 5 subframes	
ackNackSrsSimultaneousTra nsmission	FALSE	FALSE	FALSE		
srsMaxUpPTS	FALSE	FALSE	FALSE		
srsBandwidth	0	0	0	No hopping	
srsHoppingBandwidth	hbw0	hbw0	hbw0		
frequencyDomainPosition	0	0	0		
duration	TRUE	TRUE	TRUE	Indefinite duration	
Srs-ConfigurationIndex	15	85	15	SRS periodicity of 10 and 80 ms for Test 1 and 2, respectively.	
transmissionComb	0	0	0		
cyclicShift	cs0	cs0	cs0	No cyclic shift	
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].					

Table 7.1.2.5-3: DRX Configuration to be used in UE Transmit Timing Accuracy Test 2 for E-UTRAN TDD

Field	Test2	Comment	
Field	Value		
onDurationTimer	psf1		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset	sf80		
shortDRX	disable		
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].			

The UE transmit timing offset shall be within the requirements in Table 7.1.2.5-4.

The reference point for the UE initial transmit timing control test requirement shall be the downlink timing minus $(N_{\text{TA_Ref}} + N_{\text{TA offset}}) \times T_{\text{s}}$ seconds.

Table 7.1.2.5-4: Test requirement for T_e Timing Error Limit

Downlink Bandwidth (MHz)	T _e _
1.4	27*T _S
≥3	15*T _S
Note: T _S is the basic timing unit de	fined in TS 36.211 [9]

The UE shall be capable of changing the transmission timing according to the received downlink frame. When the transmission timing error between the UE and the reference cell exceeds $\pm T_e$ seconds the UE is required to adjust its timing to within $\pm T_e$ seconds.

All adjustments made to the UE uplink timing shall follow these rules:

- 1) For tests 1 and 3, the maximum adjustment step size T_q shall be within the requirements in Table 7.1.2.5-5.
- 2) For test 1, the minimum aggregate adjustment rate shall be $3.4 \times T_S$ per second.
- 3) For tests 1 and 3, the maximum aggregate adjustment rate shall be T_q per 200 ms, with T_q as defined in Table 7.1.2.5-5.

Table 7.1.2.5-5: Test requirement for Tq Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	T _q _	
1.4	18*T _S	
≥10	4*T _S	
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

Table 7.1.2.5-6: Test requirement for maximum aggregate adjustment rate per 200 ms

Downlink Bandwidth (MHz)	Maximum adjustment per 200 ms
1.4	18.6*T _S
≥10	4.6*T _S
Note: T _S is the basic timing unit de	fined in TS 36.211 [9]

An illustration of the measurement principle is shown in Figure 7.1.2.5-4.

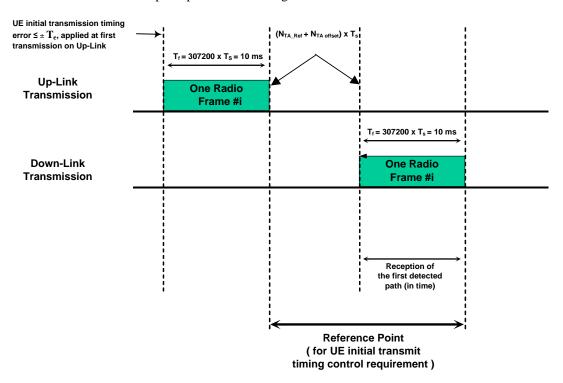


Figure 7.1.2.5-4: Illustration of measurement principle

7.1.2_1 E-UTRAN TDD - UE Transmit Timing Accuracy (Non DRx UE)

7.1.2_1.1 Test purpose

Same test purpose as 7.1.2.1

7.1.2_1.2 Test applicability

This test applies to all types of E-UTRA TDD release 8 UE's not supporting FGI bit 5.

7.1.2_1.3 Minimum conformance requirements

Same minimum conformance requirement as 7.1.2.3

7.1.2_1.4 Test description

7.1.2 1.4.1 Initial conditions

Same initial condition as 7.1.2.4.1

7.1.2 1.4.2 Test procedure

The test consists of a single cell. The transmit timing accuracy is verified related to the downlink frame timing of Cell 1. The downlink timing of Cell 1 is changed and the changes in UE transmit timing are observed. The transmit timing is verified by the UE transmitting SRS (Sounding Reference Symbols) used as a measurement reference facilitating the SS timing estimation.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to Test 1 or Test 3 in Tables 7.1.2_1.5-1 and 7.1.2_1.5-2 as appropriate. Propagation conditions are set according to Annex B clause B.1.1.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. The SS shall check that the UE transmit timing offset is $624 \times T_S$ to within the T_e limits specified in Table 7.1.2_1.5-3 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 6. The SS adjusts the downlink timing for Cell 1 to a delay of $+64 \times T_S$ (approximately $+2 \mu s$) for ≥ 3 MHz downlink bandwidth (Test 1) and a delay of $+128 \times T_S$ (approximately $+4 \mu s$) for 1.4MHz downlink (Test 3) bandwidth compared to that in step 5.
- 7. The test system samples the UE Transmit Timing once per SRS transmission (periodicity 10 subframes). To check Rule 1, the SS shall check that the maximum time adjustment step size T_q between one SRS transmission (subframe n) to next (subframe n+10) is within Rule 1 as specified in clause 7.1.2_1.5. To check that the minimum adjustment rate is within Rule 2 as specified in clause 7.1.2_1.5, the SS shall measure the change in SRS transmission timing over a 1.01s sliding window, with step size 10ms. To check that the maximum adjustment rate is within Rule 3 as specified in clause 7.1.2_1.5, the SS shall measure the change in SRS transmission timing over a 190ms sliding window, with step size 10ms. The three rules apply until the UE transmit timing offset is $(624 \times T_S)$ to within the limits specified in Table 7.1.2_1.5-3 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 8. The SS shall check that the UE transmit timing offset stays at $624 \times T_S$ to within the T_e limits specified in Table 7.1.2_1.5-3 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 9. The SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 10. After the RRC connection release, the SS switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 11. Repeat step 1-10 for each sub-test in Tables 7.1.2 1.5-1 and 7.1.2 1.5-2 as appropriate.

7.1.2_1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with exceptions listed in Tables 7.1.2.4.3-1, 7.1.2.4.3-2, 7.1.2.4.3-6, and 7.1.2.4.3-7 of section 7.1.2.4.3 and the following

Table 7.1.2_1.4.3-1: SoundingRS-UL-ConfigCommon-DEFAULT: Additional UE transmit timing for E-UTRAN TDD test requirement

Information Element	Value/remark	Comment	Condition
SoundingRsUI-ConfigCommon-DEFAULT ::=			
SEQUENCE {			
setup SEQUENCE {			
srs-BandwidthConfig		Set according to specific test; bw5 for Test 1, bw7 for Test 3	
srs-SubframeConfig	sc3		TDD
ackNackSRS-SimultaneousTransmission	FALSE		
srsMaxUpPts	Not present		
}			

Table 7.1.2_1.4.3-2: SoundingRS-UL-ConfigDedicated-DEFAULT: Additional UE transmit timing for E-UTRAN TDD test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3			
Information Element	Value/remark	Comment	Condition
SoundingRSUL-ConfigDedicated-DEFAULT ::=			
CHOICE {			
enable SEQUENCE {			
srsBandwidth	bw0	bw0 used with no frequency hopping. bw3 used with frequency hopping	
srsHoppingBandwidth	hbw0		
freqDomainPosition	0		
duration	TRUE	indefinite duration	
srs-ConfigIndex		Set according to specific test; 15 for Test 1 and Test 3	
transmissionComb	0		
cyclicShift }	cs0	No cyclic shift	
}			

7.1.2_1.5 Test requirement

Tables 7.1.2_1.5-1 and 7.1.2_1.5-2 define the primary settings including test tolerances for UE transmit timing for E-UTRAN TDD test.

Tables 7.1.2_1.5-3, 7.1.2_1.5-4 and 7.1.2_1.5-5 define the rules for adjustments made to the UE uplink timing including Test Tolerances.

Table 7.1.2_1.5-1: Test Parameters for UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Danamatan	l lait	Value		
Parameter	Unit	Test 1	Test 2	Test 3
E-UTRA RF Channel Number		1	N/A	1
Channel Bandwidth (BW _{channel})	MHz	10	N/A	1.4
Special subframe		6	N/A	6
configuration Note1				
Uplink-downlink configuration Note2		1	N/A	1
DRX cycle	ms	OFF	N/A	OFF
PDCCH/PCFICH/PHICH				
Reference measurement		R.6 TDD	N/A	R.8 TDD
channel ^{Note3}				
OCNG Pattern ^{Note4}		OP.2 TDD	N/A	OP.4 TDD
PBCH_RA				
PBCH_RB				
PSS_RA				
SSS_RA				
PCFICH_RB				
PHICH_RA	dB	0	N/A	0
PHICH_RB				
PDCCH_RA				
PDCCH_RB				
OCNG_RA ^{Note3}				
OCNG_RB ^{Note3}				
N_{oc}	dBm/15 kHz	-98	N/A	-98
\hat{E}_{s}/I_{ot}	dB	3.30	N/A	3.30
\hat{E}_s/N_{oc}	dB	3.30	N/A	3.30
Io ^{Note6}	dBm/9 MHz	-65.25	N/A	N/A
IO	dBm/1.08 MHz	N/A	N/A	-74.46
Propagation condition	-	AWGN	N/A	AWGN

Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211 [9]

Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211 [9]

Note 3: For the reference measurement channels, see section A.2.2.

Note 4 For the OCNG pattern, see section D.2.2(for 10MHz) and D.2.4(for 1.4MHz).

Note 5: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 6: lo level has been derived from other parameters for information purpose. It is not a settable parameter.

Table 7.1.2_1.5-2: Sounding Reference Signal Configuration to be used in UE Transmit Timing Accuracy Tests for E-UTRAN TDD

Field	Test 1	Test 2	Test3	Comment	
11010	Value			Commone	
srsBandwidthConfiguration	bw5	N/A	bw7		
srsSubframeConfiguration	sc3	N/A	sc3	Once every 5 subframes	
ackNackSrsSimultaneousTra nsmission	FALSE	N/A	FALSE		
srsMaxUpPTS	FALSE	N/A	FALSE		
srsBandwidth	0	N/A	0	No hopping	
srsHoppingBandwidth	hbw0	N/A	hbw0		
frequencyDomainPosition	0	N/A	0		
duration	TRUE	N/A	TRUE	Indefinite duration	
Srs-ConfigurationIndex	15	N/A	15	SRS periodicity of 10 ms for Test 1 and Test 3, respectively.	
transmissionComb	0	N/A	0		
cyclicShift	cs0	N/A	cs0	No cyclic shift	
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [5].					

The UE transmit timing offset shall be within the requirements in Table 7.1.2_1.5-3.

The reference point for the UE initial transmit timing control test requirement shall be the downlink timing minus $(N_{\text{TA_Ref}} + N_{\text{TA offset}}) \times T_{\text{s}}$ seconds.

Table 7.1.2_1.5-3: Test requirement for T_e Timing Error Limit

Downlink Bandwidth (MHz)	T _{e_}		
1.4	27*T _S		
≥3	15*T _S		
Note: T _S is the basic timing unit defined in TS 36.211 [9]			

The UE shall be capable of changing the transmission timing according to the received downlink frame. When the transmission timing error between the UE and the reference cell exceeds $\pm T_e$ seconds the UE is required to adjust its timing to within $\pm T_e$ seconds.

All adjustments made to the UE uplink timing shall follow these rules:

- 1) The maximum adjustment step size T_q shall be within the requirements in Table 7.1.2_1.5-4.
- 2) For test 1, the minimum aggregate adjustment rate shall be $3.4 \times T_S$ per second.
- 3) The maximum aggregate adjustment rate shall be T_q per 200 ms, with T_q as defined in Table 7.1.2_1.5-4.

Table 7.1.2_1.5-4: Test requirement for T_q Maximum Autonomous Time Adjustment Step

Downlink Bandwidth (MHz)	$T_{q_{-}}$	
1.4	18*T _S	
≥10 4*T _S		
Note: T _S is the basic timing unit defined in TS 36.211 [9]		

Table 7.1.2_1.5-5: Test requirement for maximum aggregate adjustment rate per 200 ms

Downlink Bandwidth (MHz) Maximum adjustment per 200 r				
1.4	18.6*T _S			
≥10	≥10 4.6*T _S			
Note: T _s is the basic timing unit defined in TS 36.211 [9]				

An illustration of the measurement principle is shown in Figure 7.1.2.5-4 in section 7.1.2.5.

7.2 UE Timing Advance

7.2.1 E-UTRAN FDD - UE Timing Advance Adjustment Accuracy

7.2.1.1 Test purpose

To verify the UE in RRC_CONNECTED state adjusts the timing of its transmissions with accuracy by meeting the E-UTRAN FDD timing advance adjustment requirements in an AWGN model.

7.2.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

7.2.1.3 Minimum conformance requirements

The timing advance is initiated from E-UTRAN with MAC message that implies and adjustment of the timing advance according to TS 36.321 [11] clause 5.2.

The UE shall adjust the timing of its uplink transmission timing at sub-frame n+6 for a timing advancement command received in sub-frame n.

The UE shall adjust the timing of its transmission with a relative accuracy better than or equal to $\pm 4 \times T_S$ seconds to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command is expressed in multiple of $16 \times T_S$ and is relative to the current uplink timing.

In case of random access response, 11-bit timing advance command, T_A , indicates N_{TA} values by index values of T_A = 0, 1, 2, ..., 1282, where an amount of the time alignment is given by N_{TA} = $T_A \times 16$ according to TS 36.213 [8] clause 4.2.3. N_{TA} is defined in TS 36.211 [9].

In other cases, 6-bit timing advance command, T_A , indicates adjustment of the current N_{TA} value, $N_{TA,old}$, to the new N_{TA} value, $N_{TA,new}$, by index values of $T_A = 0, 1, 2, ..., 63$, where $N_{TA,new} = N_{TA,old} + (T_A - 31) \times 16$ according to TS 36.213 [8] clause 4.2.3. Adjustment of N_{TA} value by a positive or a negative amount indicates advancing or delaying the uplink transmission timing by a given amount respectively.

For UE timers, the UE shall comply with the timer accuracies according to TS 36.133 [4] table 7.2.2-1. The requirements are only related to the actual timing measurements internally in the UE.

The normative reference for this requirement is TS 36.133 [4] clause 7.3 and A.7.2.1.

7.2.1.4 Test description

7.2.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise sources to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.
- 2. The general test parameter settings are set according to Table 7.2.1.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B. 0.
- 4. There is one E-UTRA FDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.2.1.4.1-1: General Test Parameters for E-UTRAN FDD - UE timing advance adjustment accuracy test case

Parameter	Unit	Value	Comment
PDSCH parameters		DL Reference Measurement Channel R.0 FDD	As specified in section A.1.1
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 FDD	As specified in section A.2.1
Timing Advance Command (<i>T_A</i>) value during T1		31	N _{TA} = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T_A) value during T2		39	$N_{TA} = 128$
DRX		OFF	
T1	S	5	
T2	S	5	

7.2.1.4.2 Test procedure

The test consists of a single cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and SRS are sent from the UE and received by the SS. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured. The UE Time Alignment Timer (timeAlignmentTimer IE), defined in TS 36.321 [11] clause 5.2, shall be configured so that it does not expire in the duration of the test.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to T1 in Tables 7.2.1.5-1 and 7.2.1.5-2. Propagation conditions are set according to Annex B clause B.1.1.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. SS shall transmit one message with a timing advance command, T_A . The timing advance command, T_A , shall be set to 31 which indicate adjustment of the current N_{TA} value. The timing advance adjustment during T1 shall be $N_{TA} = 0$.
- 6. The UE shall transmit SRS and adjust its uplink timing at the beginning of sub-frame n+6 for a timing advance command T_A received in sub-frame n. Sub-frame n is the sub-frame where the UE received the time advance command.
- 7. When T1 expires, the SS shall switch the timing advance command (T_A) from T1 to T2 as specified in Table 7.2.1.5-1.
- 8. SS shall transmit a sequence of messages with timing advance command, T_A . The timing advance command, T_A , shall be set to 39 which indicate adjustment of the current N_{TA} value. The timing advance adjustment during T2 shall be $N_{TA} = 128$.
- 9. The UE shall transmit SRS and adjust its uplink timing at the beginning of sub-frame n+6 for a timing advance command T_A received in sub-frame n. Sub-frame n is the sub-frame where the UE received the time advance command.
- 10. The result from the SRS and adjustment of the timing advance in step 9) is used to measure that the UE adjusts the timing of its transmission with a relative accuracy better than or equal to $\pm 4.5 \times T_S$ to the signalled timing advance value compared to the timing of preceding uplink transmission.
- 11. If the UE adjust the timing of its transmission within a relative accuracy greater than or equal to $\pm 4.5 \times T_S$ to the signalled timing advance value compared to the timing of preceding uplink transmission then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

- 12. The SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 13. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A (if the paging fails, switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3),

or

- switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 14. Repeat step 2-13 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.2.1.4.3-1: Common Exception messages for E-UTRAN FDD - UE timing advance adjustment accuracy test requirement

Default Message Contents			
Common contents of system information			
blocks exceptions			
Default RRC messages and information	Table H.3.4-2		
elements contents exceptions			

Table 7.2.1.4.3-2: SoundingRS-UL-ConfigCommon-DEFAULT: Additional E-UTRAN FDD - UE timing advance adjustment accuracy test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-21 SoundingRS-UL-ConfigCommon-DEFAULT			
Information Element	Value/remark	Comment	Condition
SoundingRS-UL-ConfigCommon-DEFAULT ::=			
SEQUENCE {			
setup SEQUENCE {			
srs-BandwidthConfig	bw5	Channel-	
		bandwidth-	
		dependent	
		parameter	
srs-SubframeConfig	sc3		FDD
ackNackSRS-SimultaneousTransmission	FALSE		
srsMaxUpPts	Not present		FDD
}			
}			

Table 7.2.1.4.3-3: SoundingRSUL-ConfigDedicated-DEFAULT: Additional E-UTRAN FDD - UE timing advance adjustment accuracy test requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6	I.6.3-22 SoundingRS-UL-ConfigDedicated-DEFAULT		
Information Element	Value/remark	Comment	Condition
SoundingRS-UL-ConfigDedicated-DEFAULT ::=			
CHOICE {			
setup SEQUENCE {			
srs-Bandwidth	bw0	bw0 used with no	
		frequency hopping.	
		bw3 used with	
		frequency hopping	
srs-HoppingBandwidth	hbw0		
freqDomainPosition	0		
duration	TRUE	Indefinite duration	
srs-ConfigIndex	7	SRS periodicity of	FDD
		10	
transmissionComb	0		
cyclicShift	cs0	No cyclic shift	
}			
}			

Table 7.2.1.4.3-4: MAC-MainConfig-RBC: Additional E-UTRAN FDD - UE timing advance adjustment accuracy test requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.5-1 MAC-MainConfig-RBC				
Information Element	Value/remark	Comment	Condition	
MAC-MainConfig-RBC ::= SEQUENCE {				
dl-SCH-Config SEQUENCE {}	Not present			
ul-SCH-Config SEQUENCE {				
maxHARQ-Tx	n5			
periodicBSR-Timer	sf20			
retxBSR-Timer	sf1280			
ttiBundling	FALSE			
}				
timeAlignmentTimerDedicated	Infinity			

7.2.1.5 Test requirement

Tables~7.2.1.4.1-1,~7.2.1.5-1~and~7.2.1.5-2~define~the~primary~level~settings~for~E-UTRAN~FDD~-~UE~timing~advance~adjustment~accuracy~test.

Table 7.2.1.5-1: Cell Specific Test requirement Parameters for E-UTRAN FDD - UE timing advance adjustment accuracy test case

Parameter	Unit	Value T1 T2		
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10		
OCNG Patterns defined in D.1.1		OP.1 F	DD	
(OP.1 FDD)				
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB	0		
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA Note1	dB			
OCNG_RB Note1	dB			
Timing Advance Command (T_A)		31	39	
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	3		
N_{oc}	dBm/15 KHz	-98		
\hat{E}_s/N_{oc}	dB	3		
Io ^{Note2}	dBm/9 MHz	-65.5	5	
Propagation Condition		AWGN		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Io level has been derived from other parameters for information purpose. It is not a settable parameter.

Table 7.2.1.5-2: Sounding Reference Symbol Configuration to be used in E-UTRAN FDD - UE timing advance adjustment accuracy test case

Field	Value	Comment			
srs-BandwidthConfig	bw5				
srs-SubframeConfig	sc3	Once every 5 subframes			
ackNackSRS-	FALSE				
SimultaneousTransmission	FALSE				
srsMaxUpPts	N/A	Not applicable for E-UTRAN FDD			
srs-Bandwidth	0	No hopping			
srs-HoppingBandwidth	hbw0				
freqDomainPosition	0				
duration	TRUE	Indefinite duration			
srs-ConfigIndex	7	SRS periodicity of 10.			
transmissionComb	0				
cyclicShift	cs0	No cyclic shift			
Note: For further information see section 6.3.2 in 3GPP TS 36.331 [15].					

The UE shall apply the signalled Timing Advance value to the transmission timing at the designated activation time i.e. 6 sub-frames after the reception of the timing advance command.

The UE shall adjust the timing of its transmission with a relative accuracy better than or equal to $\pm 4.5 \times T_S$ seconds to the signalled timing advance value compared to the timing of preceding uplink transmission. This requirement includes test tolerances.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

7.2.2 E-UTRAN TDD - UE Timing Advance Adjustment Accuracy

7.2.2.1 Test purpose

The purpose of the test is to verify E-UTRAN TDD Timing Advance adjustment accuracy requirements, in an AWGN model.

7.2.2.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

7.2.2.3 Minimum conformance requirements

The timing advance is initiated from E-UTRAN with MAC message that implies and adjustment of the timing advance according to TS 36.321 [11] clause 5.2.

The UE shall adjust the timing of its uplink transmission timing at sub-frame n+6 for a timing advancement command received in sub-frame n.

The UE shall adjust the timing of its transmission with a relative accuracy better than or equal to $\pm 4 \times T_S$ seconds to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command is expressed in multiple of $16 \times T_S$ and is relative to the current uplink timing.

In case of random access response, 11-bit timing advance command, T_A , indicates N_{TA} values by index values of T_A = 0, 1, 2, ..., 1282, where an amount of the time alignment is given by N_{TA} = $T_A \times 16$ according to TS 36.213 [8] clause 4.2.3. N_{TA} is defined in TS 36.211 [9].

In other cases, 6-bit timing advance command, T_A , indicates adjustment of the current N_{TA} value, $N_{TA,old}$, to the new N_{TA} value, $N_{TA,new}$, by index values of $T_A = 0, 1, 2, ..., 63$, where $N_{TA,new} = N_{TA,old} + (T_A - 31) \times 16$ according to TS 36.213 [8] clause 4.2.3. Adjustment of N_{TA} value by a positive or a negative amount indicates advancing or delaying the uplink transmission timing by a given amount respectively.

For UE timers, the UE shall comply with the timer accuracies according to TS 36.133 [4] table 7.2.2-1. The requirements are only related to the actual timing measurements internally in the UE.

The normative reference for this requirement is TS 36.133 [4] clause 7.3 and A.7.2.2.

7.2.2.4 Test description

7.2.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noises source to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.18.
- 2. The general test parameter settings are set according to Table 7.2.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clause B.0.
- 4. There is one E-UTRA TDD carrier and one cell specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Parameter	Unit	Value	Comment	
PDSCH parameters		DL Reference Measurement Channel R.0 TDD	As specified in section A.1.2	
PCFICH/PDCCH/PHICH parameters		DL Reference Measurement Channel R.6 TDD	As specified in section A.2.2	
Timing Advance Command (T_A) value during T1		31	N _{TA} = 0 for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2	
Timing Advance Command (T_A) value during T2		39	N _{TA} = 128	
DRX		OFF		
T1	S	5		
To		F.		

Table 7.2.2.4-1 General Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test

7.2.2.4.2 Test procedure

The test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and Sounding Reference Signals (SRS), are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured. The UE Time Alignment Timer (timeAlignmentTimer IE), defined in TS 36.321 [11] clause 5.2, shall be configured so that it does not expire in the duration of the test.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to T1 in Tables 7.2.2.5-1, 7.2.2.5-2 and 7.2.2.5-3. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. SS shall transmit one message with a timing advance command, T_A . The timing advance command, T_A , shall be set to 31 which indicate adjustment of the current N_{TA} value. The timing advance adjustment during T1 shall be $N_{TA} = 0$.
- 6. The UE shall transmit SRS and adjust its uplink timing from the beginning of sub-frame n+6 for a timing advance command T_A received in sub-frame n. Sub-frame n is the sub-frame where the UE receive the time advance command.
- 7. When T1 expires, the SS shall switch the timing advance command (T_A) from T1 to T2 as specified in Table 7.2.1.5-1.
- 8. SS shall transmit a sequence of messages with timing advance command, T_A . The timing advance command, T_A , shall be set to 39 which indicate adjustment of the current N_{TA} value. The timing advance adjustment during T2 shall be $N_{TA} = 128$.
- 9. The UE shall transmit SRS and adjust its uplink timing from the beginning of sub-frame n+6 for a timing advance command T_A received in sub-frame n. Sub-frame n is the sub-frame where the UE receive the time advance command.
- 10. The timing of the first SRS transmission after sub-frame n+6 and adjustment of the timing advance in step 9) is used to measure that the UE adjusts the timing of its transmission with a relative accuracy better than or equal to $\pm 4.5 \times T_S$ to the signalled timing advance value compared to the timing of preceding uplink transmission.
- 11. If the UE adjust the timing of its transmission within a relative accuracy greater than or equal to $\pm 4.5 \times T_S$ to the signalled timing advance value compared to the timing of preceding uplink transmission then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 12. The SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

- 13. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE is in State 3A according to TS 36.508 [7] clause 4.5.3A (if the paging fails, switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3),

or

- switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 14. Repeat step 2-13 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.2.2.4.3-1: Common Exception messages for E-UTRAN TDD - UE timing advance adjustment accuracy test requirement

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.3.4-2			
elements contents exceptions				

Table 7.2.2.4.3-2: SoundingRS-UL-ConfigCommon-DEFAULT: Additional UE transmit timing for E-UTRAN TDD test requirement

Derivation Path: 36.508 clause 4.6.3			
Information Element	Value/remark	Comment	Condition
SoundingRSUL-ConfigCommon-DEFAULT ::=			
SEQUENCE {			
setup SEQUENCE {			
srs-BandwidthConfig	bw5	Channel- bandwidth- dependent parameter	
srs-SubframeConfig	sc3		TDD
ackNackSRS-SimultaneousTransmission	FALSE		
srsMaxUpPts	Not present		
}			

Table 7.2.2.4.3-3: SoundingRS-UL-ConfigDedicated-DEFAULT: Additional UE transmit timing for E-UTRAN TDD test requirement

Derivation Path: 36.508 clause 4.6.3				
Information Element	Value/remark	Comment	Condition	
SoundingRSUL-ConfigDedicated-DEFAULT ::=				
CHOICE {				
enable SEQUENCE {				
srsBandwidth	bw0	bw0 used with no frequency hopping. bw3 used with frequency hopping		
srsHoppingBandwidth	hbw0			
freqDomainPosition	0			
duration	TRUE	Indefinite duration		
srs-ConfigIndex	15	SRS periodicity of 10		
transmissionComb	0			
cyclicShift	cs0	No cyclic shift		
}				
}			•	

Table 7.2.1.4.3-4: MAC-MainConfig-RBC: Additional E-UTRAN TDD - UE timing advance adjustment accuracy test requirement

Derivation Path: 36.508 clause 4.8.2			
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
dl-SCH-Config SEQUENCE {}	Not present		
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
timeAlignmentTimerDedicated	infinity		

7.2.2.5 Test requirement

Tables~7.2.2.4.1-1,~7.2.2.5-1~and~7.2.2.5-2~define~the~primary~level~settings~for~E-UTRAN~TDD~-~UE~timing~advance~adjustment~accuracy~test.

Table 7.2.2.5-1 Cell specific Test Parameters for E-UTRAN TDD Timing Advance Accuracy Test

Parameter	Unit	Value		
		T1	T2	
E-UTRA RF Channel Number		1		
BW _{channel}	MHz	10		
Special subframe configuration Note1			6	
Uplink-downlink configuration Note2			1	
OCNG Patterns defined in D.2.1 (OP.1 TDD)			OP.1 TDD	
PBCH_RA	dB			
PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB		0	
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note3}	dB			
OCNG_RB ^{Note3}	dB			
Timing Advance Command (T _A)		31	39	
$[\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}]$	dB	3		
N_{oc}	dBm/15 KHz	-98		
\hat{E}_s/N_{oc}	dB	3		
Io ^{Note4}	dBm/9 MHz	-65.5		
Propagation Condition		AWGN		

Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.

Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.

Note 3: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: Io level has been derived from other parameters for information purpose. It is not a settable parameter.

Table 7.2.2.5-2:Sounding Reference Symbol Configuration for E-UTRAN TDD Transmit Timing Accuracy Test

Field	Value	Comment		
srsBandwidthConfiguration	bw5			
srsSubframeConfiguration	sc3	Once every 5 subframes		
ackNackSrsSimultaneousTransmission	FALSE			
srsMaxUpPTS	N/A			
srsBandwidth	bw0	No hopping		
srsHoppingBandwidth	hbw0			
frequencyDomainPosition	0			
Duration	TRUE	Indefinite duration		
Srs-ConfigurationIndex	15	SRS periodicity of 10ms.		
transmissionComb	0			
cyclicShift	cs0	No cyclic shift		
Note: For further information see section 6.3.2 in 3GPP TS 36.331.				

The UE shall apply the signalled Timing Advance value to the transmission timing at the designated activation time i.e. 6 sub frames after the reception of the timing advance command.

The UE shall adjust the timing of its transmissions with an relative accuracy better than or equal to $\pm 4.5 \times T_S$ seconds to the signalled timing advance value compared to the timing of preceding uplink transmission. This requirement includes test tolerances.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

7.3 Radio Link Monitoring

7.3.1 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

7.3.1.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in TS 36.133 section 7.6.

7.3.1.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

7.3.1.3 Minimum conformance requirements

When the downlink radio link quality estimated over the last 200 ms period becomes worse than the threshold Q_{out} , Layer 1 of the UE shall send an out-of-sync indication to the higher layers within 200 ms Q_{out} evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [5] clause 5.5.3.2.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS 36.213 [8]. Two successive indications from Layer 1 shall be separated by at least 10 ms.

The transmitter power shall be turned off within 40 ms after expiry of T310 timer as specified in TS 36.331 [5] section 5.3.11.

The normative reference for this requirement is TS 36.133 [4] clause 7.6.2 and A.7.3.1.

7.3.1.4 Test description

The test consists of four subtests with one cell configured; the difference between the subtests is the number of transmitter antennas and the propagation channel. Each subtest consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 7.3.1.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

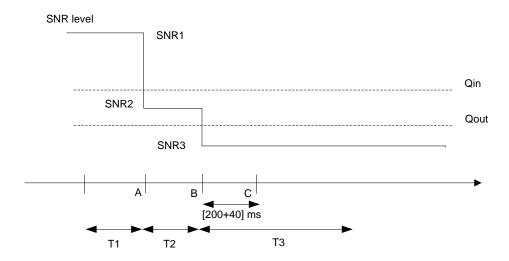


Figure 7.3.1.4-1: SNR variation for out-of-sync testing

7.3.1.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

1. Connect the SS (node B emulator) and AWGN noise sources or faders to the UE antenna connectors as stated below.

For subtest 1:As Shown in TS 36.508 [7] Annex A figure A.9 (without using the faders).

For subtest 2: As Shown in TS 36.508 [7] Annex A figure A.10 (without using the faders).

For subtest 3: As Shown in TS 36.508 [7] Annex A figure A.9

For subtest 4: As Shown in TS 36.508 [7] Annex A figure A.10

- 2. The general test parameter settings for the different subtests are set up according to Table 7.3.1.4-1.
- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 7.3.1.4.3
- 5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.1.4.1-1: General test parameters for E-UTRAN FDD out-of-sync testing

Parameter		Unit Value					Comment	
			Test 1	Test 2	Test 3	Test 4	1	
PCFICH/PDCCH/PHICH parameters			R.6 FDD	R.7 FDD	R.6 FDD	R.7 FDD	As specified in section A.2.1 None of the PDCCH are intended for the UE	
OCNG parameters			OP.2 FDD	OP.2 FDD	OP.2 FDD	OP.2 FDD	under test As specified in section	
•							D.1.2.	
Active cell			Cell 1	Cell 1	Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1	
CP length			Normal	Normal	Normal	Normal		
E-UTRA RF C	Channel Number		1	1	1	1	One E-UTRA FDD carrier frequency is used.	
(BW _{channel})	nnel Bandwidth	MHz	10	10	10	10		
Configuration	Correlation Matrix and Antenna		1x2 Low	2x2 Low	1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2	
Out of sync transmission	DCI format		1A	1A	1A	1A	As defined in section 5.3.3.1.4 in TS 36.212	
parameters (Note 1)	Number of Control OFDM symbols		2	2	2	2	Out of sync threshold Q _{out} and the corresponding	
	Aggregation level	CCE	8	8	8	8	hypothetical	
	ρ _A , ρ _B		0	-3	0	-3	PDCCH/PCFICH	
	Ratio of PDCCH to RS EPRE	dB	4	1	4	1	transmission parameters are as	
	Ratio of PCFICH to RS EPRE	dB	4	1	4	1	specified in TS 36.133 in section 7.6.1 and Table 7.6.1-1 respectively.	
DRX	1		OFF	OFF	OFF	OFF		
Layer 3 filterin	ng		Enabled	Enabled	Enabled	Enabled	Counters: N310 = 1; N311 = 1	
T310 timer	T310 timer		0	0	0	0	T310 is disabled	
T311 timer	T311 timer		1000	1000	1000	1000	T311 is enabled	
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.	
CQI reporting periodicity		ms	2	2	2	2	Minimum CQI reporting periodicity	
Propagation channel			AWGN	AWGN	ETU 70 Hz	ETU 70 Hz		
T1		s	1	1	1	1		
T2		S	0.4	0.4	0.4	0.4		
T3			0.5	0.5	0.5	0.5	o included in the	

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.

7.3.1.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to T1 in Table 7.3.1.5-1 for subtest 1 and 2 and according to T1 in Table and 7.3.1.5-2 for subtest 3 and 4. Propagation conditions are set according to Annex B clause B.1.1 for subtests 1 and 2 and according to B.2.2 for subtests 3 and 4. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.1.5-1 for subtests 1 and 2 and according to T2 in Table 7.3.1.5-2 for subtests 3 and 4. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.1.5-1 for subtests 1 and 2 and according to T3 in Table 7.3.1.5-2 for subtests 3 and 4. T3 starts.
- 5. If the SS:
 - a) detects uplink power equal to or higher than -39 dBm in each subframe configured for CQI transmission (according CQI reporting mode PUCCH 1-0) during the period from time point A to time point B

and

b) does not detect any uplink power higher than -48.5 dBm from time point C (240 ms after the start of T3) until T3 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 7.3.1.5-1 for subtests 1 and 2 and Table 7.3.1.5-2 for subtests 3 and 4.
- 7. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.3.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.1.4.3-1: Common Exception messages for E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.2.4-1			
elements contents exceptions				

Table 7.3.1.4.3-2: CQI-ReportConfig-DEFAULT: Additional E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

Information Element	Value/remark	Comment	Condition
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic ::= CHOICE {			CQI_PERIOD IC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	0		
cqi-pmi-ConfigIndex	0	(see Table 7.2.2- 1A in TS 36.213)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	483	(see Table 7.2.2- 1B in TS 36.213)	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.1.4.3-3: *PhysicalConfigDedicated-DEFAULT:* Additional E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync test 1 and 3 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT						
Information Element	Value/remark	Comment	Condition			
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {						
soundingRS-UL-ConfigDedicated	Not present		RBC			
}						

Table 7.3.1.4.3-4: *PhysicalConfigDedicated-DEFAULT:* Additional E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync test 2 and 4 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT						
Information Element	Value/remark	Comment	Condition			
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {						
soundingRS-UL-ConfigDedicated	Not present		RBC			
antennalnfo CHOICE {						
defaultValue	NULL		2TX			
}						
}						

Table 7.3.1.4.3-5: MAC-MainConfig-RBC: E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table	use 4.8.2.1.5, Table 4.8.2.1.5-1 MAC-MainConfig-RBC				
Information Element	Value/remark	Comment	Condition		
timeAlignmentTimerDedicated	Infinity				

7.3.1.5 Test requirement

Table 7.3.1.5-1: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2

Parameter	Unit	Test 1			Test 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel			1	•		1	•
Number							
BW _{channel}	MHz		10			10	
Correlation Matrix and			1x2 Low			2x2 Low	
Antenna Configuration							
OCNG Pattern defined			OP.2 FDD			OP2 FDD	
in D.1 (FDD)			OF.Z FDD			OFZ FDD	
ρ _Α , ρ _Β			0			-3	
PCFICH_RB	dB		4			1	
PDCCH_RA	dB		0		-3		
PDCCH_RB	dB		0			-3	
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB		0			-3	
PHICH_RB	dB		U			-3	
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note 1}	dB						
OCNG_RB ^{Note 1}	dB						
SNR Note 6	dB	-4.1	-8.9	-14.1	-4.3	-8.9	-14.1
N_{oc}	dBm/15 kHz	-98 -98			-98		
Propagation condition			AWGN			AWGN	

- Note 1: OCNG shall be used such that the resources in cell #1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal
- Note 6: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure 7.3.1.4-1.

Table 7.3.1.5-2: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring tests # 3 and # 4

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Parameter	Unit	Test 3			Test 4			
		T1	T2	T3	T1	T2	T3	
E-UTRA RF Channel			1	•		1		
Number								
BW _{channel}	MHz		10			10		
Correlation Matrix and			1x2 Low			2x2 Low		
Antenna Configuration								
OCNG Pattern defined			OP.2 FDD			OP.2 FDD		
in D.1 (FDD)								
ρ _A , ρ _B			0			-3		
PCFICH_RB	dB		4			1		
PDCCH_RA	dB		0			-3		
PDCCH_RB	dB		0			-3		
PBCH_RA	dB							
PBCH_RB	dB							
PSS_RA	dB							
SSS_RA	dB							
PHICH_RA	dB		0		-3			
PHICH_RB	dB				-3			
PDSCH_RA	dB							
PDSCH_RB	dB							
OCNG_RA ^{Note 1}	dB							
OCNG_RB ^{Note 1}	dB							
SNR Note 6	dB	-0.6	-4.7	-12.3	-1.4	-5.3	-13.1	
N_{oc}	dBm/15 kHz		-98			-98		
Propagation condition		ETU 70 Hz ETU 70 Hz						
Note 1: OCNG shall b	e used such th	nat the reso	ources in c	ell # 1 are f	ully alloca	ted and a c	onstant	
	ted power spec							
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.						time		
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time						of time		
period T1.								
	ntains PDCCH							
Note 5: SNR levels of REs.						signal		

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according the configured CQI reporting mode (PUCCH 1-0).

The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3

The UE shall stop transmitting uplink signal no later than time point C (240ms after the start of time duration T3).

The uplink signal is verified on the basis of the UE output power:

respectively in figure 7.3.1.4-1.

Note 6:

- UE output power equal to or higher than Transmit minimum power -39 dBm (as defined in TS 36.521-1 [10] clause 6.3.2.5) means uplink signal
- UE output power equal to or less than Transmit OFF power -48.5 dBm (as defined in TS 36.521-1 [10] clause 6.3.3.5) means no uplink signal.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

7.3.2 E-UTRAN FDD Radio Link Monitoring Test for In-sync

7.3.2.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in TS 36.133 section 7.6.

7.3.2.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward.

7.3.2.3 Minimum conformance requirements

When the downlink radio link quality estimated over the last 100 ms period becomes better than the threshold Q_{in} , Layer 1 of the UE shall send an in-sync indication to the higher layers within 100 ms Q_{in} evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [5] clause 5.5.3.2.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS 36.213 [8]. Two successive indications from Layer 1 shall be separated by at least 10 ms.

The transmitter power shall be turned off within 40 ms after expiry of T310 timer as specified in TS 36.331[5] section 5.3.11.

The normative reference for this requirement is TS 36.133 [4] clause 7.6.2 and A.7.3.2.

7.3.2.4 Test description

The test consists of two subtests with one cell configured; the difference between the subtests is the number of transmitter antennas. Each subtest consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.3.2.4-1 shows the different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

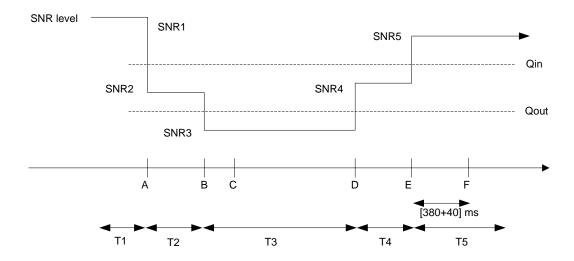


Figure 7.3.2.4-1: SNR variation for in-sync testing

7.3.2.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

For subtest 1 (one transmitter antenna): Connect the SS (node B emulator) and faders, to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.9.
 For subtest 2 (two transmitter antennas): Connect the SS (node B emulator) and faders, to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.10.

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- 2. The general test parameter settings for the different subtest are set up according to Table 7.3.2.4.1-1.
- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 7.3.2.4.3.
- 5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.2.4.1-1: General test parameters for E-UTRAN FDD in-sync testing

Parameter		Unit	Val		Comment	
	DOELO LIDDO CONTRACTOR		Test 1	Test 2		
PCFICH/PDCCH/PHICH parameters			R.6 FDD	R.7 FDD	As specified in section A.2.1 None of the PDCCH are intended for the UE	
					under test	
OCNG param	eters		OP.2 FDD	OP.2 FDD	As specified in section D.1.2.	
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1	
CP length			Normal	Normal		
E-UTRA RF C	Channel Number		1	1	One E-UTRA FDD carrier frequency is used.	
E-UTRA Char (BW _{channel})	nnel Bandwidth	MHz	10	10		
Correlation M. Configuration			1x2 Low	2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2	
In sync transmission	DCI format		1C	1C	As defined in section 5.3.3.1.4 in TS 36.212	
parameters (Note 1)	Number of Control OFDM symbols		2	2	In sync threshold Q _{in} and the corresponding hypothetical	
	Aggregation level	CCE	4	4	PDCCH/PCFICH	
	ρα, ρв		0	-3	transmission	
	Ratio of PDCCH to RS EPRE		0	-3	parameters are as specified in TS 36.133	
	Ratio of PCFICH to RS EPRE		4	1	section and Table 7.6.1- 2 respectively.	
Out of sync transmission	DCI format		1A	1A	As defined in section 5.3.3.1.3 in TS 36.212	
parameters (Note 1)	Number of Control OFDM symbols		2	2	Out of sync threshold Q _{out} and the corresponding	
	Aggregation level	CCE	8	8	hypothetical	
	ρ _A , ρ _B		0	-3	PDCCH/PCFICH	
	Ratio of PDCCH to RS EPRE	dB	4	1	transmission parameters are as	
	Ratio of PCFICH to RS EPRE	dB	4	1	specified in TS 36.133 section 7.6.1 and Table 7.6.1-1 respectively.	
DRX	•		OFF	OFF	. ,	
Layer 3 filterin	ng		Enabled	Enabled	Counters: N310 = 1; N311 = 1	
T310 timer		ms	2000	2000	T310 is enabled	
T311 timer		ms	1000	1000	T311 is enabled	
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.	
CQI reporting periodicity		ms	2	2	Minimum CQI reporting periodicity	
Propagation of	hannel		ETU 70 Hz	ETU 70 Hz		
T1	·	S	0.5	0.5		
T2		S	0.4	0.4		
T3		S	1.36	1.36		
T4		S	0.4	0.4		
T5		S	1	1		
	CCH/PCFICH corre					

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

7.3.2.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to T1 in Table 7.3.2.5-1 for subtests 1 and 2 respectively. Propagation conditions are set according to Annex B.2.2. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.2.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.2.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.3.2.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.3.2.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than -39 dBm in each subframe configured for CQI transmission (according CQI reporting mode PUCCH 1-0) during the period from time point A to time point F (420 ms after the start of time duration T5) the number of successful tests is increased by one.
 - Otherwise the number of failed tests is increased by one.
- 8. After T5 expires, repeat steps 2-7 for both subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.3.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.2.4.3-1: Common Exception messages for E-UTRAN FDD Radio Link Monitoring Test for insync

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.2.4-2			
elements contents exceptions				

Table 7.3.2.4.3-2 : CQI-ReportConfig-DEFAULT: Additional E-UTRAN FDD Radio Link Monitoring Test for in-sync

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6	6.3-2 CQI-ReportConfig-DEF	AULT	
Information Element	Value/remark	Comment	Condition
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic CHOICE {			CQI_PERIOD IC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	0		
cqi-pmi-ConfigIndex	0	(see Table 7.2.2- 1A in TS 36.213)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	483	(see Table 7.2.2- 1B in TS 36.213)	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.2.4.3-3: *PhysicalConfigDedicated-DEFAULT:* Additional E-UTRAN FDD Radio Link Monitoring Test for in-sync test 1 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2	2.1.6-1 PhysicalConfigDedica	ted-DEFAULT	
Information Element	Value/remark	Comment	Condition
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
soundingRS-UL-ConfigDedicated	Not present		RBC
}			

Table 7.3.2.4.3-4: *PhysicalConfigDedicated-DEFAULT:* Additional E-UTRAN FDD Radio Link Monitoring Test for in-sync test 2 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2	2.1.6-1 PhysicalConfigDedica	ted-DEFAULT	
Information Element	Value/remark	Comment	Condition
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
soundingRS-UL-ConfigDedicated	Not present		RBC
antennalnfo CHOICE {			
defaultValue	NULL		2TX
}			
}			

Table 7.3.2.4.3-5: MAC-MainConfig-RBC: E-UTRAN FDD Radio Link Monitoring Test for in-sync

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table	4.8.2.1.5-1 MAC-MainConfig-	-RBC	
Information Element	Value/remark	Comment	Condition
timeAlignmentTimerDedicated	Infinity		

7.3.2.5 Test requirement

Table 7.3.2.5-1: Cell specific test parameters for E-UTRAN FDD (cell # 1) for in-sync radio link monitoring tests # 1 and # 2

Parameter	Unit		Test 1			Test 2					
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
E-UTRA RF Channel				1					1		
Number											
BW _{channel}	MHz			10					10		
Correlation Matrix and			1	x2 Low	/			2	2x2 Lov	V	
Antenna Configuration											
OCNG Pattern defined			0	P.2 FD	D			0	P.2 FD	D	
in D.1 (FDD)											
ρ _Α , ρ _Β				0					-3		
PCFICH_RB	dB			4					11		
PDCCH_RA	dB			0					-3		
PDCCH_RB	dB			0					-3		
PBCH_RA	dB										
PBCH_RB	dB										
PSS_RA	dB										
SSS_RA	dB										
PHICH_RA	dB			0					-3		
PHICH_RB	dB			U					-3		
PDSCH_RA	dB										
PDSCH_RB	dB										
OCNG_RA ^{Note 1}	dB										
OCNG_RB ^{Note 1}	dB										
SNR Note 6	dB	-0.6	-4.7	-	-7.2	-0.6	-1.4	-5.3	-	-8.2	-1.4
				12.3					13.1		
N_{oc}	dBm/15 kHz			-98					-98		
Propagation condition			E٦	TU 70 F	Ηz			E1	ΓU 70 F	Ηz	
transmitted p	oe used such the ower spectral o	density	is achi	eved fo	or all O	FDM sy	mbols				
Note 2: The uplink re-	sources for CC	l repor	rting are	e assig	ned to	the UE	prior to	o the s	tart of t	ime pe	riod
T1.											

Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time

The signal contains PDCCH for UEs other than the device under test as part of OCNG. Note 4:

Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.

The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and Note 6:

SNR5 respectively in figure 7.3.2.4-1

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The uplink signal is verified on the basis of the UE output power:

UE output power equal to or higher than Transmit minimum power -39 dBm (as defined in TS 36.521-1 [10] clause 6.3.2.5) means uplink signal

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

7.3.3 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync

7.3.3.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in TS 36.133 section 7.6.

7.3.3.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

7.3.3.3 Minimum conformance requirements

When the downlink radio link quality estimated over the last 200 ms period becomes worse than the threshold Q_{out} , Layer 1 of the UE shall send an out-of-sync indication to the higher layers within 200 ms Q_{out} evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [5] clause 5.5.3.2.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS 36.213 [8]. Two successive indications from Layer 1 shall be separated by at least 10 ms.

The transmitter power shall be turned off within 40 ms after expiry of T310 timer as specified in TS 36.331 [5] section 5.3.11.

The normative reference for this requirement is TS 36.133 [4] clause 7.6.2 and A.7.3.3.

7.3.3.4 Test description

The test consists of four subtests with one cell configured; the difference between the subtests is the number of transmitter antennas and the propagation channel. Each subtest consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 7.3.3.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

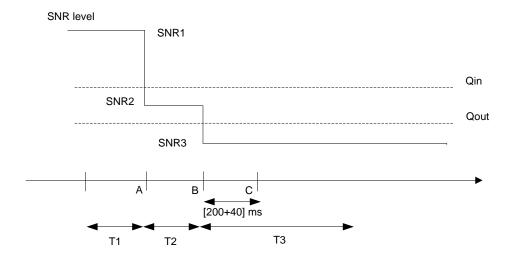


Figure 7.3.3.4-1: SNR variation for out-of-sync testing

7.3.3.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

1. Connect the SS (node B emulator) and AWGN noise sources or faders to the UE antenna connectors as stated below.

For subtest 1: As Shown in TS 36.508 [7] Annex A figure A.9 (without using the faders).

For subtest 2: As Shown in TS 36.508 [7] Annex A figure A.10 (without using the faders).

For subtest 3: As Shown in TS 36.508 [7] Annex A figure A.9

For subtest 4: As Shown in TS 36.508 [7] Annex A figure A.10

- 2. The general test parameter settings for the different subtests are set up according to Table 7.3.3.4.1-1.
- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 7.3.3.4.3.
- 5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.3.4.1-1: General test parameters for E-UTRAN TDD out-of-sync testing

Test 1 Test 2 Test 3 Test 4 PCFICH/PDCCH/PHICH parameters R.6 TDD R.7 TDD R.6 TDD R.7 TDD As spec A.2.1 None of intende under test of intended u	Comment
Degrameters OP.2 TDD OP.2 TDD OP.2 TDD OP.2 TDD OP.2 TDD OP.2 TDD As spec D.2.2. Active cell Cell 1 Cell	
Active cell Cell 1 Cell 1 Cell 1 Cell 1 Cell 1 Cell 1 is channe CP length Normal Normal Normal Normal E-UTRA RF Channel Number 1 1 1 1 1 One E-I carrier fused. E-UTRA Channel Bandwidth (BW _{channel}) Correlation Matrix and Antenna Configuration 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	oified in section If the PDCCH are If the UE If the UE
CP length Normal Normal Normal Normal CP length Normal Normal Normal Normal E-UTRA RF Channel Number 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	cified in section
E-UTRA RF Channel Number 1 1 1 1 1 One E-carrier for used. E-UTRA Channel Bandwidth (BW _{channel}) 10 10 10 10 10 Correlation Matrix and Antenna Configuration 1x2 Low 2x2 Low 1x2 Low 2x2 Low Correlation Series 2x3 Low Correlation Series 2x3 Low 1x3 Low 2x4 Low 2x5 Low Correlation Series 2x3 Low 1x4 Low 2x5 Low Correlation Series 2x4 Low 1x5 Low 2x5 Low 1x5 Low 2x6 Low 1x5 Low 2x6 Low 1x5 Low 2x7 Low 2x8 Low 1x5 Low 1x5 Low 2x8 Low 1x5	s on E-UTRA RF I number 1
E-UTRA Channel Bandwidth (BW _{channel}) Correlation Matrix and Antenna Configuration Out of sync transmission Carrier fused. 10 10 10 10 2x2 Low 1x2 Low 2x2 Low 1x2 Low 2x2 Low 1x2 Low 2x2 Low 1x2 Low 1x3 Low 1x4 Low 1x5 Low 1x5 Low 1x5 Low 1x6 Low 1x7 Low 1x8	
Correlation Matrix and Antenna Configuration Configurati	UTRA TDD requency is
Configuration Antenna are defi 36.521- B.2.3.2 Out of sync DCI format 1A 1A 1A As defir transmission Antenna are defi 36.521- B.2.3.2.1	
transmission 5.3.3.1.	
neverseters N. I. C.	ned in section 4 in TS 36.212
parameters Number of (Note 1)	
Aggregation level CCE 8 8 8 8 hypothe	etical
I IPA, PB	I/PCFICH
I TO NO LINE P	ters are as
DRX OFF OFF OFF	•
Layer 3 filtering Enabled Enabled Enabled Enabled Counter N310 =	rs: 1; N311 = 1
	disabled
	enabled
Periodic CQI reporting mode PUCCH 1-0 PUCCH 1-0 PUCCH 1-0 PUCCH 1-0 As defir 7.2.2-1	ned in table in TS 36.213.
periodic	m CQI reporting city
Propagation channel AWGN AWGN ETU 70 Hz ETU 70 Hz	
T1 s 1 1 1	
T2 s 0.4 0.4 0.4 0.4	
T3 s 0.5 0.5 0.5 0.5	

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel

7.3.3.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to T1 in Table 7.3.3.5-1 for subtests 1 and 2 and according to T1 in Table and 7.3.3.5-2 for subtest 3 and 4. Propagation conditions are set according to Annex B clause B.1.1 for subtests 1 and 2 and according to B.2.2 for subtests 3 and 4. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.3.5-1 for subtests 1 and 2 and according to T2 in Table 7.3.3.5-2 for subtests 3 and 4. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.3.5-1 for subtests 1 and 2 and according to T3 in Table 7.3.3.5-2 for subtests 3 and 4. T3 starts.
- 5. If the SS:
 - a) detects uplink power equal to or higher than -39 dBm in each uplink subframe configured for CQI transmission (according CQI reporting mode PUCCH 1-0) during the period from time point A to time point B

and

b) does not detect any uplink power higher than -48.5 dBm from time point C (240 ms after the start of T3) until T3 expires

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 7.3.3.5-1 for subtests 1 and 2 and Table 7.3.3.5-2 for subtests 3 and 4.
- 7. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.3.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.3.4.3-1: Common Exception messages for E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync

Default Message Co	ntents
Common contents of system information	
blocks exceptions	
Default RRC messages and information	Table H.2.4-1
elements contents exceptions	

Table 7.3.3.4.3-2: CQI-ReportConfig-DEFAULT: Additional E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync

Information Element	Value/remark	Comment	Condition
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic CHOICE {			CQI_PERIOD IC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	0		
cqi-pmi-ConfigIndex	0	(see Table 7.2.2- 1C in TS 36.213)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	483	(see Table 7.2.2- 1B in TS 36.213)	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.3.4.3-3: *PhysicalConfigDedicated-DEFAULT:* Additional E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync test 1 and 3 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2	2.1.6-1 PhysicalConfigDedica	ted-DEFAULT	
Information Element	Value/remark	Comment	Condition
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
soundingRS-UL-ConfigDedicated	Not present		RBC
}			

Table 7.3.3.4.3-4: *PhysicalConfigDedicated-DEFAULT:* Additional E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync test 2 and 4 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2	2.1.6-1 PhysicalConfigDedica	ted-DEFAULT	
Information Element	Value/remark	Comment	Condition
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
soundingRS-UL-ConfigDedicated	Not present		RBC
antennalnfo CHOICE {			
defaultValue	NULL		2TX
}			
}			

Table 7.3.3.4.3-5: MAC-MainConfig-RBC: E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table	4.8.2.1.5-1 MAC-MainConfig-	RBC	
Information Element	Value/remark	Comment	Condition
timeAlignmentTimerDedicated	Infinity		

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7.3.3.5 Test requirement

Table 7.3.3.5-1: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 1 and # 2

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Special subframe configuration Note1 6 6 Uplink-downlink configuration Note2 1 1 DCNG Pattern defined n D.2 (TDD) OP.2 TDD OP.2 TDD Φ _A , ρ _B 0 -3 PCFICH_RB dB 4 1 PDCCH_RA dB 0 -3 PDCCH_RB dB 0 -3 PBCH_RA dB 0 -3 PBCH_RA dB 0 -3 PBCH_RA dB 0 -3	Т3
Number BW _{channel} MHz 10 10 Correlation Matrix and Antenna Configuration 1x2 Low 2x2 Low Antenna Configuration 6 6 Special subframe configuration Note1 1 1 Uplink-downlink configuration Note2 1 1 1 DCNG Pattern defined n D.2 (TDD) OP.2 TDD OP.2 TDD OP.2 TDD OA, PB 0 -3 OP.2 TDD OP.2 TDD -3 PCFICH_RB dB 4 1 1 -3 OP.2 TDD -3 -3 -3 OP.2 TDD -3 -	
BW _{channel} MHz 10 10 Correlation Matrix and Antenna Configuration 1x2 Low 2x2 Low Antenna Configuration 6 6 Special subframe configuration Note1 1 1 Jplink-downlink configuration Note2 1 1 DCNG Pattern defined n D.2 (TDD) OP.2 TDD OP.2 TDD OA, PB 0 -3 PCFICH_RB dB 4 1 PDCCH_RA dB 0 -3 PDCCH_RB dB 0 -3 PDCCH_RB dB 0 -3 PBCH_RA dB 0 -3	
Correlation Matrix and Antenna Configuration 1x2 Low 2x2 Low Special subframe Configuration S	
Antenna Configuration 6 6 Special subframe configuration Note1 6 6 Jplink-downlink configuration Note2 1 1 DCNG Pattern defined n D.2 (TDD) OP.2 TDD OP.2 TDD OA, PB 0 -3 PCFICH_RB dB 4 1 PDCCH_RA dB 0 -3 PDCCH_RB dB 0 -3 PBCH_RA dB 0 -3 PBCH_RA dB 0 -3	
Configuration Note1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2	
Configuration Note1 Duplink-downlink 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 2 2 2 1 2 2 1 2 2 1 2	
Uplink-downlink configuration Note2 1 2 1 2 1 2 1 2 2 1 2 2 1 2	
Uplink-downlink configuration Note2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 2 2 1 2 2 1 2 2 2 1 2	
OCNG Pattern defined in D.2 (TDD) OP.2 TDD OP.2 TDD ρ _A , ρ _B 0 -3 PCFICH_RB dB 4 1 PDCCH_RA dB 0 -3 PDCCH_RB dB 0 -3 PBCH_RA dB 0 -3 PBCH_RA dB 0 -3	
in D.2 (TDD) D _{A, ρB} 0 -3 PCFICH_RB dB 4 1 PDCCH_RA dB 0 -3 PDCCH_RB dB 0 -3 PBCH_RA dB 0 -3	
ΦΑ, ΦΒ 0 -3 PCFICH_RB dB 4 1 PDCCH_RA dB 0 -3 PDCCH_RB dB 0 -3 PBCH_RA dB 0 -3	
PCFICH_RB dB 4 1 PDCCH_RA dB 0 -3 PDCCH_RB dB 0 -3 PBCH_RA dB -3 -3	
PDCCH_RA dB 0 -3 PDCCH_RB dB 0 -3 PBCH_RA dB -3 -3	
PDCCH_RB	
PBCH_RA dB	
FBCH_RB UB	
PSS_RA dB	
SSS_RA dB	
PHICH_RA dB 0 -3	
PHICH_RB dB	
PDSCH_RA dB	
PDSCH_RB dB	
OCNG_RA ^{Note 3} dB	
OCNG RB ^{Note 3} dB	
SNR Note 8 dB -4.5 -8.5 -13.7 -4.6 -8.6 -	-13.8
N_{oc} dBm/15 kHz -98 -98	
Propagation condition AWGN AWGN	
Note 1: For the special subframe configuration see table 4.2-1 in 3GPP TS 36.211.	

- For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211. Note 2:
- Note 3: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure 7.3.3.4-1.

Table 7.3.3.5-2: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring tests # 3 and # 4

Parameter	Unit		Test 3			Test 4	
		T1	T2	T3	T1	T2	Т3
E-UTRA RF Channel			1			1	
Number							
BW _{channel}	MHz		10		10		
Correlation Matrix and			1x2 Low			2x2 Low	
Antenna Configuration							
Special subframe configuration Note1			6			6	
Uplink-downlink			1			1	
configuration Note2			•			•	
OCNG Pattern defined			OP.2 TDD		(OP.2 TDD	
in D.2 (TDD)							
ρ _A , ρ _B			0			-3	
PCFICH_RB	dB		4			1	
PDCCH_RA	dB		0			-3	
PDCCH_RB	dB		0			-3	
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB				-3		
SSS_RA	dB						
PHICH_RA	dB		0				
PHICH_RB	dB		U		-3		
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note 3}	dB						
OCNG_RB ^{Note 3}	dB						
SNR Note 8	dB	-0.6	-4.5	-12.1	-1.4	-5.0	-12-8
N_{oc}	dBm/15 kHz		-98			-98	
Propagation condition			ETU 70 Hz		[ETU 70 Hz	
Note 1: For the specia	al subframe co	nfiguration	see table 4	1.2-1 in 3G			
Note 2: For the uplink	-downlink conf	iguration s	ee table 4.2	2-2 in 3GP	P TS 36.21	11.	
	e used such th						onstant
	ed power spec						
	3						time
period T1.	I to the second						
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.						of time	
							CNG
		spond to the signal to noise ratio over the cell-specific reference signal					
REs.							- 3
	me periods T1	, T2 and T3	3 is denote	d as SNR1	, SNR2 an	d SNR3	
	n figure 7.3.3.4						

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240ms after the start of the time duration T3).

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power -39 dBm (as defined in TS 36.521-1 [10] clause 6.3.2.5) means uplink signal
- UE output power equal to or less than Transmit OFF power -48.5 dBm (as defined in TS 36.521-1 [10] clause 6.3.3.5) means no uplink signal.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

7.3.4 E-UTRAN TDD Radio Link Monitoring Test for In-sync

7.3.4.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink radio link quality of the serving cell. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in TS 36.133 section 7.6.

7.3.4.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward.

7.3.4.3 Minimum conformance requirements

When the downlink radio link quality estimated over the last 100 ms period becomes better than the threshold Q_{in} , Layer 1 of the UE shall send an in-sync indication to the higher layers within 100 ms Q_{in} evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [5] clause 5.5.3.2.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS 36.213 [8]. Two successive indications from Layer 1 shall be separated by at least 10 ms.

The transmitter power shall be turned off within 40 ms after expiry of T310 timer as specified in TS 36.331 [5] section 5.3.11.

The normative reference for this requirement is TS 36.133 [4] clause 7.6.2 and A.7.3.4.

7.3.4.4 Test description

The test consists of 2 subtests with one cell configured; the difference between the subtests is the number of transmitter antennas. Each subtest consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.3.4.4-1 shows the different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

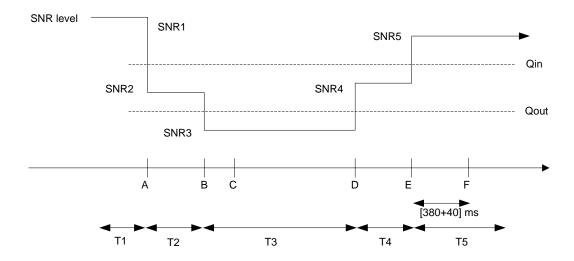


Figure 7.3.4.4-1: SNR variation for in-sync testing

7.3.4.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- For subtest 1 (one transmitter antenna): Connect the SS (node B emulator) and faders, to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.9.
 For subtest 2 (two transmitter antennas): Connect the SS (node B emulator) and faders, to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.10.
- 2. The general test parameter settings for the different subtest are set up according to Table 7.3.4.4.1-1.
- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 7.3.4.4.3.
- 6. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.4.4.1-1: General test parameters for E-UTRAN TDD in-sync testing

Pa	rameter	Unit		lue	Comment		
DOE: 01.1/DD0	011/011011		Test 1	Test 2	A (0) 11 (1)		
PCFICH/PDC	CH/PHICH		R.6 TDD	R.7 TDD	As specified in section A.2.2		
parameters					None of the PDCCH are		
					intended for the UE		
					under test		
OCNG param	eters		OP.2 TDD	OP.2 TDD	As specified in section		
Active cell			Cell 1	Cell 1	D.2.2. Cell 1 is on E-UTRA RF		
Active cell			Cell 1	Cell 1	channel number 1		
CP length			Normal	Normal			
E-UTRA RF C	Channel Number		1	1	One E-UTRA TDD		
					carrier frequency is used.		
E-UTRA Char	nnel Bandwidth	MHz	10	10			
(BW _{channel})							
	atrix and Antenna		1x2 Low	2x2 Low	Correlation Matrix and		
Configuration					Antenna Configuration		
					are defined in TS 36.521-1 [10] Annex		
					B.2.3.2		
n sync	DCI format		1C	1C	As defined in section		
transmission					5.3.3.1.4 in TS 36.212		
parameters	Number of		2	2	In sync threshold Qin		
(Note 1)	Control OFDM				and the corresponding		
	symbols	005		4	hypothetical PDCCH/PCFICH		
	Aggregation level	CCE	4	+	transmission		
	ρ _A , ρ _B Ratio of PDCCH		0	-3 -3	parameters are as		
	to RS EPRE		U	-3	specified in TS 36.133		
	Ratio of PCFICH		4	1	section and Table 7.6.1-		
	to RS EPRE				2 respectively.		
Out of sync	DCI format		1A	1A	As defined in section		
transmission			_		5.3.3.1.4 in TS 36.212		
parameters (Note 1)	Number of Control OFDM		2	2	Out of sync threshold		
(Note 1)	symbols				Q _{out} and the corresponding		
	Aggregation level	CCE	8	8	hypothetical		
	ρ _A , ρ _B	002	0	-3	PDCCH/PCFICH		
	Ratio of PDCCH	dB	4	1	transmission		
	to RS EPRE				parameters are as		
	Ratio of PCFICH	dB	4	1	specified in TS 36.133 section 7.6.1 and Table		
	to RS EPRE				7.6.1-1 respectively.		
DRX	1		OFF	OFF	- 2-F		
Layer 3 filterin	ng		Enabled	Enabled	Counters:		
	-				N310 = 1; N311 = 1		
T310 timer		ms	2000	2000	T310 is enabled		
T311 timer		ms	1000	1000	T311 is enabled		
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.		
CQI reporting periodicity		ms	1	1	Minimum CQI reporting periodicity		
Propagation of	hannel		ETU 70 Hz	ETU 70 Hz	,		
T1		S	0.5	0.5			
T2		S	0.4	0.4			
T3		S	1.46	1.46			
T4		S	0.4	0.4			
T5	0011/002:0::	S	1	1	<u> </u>		
Note 1: PD	CCH/PCFICH corre						

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

7.3.4.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

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- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to T1 in Table 7.3.4.5-1 for subtest 1 and 2 respectively. Propagation conditions are set according to Annex B.2.2. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.4.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.4.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.3.4.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.3.4.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than -39 dBm in each uplink subframe configured for CQI transmission (according CQI reporting mode PUCCH 1-0) during from time point A to time point F (420 ms after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

8. After T5 expires, repeat steps 2-7 for both subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.3.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.4.4.3-1: Common Exception messages for E-UTRAN TDD Radio Link Monitoring Test for insync

Default Message Contents					
Common contents of system information					
blocks exceptions					
Default RRC messages and information	Table H.2.4-2				
elements contents exceptions					

Table 7.3.4.4.3-2: CQI-ReportConfig-DEFAULT: Additional E-UTRAN TDD Radio Link Monitoring Test for In-sync

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-2 CQI-ReportConfig-DEFAULT						
Information Element	Value/remark	Comment	Condition			
CQI-ReportConfig-DEFAULT ::= SEQUENCE {						
cqi-ReportPeriodic	ON					
cqi-ReportPeriodic CHOICE {			CQI_PERIOD IC			
setup SEQUENCE {						
cqi-PUCCH-ResourceIndex	0					
cqi-pmi-ConfigIndex	0	(see Table 7.2.2- 1C in TS 36.213)				
cqi-FormatIndicatorPeriodic CHOICE {						
widebandCQI	NULL					
}						
ri-ConfigIndex	483	(see Table 7.2.2- 1B in TS 36.213)				
simultaneousAckNackAndCQI	FALSE	BOOLEAN				
}						
}						
}						

Condition Explanation	
-------------------------	--

CQI_PERIODIC	When periodic CQI reporting should be enabled
--------------	---

Table 7.3.4.4.3-3: *PhysicalConfigDedicated-DEFAULT:* Additional E-UTRAN TDD Radio Link Monitoring Test for in-sync test 1 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT						
Information Element Value/remark Comment Condi						
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {						
soundingRS-UL-ConfigDedicated	Not present		RBC			
}						

Table 7.3.4.4.3-4: *PhysicalConfigDedicated-DEFAULT:* Additional E-UTRAN TDD Radio Link Monitoring Test for in-sync test 2 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT						
Information Element	Value/remark	Comment	Condition			
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {						
soundingRS-UL-ConfigDedicated	Not present		RBC			
antennalnfo CHOICE {						
defaultValue	NULL		2TX			
}						
}						

Table 7.3.4.4.3-5: MAC-MainConfig-RBC: E-UTRAN TDD Radio Link Monitoring Test for in-sync

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.5-1 MAC-MainConfig-RBC						
Information Element	Value/remark	Comment	Condition			
timeAlignmentTimerDedicated	Infinity					

7.3.4.5 Test requirement

Table 7.3.4.5-1: Cell specific test parameters for E-UTRAN TDD (cell # 1) for In-sync radio link monitoring tests # 1 and # 2

Parameter	Unit			Test 1					Test 2			
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	
E-UTRA RF Channel			1						1			
Number												
BW _{channel}	MHz			10			10					
Correlation Matrix and			1	x2 Low	,			2	x2 Lov	V		
Antenna Configuration												
Special subframe				6			6					
configuration Note1												
Uplink-downlink				1					1			
configuration ^{Note2}												
OCNG Pattern defined			0	P.2 TDI	D			0	P.2 TD	D		
in D.2 (TDD)												
ρ _A , ρ _B				0					-3			
PCFICH_RB	dB			4					1			
PDCCH_RA	dB			0					-3			
PDCCH_RB	dB			0					-3			
PBCH_RA	dB											
PBCH_RB	dB											
PSS_RA	dB											
SSS_RA	dB											
PHICH_RA	dB			0				2				
PHICH_RB	dB			0					-3			
PDSCH_RA	dB											
PDSCH_RB	dB											
OCNG_RA ^{Note 3}	dB											
OCNG_RB ^{Note 3}	dB											
SNR Note 8	dB	-0.6	-4.5	-12.1	-7.2	-0.6	-1.4	-5.0	-	-8.2	-1.4	
									12.8			
N_{oc}	dBm/15			-98					-98		-	
1 voc	kHz											
Propagation condition				ΓU 70 F					U 70 F	Ηz		
Note 1: For the speci	al subframe co	nfigura	ation se	e table	4.2-1	in 3GP	PTS3	6.211.				
Note 2: For the uplink-downlink configuration see table 4.2-2 in 3GPP TS 36.211.												
	be used such t								nd a co	onstant	total	
	ower spectral											
Note 4: The uplink re	sources for CC	l repo	rting ar	e assig	ned to	the UE	prior t	o the s	tart of	time pe	eriod	
T1.												
	nd layer 3 filter	ing rela	ated pa	ramete	rs are	configu	red pri	or to th	e start	of time	;	
period T1.												
	ontains PDCCF											
	orrespond to the											
lote 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and												

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The uplink signal is verified on the basis of the UE output power:

SNR5 respectively in figure 7.3.4.4-1.

- UE output power equal to or higher than Transmit minimum power -39 dBm (as defined in TS 36.521-1 [10] clause 6.3.2.5) means uplink signal

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

7.3.5 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX

7.3.5.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in TS 36.133 section 7.6.

7.3.5.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward. Applicability requires support for FGI bit 5.

7.3.5.3 Minimum conformance requirements

When DRX is used the Q_{out} evaluation period ($T_{Evaluate}Q_{out_DRX}$) and the Q_{in} evaluation period ($T_{Evaluate}Q_{in_DRX}$) is specified in TS 36.133 [4] Table 7.6.2.2-1 will be used.

When the downlink radio link quality estimated over the last $T_{\text{Evaluate}}Q_{\text{out_DRX}}$ [s] period becomes worse than the threshold Q_{out} , Layer 1 of the UE shall send out-of-sync indication to the higher layers within $T_{\text{Evaluate}}Q_{\text{out_DRX}}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [5] clause 5.5.3.2.

When the downlink radio link quality estimated over the last $T_{\text{Evaluate}}Q_{\text{in_DRX}}$ [s] period becomes better than the threshold Q_{in} , Layer 1 of the UE shall send in-sync indications to the higher layers within $T_{\text{Evaluate}}Q_{\text{in_DRX}}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [5] clause 5.5.3.2.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS 36.213 [8]. Two successive indications from Layer 1 shall be separated by at least max(10 ms, DRX_cycle_length).

Upon start of T310 timer as specified in section 5.3.11 in TS 36.331, the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry of T310 timer

The transmitter power shall be turned off within 40 ms after expiry of T310 counter as specified in TS 36.331 [5] section 5.3.11.

Table 7.3.5.3-1: Qout and Qin Evaluation Period in DRX

DRX cycle length (s)	T _{Evaluate_} Q _{out_DRX} and T _{Evaluate_} Q _{in_DRX} (s) (DRX cycles)
≤0.04	Note (20)
0.04 < DRX cycle ≤ 0. 64	Note (10)
0.64 < DRX cycle ≤ 2.56	Note (5)
Note: Evaluation period length in	time depends on the length of the
DRX cycle in use	

The normative reference for this requirement is TS 36.133 [4] clause 7.6.2 and A.7.3.5.

7.3.5.4 Test description

The test consists of two subtests with one cell configured; the difference between the subtests is the DRX cycle length, number of transmit antennas and the propagation conditions. Each subtest consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 7.3.5.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

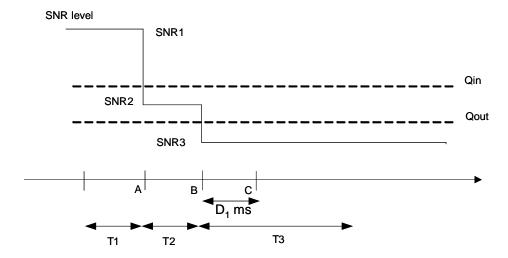


Figure 7.3.5.4-1: SNR variation for out-of-sync testing in DRX

7.3.5.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

1. Connect the SS (node B emulator) and AWGN noise sources or faders to the UE antenna connectors as stated below.

For subtest 1: As Shown in TS 36.508 [7] Annex A figure A.10

For subtest 2: As Shown in TS 36.508 [7] Annex A figure A.9 (without using the faders)

- 2. The general test parameter settings for the different subtests are set up according to Table 7.3.5.4-1.
- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 7.3.5.4.3
- 5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.5.4.1-1: General test parameters for E-UTRAN FDD out-of-sync in DRX testing

Para	ameter	Unit	Val	ue	Comment
			Test 1	Test 2	
PCFICH/PDCCH/PHICH parameters			R.7 FDD	R.6 FDD	As specified in section A.2.1. None of the PDCCH are intended for the UE under test
OCNG param	eters		OP.2 FDD	OP.2 FDD	As specified in section D.1.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
E-UTRA RF C	Channel Number		1	1	One E-UTRA FDD carrier frequency is used.
(BW _{channel})	nnel Bandwidth	MHz	10	10	
Correlation Ma Antenna Conf			2x2 Low	1x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2
	DCI format		1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	Out of sync threshold Q _{out} and the corresponding hypothetical
Out of sync transmission	Aggregation level	CCE	8	8	PDCCH/PCFICH transmission parameters
parameters	ρΑ, ρΒ		-3	0	are as specified in TS
(Note 1)	Ratio of PDCCH to RS EPRE	dB	1	4	36.133 [4] in section 7.6.1 and Table 7.6.1-1 respectively.
	Ratio of PCFICH to RS EPRE	dB	1	4	
DRX cycle		ms	40	1280	See Table 7.3.5.5-2
Layer 3 filterin	ıg		Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	0	0	T310 is disabled
T311 timer		ms	1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1- 0	As defined in table 7.2.2-1 in TS 36.213 [8].
CQI reporting	periodicity	ms	2	2	Minimum CQI reporting periodicity
Propagation of	hannel		ETU 70 Hz	AWGN	
T1		S	4	32	
T2		S	1.6	12.8	
T3		S	1.8	13	
Note 1: PD	CCH/PCFICH cor			of sync transm	nission parameters

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.

7.3.5.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to T1 in Table 7.3.5.5-1 for subtest 1 and 2. Propagation conditions are set according to Annex B clause B.2.2 for subtests 1 and according to B.1.1 for subtests 2. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.5.5-1 for subtests 1 and 2. T2 starts.

4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.5.5-1 for subtests 1 and 2. T3 starts.

5. If the SS:

a) detects uplink power equal to or higher than -39 dBm in the On-duration part of every DRX cycle in the subframe according the configured CQI reporting mode (PUCCH 1-0) during the period from time point A to time point B

and

b) For subtest 1: does not detect any uplink power higher than -48.5 dBm from time point C (900 ms after the start of T3) until T3 expires,

For subtest 2: does not detect any uplink power higher than -48.5 dBm from time point C (6500 ms after the start of T3) until T3 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 7.3.5.5-1 for subtests 1 and 2.
- 7. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.3.5.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.5.4.3-1: Common Exception messages for E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX

Default Message Contents		
Common contents of system information		
blocks exceptions		
Default RRC messages and information	Table H.2.4-1	
elements contents exceptions		

Table 7.3.5.4.3-2: CQI-ReportConfig-DEFAULT: Additional E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync in DRX

Information Element	Value/remark	Comment	Condition
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic ::= CHOICE {			CQI_PERIOD IC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	0		
cqi-pmi-ConfigIndex	0	(see Table 7.2.2- 1A in TS 36.213)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	483	(see Table 7.2.2- 1B in TS 36.213)	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.5.4.3-3: MAC-MainConfig-RBC: E-UTRAN FDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table	e 4.8.2.1.6-1 MAC-MainCor	nfig-RBC	
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			pc_FeatrGrp _5 AND DRX_S
Setup SEQUENCE {			
onDurationTimer	psf2		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for real-time services.	
sf40	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	infinity		
}			

Table 7.3.5.4.3-4: MAC-MainConfig-RBC: E-UTRAN FDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #2 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5,	Table 4.8.2.1.6-1.MAC-MainCo	infig-RRC	
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			pc_FeatrGrp _5 AND DRX_S
Setup SEQUENCE {			
onDurationTimer	psf2		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset CHOICE {		sf1280 typical value in real network for best- effort services.	
sf1280	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	infinity		
}			

Table 7.3.5.4.3-5: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN FDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 and #2 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	Value/remark	Comment	Condition
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
soundingRS-UL-ConfigDedicated	Not present		RBC
schedulingRequestConfig	SchedulingRequest- Config-DEFAULT		RBC
}			

Table 7.3.5.4.3-6: *PhysicalConfigDedicated-DEFAULT:* Additional E-UTRAN FDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT			
Information Element	Value/remark	Comment	Condition
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
antennalnfo CHOICE {			
defaultValue	NULL		2TX
}			
}			

Table 7.3.5.4.3-7: SchedulingRequest-Config-DEFAULT: Additional E-UTRAN FDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 and #2 requirements

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	Value/remark	Comment	Condition
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	0		
dsr-TransMax	n4		
}			
}			

7.3.5.5 Test requirement

Table 7.3.5.5-1: Cell specific test parameters for E-UTRAN FDD (cell # 1) for out-of-sync radio link monitoring subtests #1 and # 2

Parameter	Unit	Test 1			Test 2		
		T1	T2	T3	T1	T2	T3
E-UTRA RF Channel		1			1		
Number			· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·	
BW _{channel}	MHz		10		10		
Correlation Matrix			2x2 Low			1x2 Low	
and Antenna							
Configuration							
OCNG Pattern			OP.2 FDD			OP.2 FDD	
defined in D.1 (FDD)							
ρ _A , ρ _B			-3			0	
PCFICH_RB	dB		11			4	
PDCCH_RA	dB		-3			0	
PDCCH_RB	dB		-3			0	
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB	-3 0					
PHICH_RB	<u>dB</u>						
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RA ^{Note1}	dB						
OCNG_RB ^{Note1}	dB						
SNR ^{Note 6}	dB	-1.4	-5.3	-13.1	-4.1	-8.9	-14.1
N_{oc}	dBm/15 kHz	-98 -98					
Propagation condition		ETU 70 Hz AWGN					
Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant							
total transmitted power spectral density is achieved for all OFDM symbols. Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.							
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.							
Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.							

Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.

The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 Note 6: respectively in figure 7.3.5.4-1.

Table 7.3.5.5-2: DRX-Configuration for E-UTRAN FDD Radio Link Monitoring out-of-sync in DRX test

Field	Test1	Test2	Comment
rieid	Value	Value	
onDurationTimer	psf2	psf2	As specified in section 6.3.2 in
drx-InactivityTimer	psf1	psf1	3GPP TS 36.331 [5]
drx-RetransmissionTimer	psf1	psf1	
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	disable	

Table 7.3.5.5-3: TimeAlignmentTimer -Configuration for E-UTRAN FDD Radio Link Monitoring out-ofsync in DRX test

Field	Test1	Test2	Comment
rieid	Value	Value	
TimeAlignmentTimer	infinity	infinity	As specified in section 6.3.2 in 3GPP TS 36.331 [5]
sr-ConfigIndex	0	0	For further information see section 6.3.2 in 3GPP TS 36.331 and section10.1 in 3GPP TS 36.213 [8].

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In subtest 1 and subtest 2 during the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according the configured CQI reporting mode (PUCCH 1-0).

In subtest 1 the UE shall stop transmitting uplink signal no later than time point C (duration D1 = 900 ms after the start of time duration T3).

In subtest 2 the UE shall stop transmitting uplink signal no later than time point C (duration D1 = 6500 ms after the start of time duration T3).

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power -39 dBm (as defined in TS 36.521-1 [10] clause 6.3.2.5) means uplink signal
- UE output power equal to or less than Transmit OFF power -48.5 dBm (as defined in TS 36.521-1 [10] clause 6.3.3.5) means no uplink signal.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

7.3.6 E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX

7.3.6.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN FDD radio link monitoring requirements in TS 36.133 section 7.6.

7.3.6.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 8 and forward. Applicability requires support for FGI bit 5.

7.3.6.3 Minimum conformance requirements

When DRX is used the Q_{out} evaluation period ($T_{Evaluate}Q_{out_DRX}$) and the Q_{in} evaluation period ($T_{Evaluate}Q_{in_DRX}$) is specified in TS 36.133 [4] Table 7.6.2.2-1 will be used.

When the downlink radio link quality estimated over the last $T_{\text{Evaluate}}Q_{\text{out_DRX}}$ [s] period becomes worse than the threshold Q_{out} , Layer 1 of the UE shall send out-of-sync indication to the higher layers within $T_{\text{Evaluate}}Q_{\text{out_DRX}}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [5] clause 5.5.3.2.

When the downlink radio link quality estimated over the last $T_{\text{Evaluate}}Q_{\text{in_DRX}}$ [s] period becomes better than the threshold Q_{in} , Layer 1 of the UE shall send in-sync indications to the higher layers within $T_{\text{Evaluate}}Q_{\text{in_DRX}}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331 [5] clause 5.5.3.2.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS 36.213 [8]. Two successive indications from Layer 1 shall be separated by at least max(10 ms, DRX_cycle_length).

Upon start of T310 timer as specified in section 5.3.11 in TS 36.331, the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry of T310 timer.

The transmitter power shall be turned off within 40 ms after expiry of T310 counter as specified in TS 36.331 [5] section 5.3.11.

Table 7.3.6.3-1: Q _{out} and Q	Q _{in} Evaluation Period in DRX
---	---

DRX cycle length (s)	T _{Evaluate} _Q _{out_DRX} and T _{Evaluate} _Q _{in_DRX} (s) (DRX cycles)				
≤0.04	Note (20)				
0.04 < DRX cycle ≤ 0. 64	Note (10)				
0.64 < DRX cycle ≤ 2.56	Note (5)				
Note: Evaluation period length in time depends on the length of the					

The normative reference for this requirement is TS 36.133 [4] clause 7.6.2 and A.7.3.6.

7.3.6.4 Test description

The test consists of one subtest with one cell configured. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.3.6.4-1 shows the different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

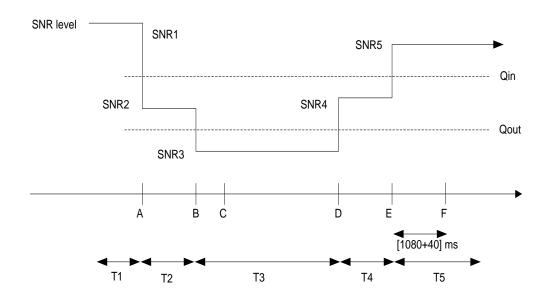


Figure 7.3.6.4-1: SNR variation for in-sync testing in DRX

7.3.6.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1. Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.18.
- 2. The general test parameter settings for the test is set up according to Table 7.3.6.4-1.

- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 7.3.6.4.3
- 5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.6.4.1-1: General test parameters for E-UTRAN FDD in-sync in DRX testing

Parameter		Unit	Value	Comment	
PCFICH/PDCCH/PHICH parameters			R.6 FDD	As specified in section A.2.1. None of the PDCCH are intended for the UE under test	
OCNG parameters			OP.2 FDD	As specified in section D.1.2.	
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1	
CP length	CP length		Normal		
E-UTRA RF Channel Number			1	One E-UTRA FDD carrier frequency is used.	
E-UTRA Channel Bandwidth (BW _{channel})		MHz	10		
Correlation Matrix and Antenna Configuration			1x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2	
	DCI format		1C	As defined in section 5.3.3.1.4 in TS 36.212	
In sync transmission	Number of Control OFDM symbols		2	In sync threshold Q _{in} and the corresponding hypothetical PDCCH/PCFICH transmission	
	Aggregation level	CCE	4	parameters are as specified in TS 36.133 [4] in section and	
parameters (Note 1)	ρ _A , ρ _B		0	Table 7.6.1-2 respectively.	
(Note 1)	Ratio of PDCCH to RS EPRE		0		
	Ratio of PCFICH to RS EPRE		4		
Out of sync transmission	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212	
	Number of Control OFDM symbols		2	Out of sync threshold Q _{out} and the corresponding hypothetical PDCCH/PCFICH transmission	
	Aggregation level	CCE	8	parameters are as specified in TS 36.133 [4] in section 7.6.1	
parameters (Note 1)	ρ _A , ρ _B		0	and Table 7.6.1-1 respectively.	
(Note 1)	Ratio of PDCCH to RS EPRE	dB	4		
	Ratio of PCFICH to RS EPRE	dB	4		
DRX cycle		ms	40	See Table 7.3.6.5-2	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1	
T310 timer		ms	2000	T310 is enabled	
T311 timer		ms	1000	T311 is enabled	
Periodic CQI reporting mode			PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213 [8].	
CQI reporting periodicity		ms	2	Minimum CQI reporting periodicity	
Propagation channel			AWGN		
T1		S	4		
T2		S	1.6		
T3 T4		S S	1.46 0.4		
T5		S	4		
	PCFICH correspond		•	l out of sync transmission	

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

7.3.6.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 2 ms.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to T1 in Table 7.3.6.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.6.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.6.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.3.6.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.3.6.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than -39 dBm in the On-duration part of every DRX cycle in the subframe according the configured CQI reporting mode (PUCCH 1-0) during the period from time point A to time point F (1120 ms after the start of time duration T5) the number of successful tests is increased by one.
 - Otherwise the number of failed tests is increased by one.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.3.6.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.6.4.3-1: Common Exception messages for E-UTRAN FDD Radio Link Monitoring Test for Insync in DRX

Default Message Contents					
Common contents of system information					
blocks exceptions					
Default RRC messages and information	Table H.2.4-2				
elements contents exceptions					

Table 7.3.6.4.3-2: CQI-ReportConfig-DEFAULT: Additional E-UTRAN FDD Radio Link Monitoring Test for In-sync in DRX

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4	.6.3-2		
Information Element	Value/remark	Comment	Condition
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic ::= CHOICE {			CQI_PERIOD IC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	0		
cqi-pmi-ConfigIndex	0	(see Table 7.2.2- 1A in TS 36.213)	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	483	(see Table 7.2.2- 1B in TS 36.213)	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.6.4.3-3: MAC-MainConfig-RBC: E-UTRAN FDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table	e 4.8.2.1.6-1 MAC-MainCor	nfig-RBC	
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			pc_FeatrGrp _5 AND DRX_S
Setup SEQUENCE {			
onDurationTimer	psf2		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for real-time services.	
sf40	0		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	infinity		
}			

Table 7.3.6.4.3-4: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN FDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT					
Information Element	Value/remark	Comment	Condition		
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {					
soundingRS-UL-ConfigDedicated	Not present		RBC		
schedulingRequestConfig	SchedulingRequest- Config-DEFAULT		RBC		
}					

Table 7.3.6.4.3-5: SchedulingRequest-Config-DEFAULT: Additional E-UTRAN FDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT				
Information Element	Value/remark	Comment	Condition	
SchedulingRequest-Config-DEFAULT ::= CHOICE {				
setup SEQUENCE {				
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter		
sr-ConfigIndex	0			
dsr-TransMax	n4			
}				
}				

7.3.6.5 Test requirement

Table 7.3.6.5-1: Cell specific test parameters for E-UTRAN FDD (cell # 1) for In-sync radio link monitoring test

Parameter	Unit			Test 1		
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number				1		
BW _{channel}	MHz			10		
Correlation Matrix and				1x2 Low		
Antenna Configuration						
OCNG Pattern defined in D.1				OP.2 FDD		
(FDD)						
ρΑ, ρΒ				0		
PCFICH_RB	dB			4		
PDCCH_RA	dB			0		
PDCCH_RB	dB			0		
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB	0				
PHICH_RB	dB			-		
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA ^{Note1}	dB					
OCNG_R B ^{Note1} SNR Note 6	dB	4.4	0.0	444		4.4
SINR	dB	-4.1	-8.9	-14.1	-9.3	-4.1
N_{oc}	dBm/15			-98		
	kHz			A)A/OA!		
Propagation condition				AWGN		_
Note 1: OCNG shall be used					and a consta	nt total
	transmitted power spectral density is achieved for all OFDM symbols.					
Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.						
Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.			ne perioa			
Note 4: The signal contains PDCCH for UEs of						
Note 5: SNR levels correspo						
Note 6: The SNR in time per respectively in figure		nd T3 is deno	ted as SNR1,	SNR2, SNR	3, SNR4 an	d SNR5

Table 7.3.6.5-2: DRX-Configuration for E-UTRAN FDD Radio Link Monitoring in-sync in DRX test

Field	Value	Comment
onDurationTimer	psf2	As specified in section 6.3.2 in
drx-InactivityTimer	psf1	3GPP TS 36.331 [5]
drx-RetransmissionTimer	psf1	
longDRX-CycleStartOffset	sf40	
shortDRX	disable	

Table 7.3.6.5-3: *TimeAlignmentTimer* -Configuration for E-UTRAN FDD Radio Link Monitoring in-sync in DRX test

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in section 6.3.2 in 3GPP TS 36.331 [5]
sr-ConfigIndex	0	For further information see section 6.3.2 in 3GPP TS 36.331 [8] and section10.1 in 3GPP TS 36.213 [8].

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the subframe according to the configured CQI reporting mode (PUCCH 1-0).

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power -39 dBm (as defined in TS 36.521-1 [10] clause 6.3.2.5) means uplink signal.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

7.3.7 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX

7.3.7.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in TS 36.133 section 7.6.

7.3.7.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward. Applicability requires support for FGI bit 5.

7.3.7.3 Minimum conformance requirements

When DRX is used the Q_{out} evaluation period ($T_{Evaluate}Q_{out_DRX}$) and the Q_{in} evaluation period ($T_{Evaluate}Q_{in_DRX}$) is specified in TS 36.133 [4] Table 7.6.2.2-1 will be used.

When the downlink radio link quality estimated over the last $T_{Evaluate_}Q_{out_DRX}$ [s] period becomes worse than the threshold Q_{out} , Layer 1 of the UE shall send out-of-sync indication to the higher layers within $T_{Evaluate_}Q_{out_DRX}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 .

When the downlink radio link quality estimated over the last $T_{\text{Evaluate}}Q_{\text{in_DRX}}$ [s] period becomes better than the threshold Q_{in} , Layer 1 of the UE shall send in-sync indications to the higher layers within $T_{\text{Evaluate}}Q_{\text{in_DRX}}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS 36.213 [8]. Two successive indications from Layer 1 shall be separated by at least max(10 ms, DRX_cycle_length).

Upon start of T310 timer as specified in section 5.3.11 in TS 36.331 [5], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry of T310 timer.

The transmitter power shall be turned off within 40 ms after expiry of T310 counter as specified in TS 36.331 [5] section 5.3.11.

Table 7.3.7.3-1: Qout and Qin Evaluation Period in DRX

DRX cycle length (s)	T _{Evaluate} Q _{out_DRX} and T _{Evaluate} Q _{in_DRX} (s) (DRX cycles)	
≤0.04	Note (20)	
0.04 < DRX cycle ≤ 0. 64	Note (10)	
0.64 < DRX cycle ≤ 2.56	Note (5)	
Note: Evaluation period length in time depends on the length of the		
DRX cycle in use		

The normative reference for this requirement is TS 36.133 [4] clause 7.6.2 and A.7.3.7.

7.3.7.4 Test description

The test consists of two subtests with one cell configured; the difference between the subtests is the DRX cycle length, number of transmit antennas and the propagation conditions. Each subtest consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 7.3.7.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

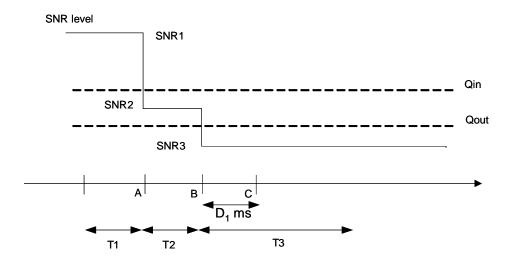


Figure 7.3.7.4-1: SNR variation for out-of-sync testing in DRX

7.3.7.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and 4.3.1.

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

1. Connect the SS (node B emulator) and AWGN noise sources or faders to the UE antenna connectors as stated below.

For subtest 1: As Shown in TS 36.508 [7] Annex A figure A.10 For subtest 2: As Shown in TS 36.508 [7] Annex A figure A.9 (without using the faders)

- 2. The general test parameter settings for the different subtests are set up according to Table 7.3.7.4-1.
- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 7.3.7.4.3
- 5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.7.4.1-1: General test parameters for E-UTRAN TDD out-of-sync in DRX testing

Parameter		Unit	Val	ue	Comment
			Test 1	Test 2	
PCFICH/PDC parameters	CH/PHICH		R.7 TDD	R. 6 TDD	As specified in section A.2.2. None of the PDCCH are intended for the UE under test
OCNG param	eters		OP.2 TDD	OP.2 TDD	As specified in section D.2.2.
Active cell			Cell 1	Cell 1	Cell 1 is on E-UTRA RF channel number 1
CP length			Normal	Normal	
	Channel Number		1	1	One E-UTRA TDD carrier frequency is used.
(BW _{channel})	nnel Bandwidth	MHz	10	10	
Correlation Ma Antenna Conf	iguration		2x2 Low	1x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2
	DCI format		1A	1A	As defined in section 5.3.3.1.3 in TS 36.212
	Number of Control OFDM symbols		2	2	Out of sync threshold Q _{out} and the corresponding hypothetical
Out of sync transmission	Aggregation level	CCE	8	8	PDCCH/PCFICH transmission parameters
parameters	ρ _A , ρ _B		-3	0	are as specified in TS
(Note 1)	Ratio of PDCCH to RS EPRE	dB	1	4	36.133 [4] in section 7.6.1 and Table 7.6.1-1 respectively.
	Ratio of PCFICH to RS EPRE	dB	1	4	
DRX cycle		ms	40	1280	See Table 7.3.7.5-2
Layer 3 filterin	g		Enabled	Enabled	Counters: N310 = 1; N311 = 1
T310 timer	<u> </u>	ms	0	0	T310 is disabled
T311 timer	T311 timer		1000	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1-0	PUCCH 1- 0	As defined in table 7.2.2-1 in TS 36.213 [8].
CQI reporting periodicity		ms	1	1	Minimum CQI reporting periodicity
Propagation c	hannel		ETU 70 Hz	AWGN	
T1		S	4	32	
T2		S	1.6	12.8	
T3	0011/0051011	S	1.8	13	

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel.

7.3.7.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to T1 in Table 7.3.7.5-1 for subtest 1 and 2. Propagation conditions are set according to Annex B clause B.2.2 for subtests 1 and according to B.1.1 for subtests 2. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.7.5-1 for subtests 1 and 2. T2 starts.

4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.7.5-1 for subtests 1 and 2. T3 starts.

5. If the SS:

a) detects uplink power equal to or higher than -39 dBm in the On-duration part of every DRX cycle in the uplink subframe according the configured CQI reporting mode (PUCCH 1-0) during the period from time point A to time point B

and

b) For subtest 1: does not detect any uplink power higher than -48.5 dBm from time point C (900 ms after the start of T3) until T3 expires,

For subtest 2: does not detect any uplink power higher than -48.5 dBm from time point C (6500 ms after the start of T3) until T3 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 7.3.7.5-1 for subtests 1 and 2.
- 7. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.3.7.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.7.4.3-1: Common Exception messages for E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.2.4-1			
elements contents exceptions				

Table 7.3.7.4.3-2: CQI-ReportConfig-DEFAULT: Additional E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync in DRX

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6	.3-2 CQI-ReportConfig-DEF	AULT	
Information Element	Value/remark	Comment	Condition
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic ::= CHOICE {			CQI_PERIOD IC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	0		
cqi-pmi-ConfigIndex	0	(see Table 7.2.2- 1C in TS 36.213 [8])	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	483	(see Table 7.2.2- 1B in TS 36.213 [8])	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.7.4.3-3: MAC-MainConfig-RBC: E-UTRAN TDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.6-1 MAC-MainConfig-RBC				
Information Element	Value/remark	Comment	Condition	
MAC-MainConfig-RBC ::= SEQUENCE {				
ul-SCH-Config SEQUENCE {				
maxHARQ-Tx	n5			
periodicBSR-Timer	sf20			
retxBSR-Timer	sf1280			
ttiBundling	FALSE			
}				
drx-Config CHOICE {			pc_FeatrGrp _5 AND DRX_S	
Setup SEQUENCE {				
onDurationTimer	psf2			
drx-InactivityTimer	psf1			
drx-RetransmissionTimer	psf1			
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for real-time services.		
sf40	2			
}				
shortDRX	Not present			
}				
}				
timeAlignmentTimerDedicated	infinity			
}				

Table 7.3.7.4.3-4: *MAC-MainConfig-RBC*: E-UTRAN TDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #2 requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Ta	able 4.8.2.1.6-1 MAC-MainCo	nfig-RBC	
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			pc_FeatrGrp _5 AND DRX_DRX_ L
Setup SEQUENCE {			
onDurationTimer	psf2		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset CHOICE {		sf1280 typical value in real network for best- effort services.	
sf1280	2		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	infinity		
}			

Table 7.3.7.4.3-5: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN TDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 and #2 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT					
Information Element	Value/remark	Comment	Condition		
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {					
soundingRS-UL-ConfigDedicated	Not present		RBC		
schedulingRequestConfig	SchedulingRequest- Config-DEFAULT		RBC		
}					

Table 7.3.7.4.3-6: *PhysicalConfigDedicated-DEFAULT:* Additional E-UTRAN TDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 requirements

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT				
Information Element	Value/remark	Comment	Condition	
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {				
antennalnfo CHOICE {				
defaultValue	NULL		2TX	
}				
}				

Table 7.3.7.4.3-7: SchedulingRequest-Config-DEFAULT: Additional E-UTRAN TDD Radio Link Monitoring test for Out-of-sync in DRX, subtest #1 and #2 requirements

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-20 SchedulingRequest-Config-DEFAULT			
Information Element	Value/remark	Comment	Condition
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	2		
dsr-TransMax	n4		
}			
}			

Note 8:

respectively in figure 7.3.7.4-1.

7.3.7.5 Test requirement

Table 7.3.7.5-1: Cell specific test parameters for E-UTRAN TDD (cell # 1) for out-of-sync radio link monitoring subtests #1 and # 2

Parameter	Unit		Test 1			Test 2	
		T1	T2	Т3	T1	T2	T3
E-UTRA RF Channel			1			1	
Number						•	
BW _{channel}	MHz		10			10	
Correlation Matrix			2x2 Low			1x2 Low	
and Antenna							
Configuration							
Special subframe			6			6	
configuration Note1							
Uplink-downlink			1			1	
configuration Note2 OCNG Pattern							
			OP.2 TDD			OP.2 TDD	
defined in D.2 (TDD)							
ρα, ρΒ	-ID		-3			0	
PCFICH_RB	dB		1			4	
PDCCH_RA	dB		-3 -3			0	
PDCCH_RB PBCH_RA	dB dB		-3			0	
PBCH_RB							
PSS_RA	dB dB						
SSS_RA	dB						
PHICH_RA	dB						
PHICH_RB	dB	-3 0					
PDSCH_RA	dB	-					
PDSCH_RB	dB						
OCNG_RA ^{Note1}	dB						
OCNG_RB ^{Note1}	dB						
SNR Note 8	dB	-1.4	-5.0	-12.8	-4.5	-8.5	-13.7
	dBm/15		-98	12.0		-98	10.7
N_{oc}	kHz						
Propagation condition		ETU 70 Hz AWGN					
Note 1: For the speci	ial subframe co	onfiguratio	n see table	4.2-1 in 30	3PP TS 36	.211 [9].	
	k-downlink cor						
		uch that the resources in cell # 1 are fully allocated and a constant					
total transmit	ted power spe	spectral density is achieved for all OFDM symbols.					
	sources for Co	CQI reporting are assigned to the UE prior to the start of time					
period T1.							
	nd layer 3 filtei	Itering related parameters are configured prior to the start of time					
period T1.							
		CH for UEs other than the device under test as part of OCNG.					
	correspond to t	the signal to noise ratio over the cell-specific reference signal					
RES.	REs.						

Table 7.3.7.5-2: DRX-Configuration for E-UTRAN TDD Radio Link Monitoring out-of-sync in DRX test

The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3

Field	Test1	Test2	Comment
rieid	Value	Value	1
onDurationTimer	psf2	psf2	As specified in section 6.3.2 in
drx-InactivityTimer	psf1	psf1	3GPP TS 36.331 [5]
drx-RetransmissionTimer	psf1	psf1	1
longDRX-CycleStartOffset	sf40	sf1280	
shortDRX	disable	Disable	

Table 7.3.7.5-3: *TimeAlignmentTimer* -Configuration for E-UTRAN TDD Radio Link Monitoring out-of-sync in DRX test

Field	Test1	Test2	Comment
rieid	Value	Value	
TimeAlignmentTimer	infinity	infinity	As specified in section 6.3.2 in 3GPP TS 36.331 [5]
sr-ConfigIndex	2	2	For further information see section 6.3.2 in 3GPP TS 36.331 [5] and section10.1 in 3GPP TS 36.213 [8].

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

In subtest 1 and subtest 2 during the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0).

In subtest 1 the UE shall stop transmitting uplink signal no later than time point C (duration D1 = 900 ms after the start of time duration T3).

In subtest 2 the UE shall stop transmitting uplink signal no later than time point C (duration D1 = 6500 ms after the start of time duration T3).

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power -39 dBm (as defined in TS 36.521-1 [10] clause 6.3.2.5) means uplink signal
- UE output power equal to or less than Transmit OFF power -48.5 dBm (as defined in TS 36.521-1 [10] clause 6.3.3.5) means no uplink signal.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

7.3.8 E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX

7.3.8.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink radio link quality of the serving cell when DRX is used. This test will partly verify the E-UTRAN TDD radio link monitoring requirements in TS 36.133 section 7.6.

7.3.8.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 8 and forward. Applicability requires support for FGI bit 5.

7.3.8.3 Minimum conformance requirements

When DRX is used the Q_{out} evaluation period ($T_{Evaluate}Q_{out_DRX}$) and the Q_{in} evaluation period ($T_{Evaluate}Q_{in_DRX}$) is specified in TS 36.133 [4] Table 7.6.2.2-1 will be used.

When the downlink radio link quality estimated over the last $T_{\text{Evaluate}}Q_{\text{out_DRX}}$ [s] period becomes worse than the threshold Q_{out} , Layer 1 of the UE shall send out-of-sync indication to the higher layers within $T_{\text{Evaluate}}Q_{\text{out_DRX}}$ [s] evaluation period. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 36.331 [5] clause 5.5.3.2.

When the downlink radio link quality estimated over the last $T_{\text{Evaluate}}Q_{\text{in_DRX}}$ [s] period becomes better than the threshold Q_{in} , Layer 1 of the UE shall send in-sync indications to the higher layers within $T_{\text{Evaluate}}Q_{\text{in_DRX}}$ [s] evaluation period. A L3 filter shall be applied to the in-sync indications as specified in TS 36.331.

The out-of-sync and in-sync evaluations shall be performed as specified in section 4.2.1 in TS 36.213 [8]. Two successive indications from Layer 1 shall be separated by at least max(10 ms, DRX_cycle_length).

Upon start of T310 timer as specified in section 5.3.11 in TS 36.331 [5], the UE shall monitor the link for recovery using the evaluation period and Layer 1 indication interval corresponding to the non-DRX mode until the expiry of T310 timer.

The transmitter power shall be turned off within 40 ms after expiry of T310 counter as specified in TS 36.331 [5] section 5.3.11.

Table 7.3.8.3-1: Q _{out} and	l Q _{in} Eval	uation Period	d in DRX
---------------------------------------	------------------------	---------------	----------

DRX cycle length (s)	T _{Evaluate_} Q _{out_DRX} and T _{Evaluate_} Q _{in_DRX} (s) (DRX cycles)			
≤0.04	Note (20)			
0.04 < DRX cycle ≤ 0. 64	Note (10)			
0.64 < DRX cycle ≤ 2.56	Note (5)			
Note: Evaluation period length in time depends on the length of the				

The normative reference for this requirement is TS 36.133 [4] clause 7.6.2 and A.7.3.8.

7.3.8.4 Test description

The test consists of one subtest with one cell configured. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.3.8.4-1 shows the different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

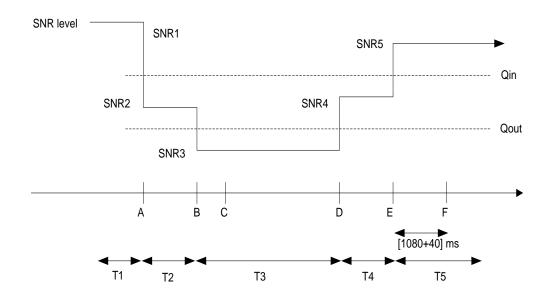


Figure 7.3.8.4-1: SNR variation for in-sync testing in DRX

7.3.8.4.1 Initial conditions

Test Environment: Normal, as defined in TS 36.508 [7] clause 4.1.

Frequencies to be tested: According to Annex E table E-1 and TS 36.508 [7] clauses 4.4.2 and

Channel Bandwidth to be tested: 10 MHz as defined in TS 36.508 [7] clause 4.3.1.

- 1 Connect the SS (node B emulator) and AWGN noise source to the UE antenna connectors as shown in TS 36.508 [7] Annex A figure A.18.
- 2. The general test parameter settings for the test is set up according to Table 7.3.8.4-1.

- 3. Propagation conditions are set according to Annex B clauses B.0.
- 4. Message contents are defined in clause 7.3.8.4.3
- 5. There is one cell specified in this test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.0 and C.1 for this test.

Table 7.3.8.4.1-1: General test parameters for E-UTRAN TDD in-sync in DRX testing

Parai	neter	Unit	Value	Comment	
PCFICH/PDCCH/PHICH parameters			R.6 TDD	As specified in section A.2.2. None of the PDCCH are intended for the UE under test	
OCNG parameters	OCNG parameters		OP.2 TDD	As specified in section D.2.2.	
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1	
CP length			Normal		
E-UTRA RF Chann	el Number		1	One E-UTRA TDD carrier frequency is used.	
E-UTRA Channel E (BW _{channel})		MHz	10		
Correlation Matrix a Configuration	and Antenna		1x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2	
	DCI format		1C	As defined in section 5.3.3.1.4 in TS 36.212	
	Number of Control OFDM symbols		2	In sync threshold Q _{in} and the corresponding hypothetical PDCCH/PCFICH transmission	
In sync transmission	Aggregation level	CCE	4	parameters are as specified in TS 36.133 [4] in section and	
parameters (Note 1)	ρ _Α , ρ _Β		0	Table 7.6.1-2 respectively.	
(Note 1)	Ratio of PDCCH to RS EPRE		0		
	Ratio of PCFICH to RS EPRE		4		
	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212	
Out of our	Number of Control OFDM symbols		2	Out of sync threshold Q _{out} and the corresponding hypothetical PDCCH/PCFICH transmission	
Out of sync transmission	Aggregation level	CCE	8	parameters are as specified in TS 36.133 [4] in section 7.6.1	
parameters (Note 1)	ρα, ρв		0	and Table 7.6.1-1 respectively.	
(**************************************	Ratio of PDCCH to RS EPRE	dB	4		
	Ratio of PCFICH to RS EPRE	dB	4		
DRX cycle		ms	40	See Table 7.3.8.5-2	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1	
T310 timer		ms	2000	T310 is enabled	
T311 timer		ms	1000	T311 is enabled	
	Periodic CQI reporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213 [8].	
CQI reporting perio	dicity	ms	2	Minimum CQI reporting periodicity	
Propagation chann	Propagation channel		AWGN		
T1		S	4		
T2		S	1.6		
T3 T4		S	1.46 0.4		
T5		S S	4		

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

7.3.8.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CQI reporting in PUCCH 1-0 mode with a reporting periodicity of 1 ms.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 7.2A.3.
- 2. Set the parameters according to T1 in Table 7.3.8.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.3.8.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.3.8.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.3.8.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.3.8.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than -39 dBm in the On-duration part of every DRX cycle in the uplink subframe according the configured CQI reporting mode (PUCCH 1-0) during the period from time point A to time point F (1120 ms after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.3.8.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 7.3.8.4.3-1: Common Exception messages for E-UTRAN TDD Radio Link Monitoring Test for Insync in DRX

Default Message Contents			
Common contents of system information			
blocks exceptions			
Default RRC messages and information	Table H.2.4-2		
elements contents exceptions			

Table 7.3.8.4.3-2: CQI-ReportConfig-DEFAULT: Additional E-UTRAN TDD Radio Link Monitoring Test for In-sync in DRX

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6	6.3-2		
Information Element	Value/remark	Comment	Condition
CQI-ReportConfig-DEFAULT ::= SEQUENCE {			
cqi-ReportPeriodic	ON		
cqi-ReportPeriodic ::= CHOICE {			CQI_PERIOD IC
setup SEQUENCE {			
cqi-PUCCH-ResourceIndex	0		
cqi-pmi-ConfigIndex	0	(see Table 7.2.2- 1C in TS 36.213 [8])	
cqi-FormatIndicatorPeriodic CHOICE {			
widebandCQI	NULL		
}			
ri-ConfigIndex	483	(see Table 7.2.2- 1B in TS 36.213 [8])	
simultaneousAckNackAndCQI	FALSE	BOOLEAN	
}			
}			
}			

Condition	Explanation
CQI_PERIODIC	When periodic CQI reporting should be enabled

Table 7.3.8.4.3-3: MAC-MainConfig-RBC: E-UTRAN TDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Ta	ble 4.8.2.1.6-1 MAC-MainCo	nfig-RBC	
Information Element	Value/remark	Comment	Condition
MAC-MainConfig-RBC ::= SEQUENCE {			
ul-SCH-Config SEQUENCE {			
maxHARQ-Tx	n5		
periodicBSR-Timer	sf20		
retxBSR-Timer	sf1280		
ttiBundling	FALSE		
}			
drx-Config CHOICE {			pc_FeatrGrp _5 AND DRX_S
Setup SEQUENCE {			
onDurationTimer	psf2		
drx-InactivityTimer	psf1		
drx-RetransmissionTimer	psf1		
longDRX-CycleStartOffset CHOICE {		sf40 typical value in real network for real-time services.	
sf40	2		
}			
shortDRX	Not present		
}			
}			
timeAlignmentTimerDedicated	infinity		
}			

Table 7.3.8.4.3-4: *PhysicalConfigDedicated-DEFAULT*: Additional E-UTRAN TDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT							
Information Element	Value/remark	Comment	Condition				
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {							
soundingRS-UL-ConfigDedicated	Not present		RBC				
schedulingRequestConfig	SchedulingRequest- Config-DEFAULT		RBC				
}							

Table 7.3.8.4.3-5: SchedulingRequest-Config-DEFAULT: Additional E-UTRAN TDD Radio Link Monitoring test for In-sync in DRX requirement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6	6.3-20 SchedulingRequest-	Config-DEFAULT	
Information Element	Value/remark	Comment	Condition
SchedulingRequest-Config-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
sr-PUCCH-ResourceIndex	41	10 MHz channel bandwidth parameter	
sr-ConfigIndex	2		
dsr-TransMax	n4		
}			
}			

7.3.8.5 Test requirement

Table 7.3.8.5-1: Cell specific test parameters for E-UTRAN TDD (cell # 1) for In-sync radio link monitoring test

Parameter	Unit					
		T1	T2	T3	T4	T5
E-UTRA RF Channel Number				1		
BW _{channel}	MHz			10		
Correlation Matrix and				1x2 Low		
Antenna Configuration						
Special subframe				6		
configuration ^{Note1}						
Uplink-downlink		1				
configuration Note2		00.0 TDD				
OCNG Pattern defined in D.2		OP.2 TDD				
(TDD)						
ρΑ, ρΒ		0				
PCFICH_RB	dB	4				
PDCCH_RA	dB	0				
PDCCH_RB	dB	0				
PBCH_RA	dB					
PBCH_RB	dB					
PSS_RA	dB					
SSS_RA	dB					
PHICH_RA	dB			0		
PHICH_RB	dB					
PDSCH_RA	dB					
PDSCH_RB	dB					
OCNG_RA ^{Note1}	dB					
OCNG_R B ^{Note1} SNR Note 8	dB	4.5	0.5	40.7	0.7	4.5
SNR	dB	-4.5	-8.5	-13.7	-9.7	-4.5
N_{oc}	dBm/15			-98		
	kHz					
Propagation condition				AWGN		
Note 1: For the special subfr						
Note 2: For the uplink-downl						
Note 3: OCNG shall be used					and a consta	nt total
transmitted power sp						
Note 4: The uplink resources						
	3 filtering rela	elated parameters are configured prior to the start of time period				
T1.	DD00114 115					
Note 6: The signal contains						
Note 7: SNR levels correspo						
Note 8: The SNR in time per			is denoted as	S SNK1, SNK	(2, SNR3, SN	ik4 and
SNR5 respectively in	n figure 7.3.8.4	F1.				

Table 7.3.8.5-2: DRX-Configuration for E-UTRAN TDD Radio Link Monitoring in-sync in DRX test

Field	Value	Comment
onDurationTimer	psf2	As specified in section 6.3.2 in
drx-InactivityTimer	psf1	3GPP TS 36.331 [5]
drx-RetransmissionTimer	psf1	1
longDRX-CycleStartOffset	sf40	1
shortDRX	disable	

Table 7.3.8.5-3: TimeAlignmentTimer -Configuration for E-UTRAN TDD Radio Link Monitoring in-sync in DRX test

Field	Value	Comment
TimeAlignmentTimer	infinity	As specified in section 6.3.2 in 3GPP TS 36.331 [5]
sr-ConfigIndex	2	For further information see section 6.3.2 in 3GPP TS 36.331 [5] and section10.1 in 3GPP TS 36.213 [8].

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (1120 ms after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the uplink subframe according to the configured CQI reporting mode (PUCCH 1-0).

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power -39 dBm (as defined in TS 36.521-1 [10] clause 6.3.2.5) means uplink signal

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

7.3.9 E-UTRAN FDD Radio Link Monitoring Test for Out-of-sync-Non MBSFN ABS (eICIC)

Editor's notes: This test is incomplete. The following aspects are either missing or not yet determined:

- Many clauses are still FFS
- The test tolerances are undefined

7.3.9.1 Test purpose

To verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction.

7.3.9.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 10 and forward which support

7.3.9.3 Minimum conformance requirements

7.3.9.4 Test description

7.3.9.4.1 Initial conditions

Table 7.3.9.4.1-1: General test parameters for E-UTRAN FDD out-of-sync testing under time domain measurement resource restriction with non-MBSFN ABS (eICIC)

Para	meter	Unit	Value	Comment
PCFICH/PDC	CH/PHICH		R.9.FDD	As specified in section A.2.1.
parameters				None of the PDCCH are intended for the UE under test
OCNG param	eters		OP. 6 FDD	As specified in section D.1.6.
Serving cell (F			Cell 1	Cell 1 is on E-UTRA RF channel number 1
Neighbour cel			Cell 2	Aggressor cell on E-UTRA RF channel number
Neighbour cel configuration	I ABS		Non-MBSFN ABS	As defined in Table C.3.1.1.2-1
CP length			Normal	
E-UTRA RF C	:hannel		1	One E-UTRA FDD carrier frequency is used.
Number				one 2 or act 22 camer mequality to accu.
E-UTRA Char (BW _{channel})	nnel Bandwidth	MHz	10	
Correlation Ma	atrix and		2x2 Low	Correlation Matrix and Antenna Configuration
Antenna Conf				are defined in TS 36.521-1 [10] Annex B.2.3.2
Out of sync	DCI format	1	1A	As defined in section 5.3.3.1.3 in TS 36.212
transmission	Number of		3	Out of sync threshold Q _{out} and the
parameters	Control			corresponding hypothetical PDCCH/PCFICH
(Note 1)	OFDM			transmission parameters are as specified in
	symbols			section 7.6.1 and Table 7.6.1-1 respectively.
	Aggregation level	CCE	8	
	ρΑ, ρΒ		-3	
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX	•		OFF	
Layer 3 filterin	ıg		Enabled	Counters:: N310 = 1; N311 = 1
T310 timer		ms	0	T310 is disabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI r	eporting mode		PUCCH 1-0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting	periodicity	ms	2	Minimum CQI reporting periodicity
Time offset be	-		3 μs	Synchronous cells
T1	AWOOTT COILC		1	Synonionodo cono
		S		
T2		S	0.4	
T3		S	0.5	
Physical cell II	D PCI		(PCI _{cell1} -PCI _{cell2})mod3 != 0	Cell IDs are chosen such that CRS from cells 1 and 2 do not overlap in frequency
ABS pattern			'100000010000001000 00001000000010000000'	FDD ABS Pattern Info IE, as defined in TS 36.423, clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the PCell subframe #0 SFN 0. No MBSFN subframes are configured in the ABS subframes.
Time domain resource restr	iction pattern		'10000000100000001000 0000100000001000000	Time domain measurement resource restriction pattern for serving cell measurement signalled to the UE in message measSubframePattern PCell -r10 as defined in TS 36.331, clause 6.3.2.

Note 1: PDCCH/PCFICH corresponding to the out of sync transmission parameters need not be included in the Reference Measurement Channel

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7.3.9.4.2 Test procedure

FFS

7.3.9.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

FFS

7.3.9.5 Test requirements

FFS

Table 7.3.9.5-1: Cell specific test requirement parameters for E-UTRAN FDD for out-of-sync radio link monitoring under time domain measurement resource restriction with non-MBSFN ABS (eICIC)

Parameter	Unit		Cell 1			Cell 2		
		T1	T2	T3	T1	T2	Т3	
E-UTRA RF Channel			1			1		
Number								
BW _{channel}	MHz		10			10		
Correlation Matrix			2x2 Low			2x2 Low		
and Antenna								
Configuration								
OCNG Pattern			OP.6 FDD			OP.6 FDD		
defined in D.1.6								
(FDD)								
ρα, ρΒ	ID		-3			-3		
PCFICH_RB	dB		1					
PDCCH_RA	dB		1					
PDCCH_RB	dB		11					
PBCH_RA	dB							
PBCH_RB	dB				N 450			
PSS_RA	dB				Non-ABS and ABS subf			
SSS_RA PHICH_RA	dB				channel powers defined Table C.3.1.1.2-1.			
PHICH_RB	dB dB		-3					
PDSCH_RA	dB	-			-			
PDSCH_RB	dB	_						
OCNG_RA ^{Note1}	dB dB							
OCNG_RB ^{Note1}	dB							
SNR Note 6	dB	-1.3	-5.4 -12.4			[5]		
	dBm/15	-1.0	-98	-12.7		-98		
N_{oc}	kHz		-30			-30		
Propagation condition	IXI IZ		ETU 30			ETU 30		
	be used such	that the rec		مرد 1 # المر	fully alloc		nnetant	
	ted power spe						Onstant	
	sources for Co						time	
period T1.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ar roporting	g are accig	100 10 1110	0 = p.1.01 to	, ino otani oi		
	Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time							
	ontains PDCCI	H for UEs o	other than t	he device	under test	as part of C	CNG.	
	gnal contains PDCCH for UEs other than the device under test as part of OCNG. evels correspond to the signal quality, signal-to-interference-plus-noise ratio, on the Es.							
Note 6: The SNR in t	the restricted n SNR1, SNR2 a						nd T3 is	

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.10 E-UTRAN TDD Radio Link Monitoring Test for Out-of-sync-Non MBSFN ABS (eICIC)

Editor's notes: This test is incomplete. The following aspects are either missing or not yet determined:

- Many clauses are still FFS
- The test tolerances are undefined

7.3.10.1 Test purpose

To verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell under time domain measurement resource restriction.

7.3.10.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 10 and forward which support

7.3.10.3 Minimum conformance requirements

7.3.10.4 Test description

7.3.10.4.1 Initial conditions

Table 7.3.10.4.1-1: General test parameters for E-UTRAN TDD out-of-sync testing under time domain measurement resource restriction with non-MBSFN ABS (eICIC)

	ameter	Unit	Value	Comment
PCFICH/PDC	CH/PHICH		R.9 TDD	As specified in section A.2.2.
parameters				None of the PDCCH are intended for
				the UE under test
OCNG parame	eters		OP.2 TDD	As specified in section D.2.2.
Serving cell			Cell 1	Cell 1 is on E-UTRA RF channel
J				number 1
Neighbour cell			Cell 2	Cell 2 is the aggressor cell on E-UTRA
J				RF channel number 1
Neighbour cell	I ABS		Non-MBSFN ABS	As defined in Table C.3.1.1.2-1
configuration				
CP length			Normal	
	hannel Number		1	One E-UTRA TDD carrier frequency is
				used.
E-UTRA Chan	nel Bandwidth	MHz	10	
(BW _{channel})	20			
Correlation Ma	atrix and		2x2 Low	Correlation Matrix and Antenna
Antenna Confi				Configuration are defined in TS 36.521-
	J			1 [10] Annex B.2.3.2
Out of sync	DCI format		1A	As defined in section 5.3.3.1.3 in TS
transmission	20omat			36.212
parameters	Number of		3	Out of sync threshold Q _{out} and the
(Note 1)	Control OFDM			corresponding hypothetical
,	symbols			PDCCH/PCFICH transmission
•	Aggregation	CCE	8	parameters are as specified in section
	level	OOL		7.6.1 and Table 7.6.1-1 respectively.
ŀ			-3	The frame rable from Free position.
•	ρ _A , ρ _B Ratio of	dB	1	
	PDCCH to RS	uБ	1	
	EPRE			
-	Ratio of	dB	1	-
	PCFICH to RS	uБ	1	
	EPRE			
Dhusiaal aall II			(DCI DCI \max d2.1	Cell IDs are chosen such that CRS from
Physical cell II	DPCI		(PCI _{cell1} -PCI _{cell2})mod3!=	
			0	cells 1 and 2 do not overlap in
ABS pattern			[1000000001000000000]	frequency. TDD ABS Pattern Info IE is configured
Abo pattern			[10000000001000000000]	in Cell 2 as defined in section 9.2.54 in
				TS 36.423.
				No MBSFN subframes are configured in
				the ABS subframes.
Time domain r	maasuramant		[1000000001000000000]	
resource restri			[1000000001000000000]	in UE for serving cell measurement as
1030uioc icalii	ισιιστι ραιιστι			defined in section 6.3.6 in TS 36.331.
DRX			OFF	45.11104 III 000tion 0.0.0 III 10 00.001.
Layer 3 filterin	ď		Enabled	Counters:
Layer 3 miletim	Э		Lilabieu	N310 = 1; N311 = 1
T310 timer		me	0	T310 is disabled
T310 timer		ms	1000	T311 is enabled
	eporting mode	ms	PUCCH 1-0	As defined in table 7.2.2-1 in TS
renould GQI f	eporting mode		FUCCH I-U	36.213.
	periodicity	ms	1	Minimum CQI reporting periodicity
CQI reporting	tween cells	μS	3	
CQI reporting Time offset be		1	ETU30	
Time offset be	hannel			†
Time offset be Propagation cl	hannel	s	1	
Time offset be Propagation cl T1	hannel	S		
Time offset be Propagation cl T1 T2	hannel	s	0.4	
Time offset be Propagation of T1 T2 T3		S S	0.4 0.5	ion parameters need not be included in

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7.3.10.4.2 Test procedure

FFS

7.3.10.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

FFS

7.3.10.5 Test requirements

Table 7.3.10.5-1: Cell specific test requirement parameters for E-UTRAN TDD for out-of-sync radio link monitoring under time domain measurement resource restriction with non-MBSFN ABS (eICIC)

Parameter	Unit	Unit Cell 1 Cell 2			Cell 2		
		T1	T2	Т3	T1	T2	Т3
E-UTRA RF Channel			1			1	
Number							
BW _{channel}	MHz		10			10	
Correlation Matrix			2x2 Low			2x2 Low	
and Antenna							
Configuration							
Special subframe			6			6	
configuration Note1							
Uplink-downlink			1			1	
configuration Note2							
OCNG Pattern			OP.2 TDD			OP.2 TDD	
defined in D.2.2							
(TDD)							
ρα, ρΒ			-3			-3	
PCFICH_RB	dB		1			and ABS	
PDCCH_RA	dB		1			I powers de	
PDCCH_RB	dB		1		ı ar	ole C.3.1.1.	2-1.
PBCH_RA	dB						
PBCH_RB	dB						
PSS_RA	dB						
SSS_RA	dB						
PHICH_RA	dB		-3				
PHICH_RB	dB		· ·				
PDSCH_RA	dB						
PDSCH_RB	dB						
OCNG_RANote 3	dB						
OCNG_RB ^{Note 3}	dB		•	ı			
SNR Note 8	dB	-1.3	-5.4	-12.4		[5]	
N_{oc}	dBm/15		-98			-98	
	kHz						
Propagation condition			ETU30			ETU30	
	ial subframe c						
	k-downlink cor						
Note 3: OCNG shall	be used such	that the res	sources in o	cell # 1 are	fully alloca	ated and a	constant
	tted power spe						
Note 4: The uplink reperiod T1.							f time
Note 5: The timers a period T1.	The timers and layer 3 filtering related parameters are configured prior to the start of time						rt of time
	ontains PDCC	H for UEs	other than t	he device	under test	as part of C	CNG.
	correspond to t						
	time periods T	1, T2 and 1	Γ3 of active	cell is den	oted as SN	NR1, SNR2	and

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

SNR3 respectively in figure A.7.3.10.1-1.

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The UE shall stop transmitting uplink signal no later than time point C (240 ms after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.11 E-UTRAN FDD Radio Link Monitoring Test for In-sync-Non MBSFN ABS (eICIC)

Editor's notes: This test is incomplete. The following aspects are either missing or not yet determined:

- Many clauses are still FFS
- The test tolerances are undefined

7.3.11.1 Test purpose

To verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell.

7.3.11.2 Test applicability

This test applies to all types of E-UTRA FDD UE release 10 and forward which support \dots

7.3.11.3 Minimum conformance requirements

7.3.11.4 Test description

7.3.11.4.1 Initial conditions

Table 7.3.11.4.1-1: General test parameters for E-UTRAN FDD in-sync testing under time domain measurement resource restriction (elCIC)

Parameter		Uni	Value	Comment
PCFICH/PDCCH/PHICH parameters		t	R.9 FDD	As specified in section A.2.1. None of the PDCCH are intended for the UE under test
OCNG parai	meters		OP.6 FDD	As specified in section D.1.6.
Active cell			Cell 1	Cell 1 is on E-UTRA RF channel number 1
J	Neighbour cell		Cell 2	Cell 2 is on E-UTRA RF channel number 1; Cell 2 generates interference over restricted resources.
Neighbour c configuration			Non- MBSFN ABS	As defined in Table C.3.1.1.2-2
CP length			Normal	
E-UTRA RF Number	Channel		1	One E-UTRA FDD carrier frequency is used.
E-UTRA Cha (BWchannel	annel Bandwidth	MH z	10	
Correlation N Antenna Cor	Matrix and nfiguration		2x2 Low	Correlation Matrix and Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2
In sync transmissi	DCI format		1C	As defined in section 5.3.3.1.4 in TS 36.212
on parameter s for the	Number of Control OFDM symbols		3	In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission
active cell (Note 1)	Aggregation level	CC E	4	parameters are as specified in section and Table 7.6.1-2
	ρΑ, ρΒ		-3	respectively.
	Ratio of PDCCH to RS EPRE	dB	-3	
	Ratio of PCFICH to RS EPRE	dB	1	
Out of sync	DCI format		1A	As defined in section 5.3.3.1.3 in TS 36.212
transmissi on parameter	Number of Control OFDM symbols		3	Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission
s for active cell (Note	Aggregation level	CC E	8	parameters are as specified in section 7.6.1 and Table 7.6.1-1
1)	ρΑ, ρΒ		-3	respectively.
	Ratio of PDCCH to RS EPRE	dB	1	
	Ratio of PCFICH to RS EPRE	dB	1	
DRX			OFF	
Layer 3 filtering			Enabled	Counters: N310 = 1; N311 = 1
T310 timer		ms	2000	T310 is enabled
T311 timer		ms	1000	T311 is enabled
Periodic CQI reporting mode			PUCCH 1- 0	As defined in table 7.2.2-1 in TS 36.213.
CQI reporting periodicity		ms	2	Minimum CQI reporting

			periodicity
Time offset between cells	μS	3	
Propagation channel		ETU30	
T1	S	0.5	
T2	S	0.4	
T3	S	1.46	
T4	S	0.4	
T5	S	1	
Physical cell ID PCI		(PCI _{cell1} - PCI _{cell2})mo d3!= 0	Cell IDs are chosen such that CRS from cells 1 and 2 do not overlap in frequency
ABS pattern		'100000001 00000010 000000100 000001000 0000'	FDD ABS Pattern Info IE, as defined in TS 36.423, clause 9.2.54. Configured in Cell 2. The first/leftmost bit corresponds to the PCell subframe #0 SFN0. No MBSFN subframes are configured in the ABS subframes.
Time domain measurement resource restriction pattern Note 1: PDCCH/PCFICH of		'100000001 00000010 00000100 0000'	TDM pattern for serving cell measurement signalled to the UE in message measSubframePattern PCell - r10 as defined in TS 36.331, clause 6.3.2.

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

FFS

7.3.11.4.2 Test procedure

FFS

7.3.11.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

FFS

7.3.11.5 Test requirements

Table 7.3.11.5-1: Cell specific test requirement parameters for E-UTRAN FDD for in-sync radio link monitoring under time domain measurement resource restriction (elClC)

Parameter Unit		Cell 1						Cell 2					
		T1	T2	T3	T4	T5	T1	T2	T3	T4	T5		
E-UTRA RF Channel			1					1					
Number													
BW _{channel}	MHz	10						10					
Correlation Matrix	2x2 Low							2x2 Lo	w				
and Antenna													
Configuration													
PCFICH/PDCCH/PHI				R.9 FD)D				R.9 FD	DD			
CH parameters													
Number of Control				3					3				
OFDM symbols													
OCNG Pattern				OP.6 F	DD			(OP.6 F	DD			
defined D.1.6 (FDD)													
ρ_A , ρ_B			-3					-3					
PCFICH_RB	PCFICH_RB dB			1					Non-ABS and ABS subframe				
PDCCH_RA	PDCCH_RA dB			-3					channel powers defined in Table				
PDCCH_RB	dB			-3				C	2.3.1.1.	2-2.			
PBCH_RA	dB												
PBCH_RB	dB	-3											
PSS_RA	dB												
SSS_RA	dB												
PHICH_RA	dB												
PHICH_RB	dB	s											
PDSCH_RA	dB												
PDSCH_RB	dB												
OCNG_RA ^{Note 1}	dB												
OCNG RR ^{Note 1}	dB	1											
SNR Note 6	dB	-1.3 -5.4 -12.4 -7.3 -1.3						[5]					
N_{oc}	dBm/15	-98					-98						
KΠZ													
Propagation condition		ETU30					ETU30						

Note 1: OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all subframes configured for CQI transmission according to the configured CQI reporting mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.

7.3.12 E-UTRAN TDD Radio Link Monitoring Test for In-sync-Non MBSFN ABS (eICIC)

Editor's notes: This test is incomplete. The following aspects are either missing or not yet determined:

- Many clauses are still FFS
- The test tolerances are undefined

Note 2: The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1.

Note 3: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.

Note 4: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 5: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.

Note 6: The SNR in time periods T1, T2, T3, T4 and T5 of the active cell is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.7.3.11.1-1.

7.3.12.1 Test purpose

To verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the serving cell.

7.3.12.2 Test applicability

This test applies to all types of E-UTRA TDD UE release 10 and forward which support

7.3.12.3 Minimum conformance requirements

7.3.12.4 Test description

7.3.12.4.1 Initial conditions

Table 7.3.12.4.1-1: General test parameters for E-UTRAN TDD in-sync testing under time domain measurement resource restriction (elCIC)

PCFICH/PDCCH/PHICH parameters OCNG parameters As defined in section 5.3.3.1.3 In TS 36.212 Parameters OCNG parameters O	Parameter		Uni	Value	Comment
OCNG parameters OP.2 TDD As specified in section D.2.2 Active cell Cell 1 Cell 1 is on E-UTRA RF channel number 1 Neighbour cell Cell 2 Cell 2 is on E-UTRA RF channel number 1; Cell 2 generates interference over restricted resources. Neighbour cell ABS configuration Non-MBSFN AB defined in Table C.3.1.1.2-2 generates interference over restricted resources. CP length Normal E-UTRA RF Channel Number Normal E-UTRA RF Channel Bandwidth (BWchannel) MH Correlation Matrix and Antenna Configuration Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2 In sync transmissi on parameter sort transmissi on excitive cell (Note 1) Number of Control OFDM symbols 3 In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in Section 3.3.1.3 in TS 36.212 Out of Sync EPRE ABB -3 PDCCH/PCFICH transmission on parameter are as specified in Section 5.3.3.1.3 in TS 36.212 Out of Sync CHYPCFICH to RS EPRE ABB -1 PCFICH to RS EPRE ABB -1 PCFICH to RS EPRE ABB -1 PCFICH to RS EPRE ABB -1 PCFICH to RS EPRE ABB -1 PCFICH to RS EPRE ABB -1 PCFICH to RS EPRE ABB -1 PCFICH to RS EPRE ABB -1 PCFICH to RS EPRE ABB -1 PCFICH to RS EPRE			t	R.9 TDD	None of the PDCCH are
Cell 1 Cell 1 Son E-UTRA RF Channel number 1 Cell 2 Son E-UTRA RF Channel number 1 Cell 2 Senerates interference over restricted resources.	OCNG parameters			OP.2 TDD	
Neighbour cell Section Cell 2 Cell 2 is on E-UTRA RF channel number 1; Cell 2 generates interference over restricted resources.					Cell 1 is on E-UTRA RF
configuration ABS 2 CP length Normal E-UTRA RF Channel Number 1 One E-UTRA TDD carrier frequency is used. E-UTRA Channel Bandwidth (BWchannel) MH 10 Correlation Matrix and Antenna Configuration 2x2 Low Correlation Matrix and Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2 In sync transmissis on parameter s for the active cell (Note 1) DCI format 1C As defined in section 5.3.3.1.4 in TS 36.212 (Note 1) Number of control OFDM symbols 3 In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively. Number of PDCCH to RS EPRE dB -3 Out of sync Sync 1A As defined in section 5.3.3.1.3 in TS 36.212 Number of Control OFDM sync 3 Out of sync threshold Qout and the corresponding hypothetical pocchively. Sync Transmissi on Parameters are as a specified in section 5.3.3.1.3 in TS 36.212 Out of Sync Sync Aggregation Evel C 8 Evel Transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively. Transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectiv	Neighbour cell			Cell 2	channel number 1; Cell 2 generates interference over
CP length E-UTRA RF Channel Number 1					
E-UTRA RF Channel Number 1 One E-UTRA TDD carrier frequency is used. E-UTRA Channel Bandwidth (BWchannel) MH 10 Correlation Matrix and Antenna Configuration 2x2 Low Correlation Matrix and Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2 In sync transmissi on parameter s for the active cell (Note 1) DCI format 1C As defined in section 5.3.3.1.4 in TS 36.212 Number of control OFDM symbols 3 In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively. Out of sync transmissi on parameter s for active cell (Note 1) Number of Control OFDM symbols 3 As defined in section 5.3.3.1.3 in TS 36.212 Out of sync transmissi on parameter s for active cell (Note 1) Number of Control OFDM symbols 3 Out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively. 1) Ratio of PDCCH to RS EPRE 6 8 1 Ratio of PDCCH to RS EPRE C 8 1 Ratio of PDCCH to RS EPRE C 8 1 Ratio of PDCCH to RS EPRE C 8 1 Ratio of PDCCH to		•			_
E-UTRA Channel Bandwidth (BWchannel) Correlation Matrix and Antenna Configuration Antenna Configuration DCI format In sync transmissi on parameter s for the active cell (Note 1) Antenna Configuration DCI format In sync transmissi on parameter s for the active cell (Note 1) Antenna Configuration DCI format In sync transmissi on parameter s are as specified in section 5.3.3.1.4 in TS 36.212 As defined in section 5.3.3.1.4 in TS 36.212 As defined in section 5.3.3.1.4 in TS 36.212 In sync threshold Qin and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively. Aggregation CC 4 section 1 section 3 in TS 36.212 Out of sync transmissi on parameters are as specified in section 5.3.3.1.3 in TS 36.212 Tansmissi on parameter section 5.3.3.1.3 in TS 36.212 As defined in section 5.3.3.1.4 in TS 36.212 Tansmission parameter section 5.3.3.1.3 in TS 36.212 Tansmission parameter section 7.6.1 and Table 7.6.1-1 respectively. DCI format 3 out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively. DCI format 3 out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively. DCI format 3 out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively. DCI format 3 out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively. DCI format 3 out of sync threshold Qout and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 and Table 7.6.1-1 respectively.	E-UTRA RF	Channel			
Correlation Matrix and Antenna Configuration				10	
transmissi on parameter s for the active cell (Note 1) Out of PDCCH to RS EPRE Out of Sync transmissi on PCFICH to RS EPRE Out of Sync transmissi on PCFICH to RS EPRE Out of Sync transmissi on PCFICH to RS EPRE Out of Sync transmissi on PCFICH to RS EPRE Out of Sync transmissi on PCFICH to RS EPRE Out of Sync transmissi on PCFICH to RS EPRE Out of Sync transmissi on PCFICH to RS EPRE Out of Sync transmissi on PCFICH to RS EPRE Aggregation CC 8 automater s for active cell (Note 1) PA, pB	Correlation I	Matrix and		2x2 Low	Antenna Configuration are defined in TS 36.521-1 [10] Annex B.2.3.2
parameter s for the active cell (Note 1) Control OFDM symbols corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section and Table 7.6.1-2 respectively. (Note 1) PA, ρB (PDCCH to RS EPRE) -3 (PDCCH to RS EPRE) -3 (PDCCH to RS EPRE) Out of sync transmission parameter s for active cell (Note 1) DCI format (PDCCH to RS EPRE) 1A (PDCCH to RS EPRE) 3 (PDCCH to RS EPRE) 1) Aggregation (PDCCH to RS EPRE) CCC (PDCCH to RS EPRE) 8 (PDCCH to RS EPRE) 2 (PDCCH to RS EPRE) 1) Aggregation (PDCCH to RS EPRE) CCC (PDCCH to RS EPRE) 8 (PDCCH to RS EPRE) 2 (PDCCH to RS EPRE) DRX OFF Counters: N310 = 1; N311 = 1 Tatlo timer ms 2000 T310 is enabled T311 timer ms 2000 T311 is enabled Periodic CQI reporting mode PUCCH 1-0 As defined in section 5.3.3.1.3 in TS 36.213.		DCI format		1C	
Note 1 N	parameter	Control OFDM		3	corresponding hypothetical
Ratio of PDCCH to RS EPRE Ratio of PCFICH to RS EPRE Ratio of PCFICH to RS EPRE DCI format 1A As defined in section 5.3.3.1.3 in TS 36.212 m TS 36.213 m				4	
PDCCH to RS EPRE Ratio of PCFICH to RS EPRE		ρΑ, ρΒ			respectively.
PCFICH to RS EPRE		PDCCH to RS	dB	-3	
Sync In TS 36.212 In TS 36.212		PCFICH to RS	dB	1	
on parameter s for active cell (Note 1) Control OFDM symbols and the corresponding hypothetical PDCCH/PCFICH transmission parameters are as specified in section 7.6.1 1) Aggregation level E -3 and Table 7.6.1-1 respectively. PDCCH to RS EPRE Ratio of PCFICH to RS EPRE dB 1 respectively. DRX OFF Counters: N310 = 1; N311 = 1 N310 = 1; N311 = 1 T310 timer ms 2000 T310 is enabled T311 timer ms 1000 T311 is enabled Periodic CQI reporting mode PUCCH 1-0 As defined in table 7.2.2-1 in TS 36.213.	sync	DCI format			in TS 36.212
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	on	Control OFDM		3	and the corresponding
Ratio of				8	
PDCCH to RS EPRE Ratio of PCFICH to RS EPRE PCFICH to RS EPRE PCFICH to RS EPRE PCFICH to RS EPRE PCFICH to RS Enabled Counters: N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS N310 = 1; N311 = 1 PCFICH to RS P	1)	ρΑ, ρΒ		-3	
PCFICH to RS EPRE		PDCCH to RS	dB	1	respectively.
Layer 3 filtering Enabled Counters: N310 = 1; N311 = 1 T310 timer ms 2000 T310 is enabled T311 timer ms 1000 T311 is enabled Periodic CQI reporting mode PUCCH 1-0 As defined in table 7.2.2-1 in TS 36.213.		PCFICH to RS	dB	1	
N310 = 1; N311 = 1 T310 timer					
T311 timer ms 1000 T311 is enabled Periodic CQI reporting mode PUCCH 1-0 As defined in table 7.2.2-1 in TS 36.213.	Layer 3 filtering			Enabled	
Periodic CQI reporting mode PUCCH 1-0 As defined in table 7.2.2-1 in TS 36.213.			ms		
			ms		As defined in table 7.2.2-1 in
<u> </u>	CQI reportin	CQI reporting periodicity		2	TS 36.213. Minimum CQI reporting

			periodicity					
Time offset between cells	μS	3						
Propagation channel		ETU30						
T1	S	0.5						
T2	S	0.4						
T3	S	1.46						
T4	S	0.4						
T5	S	1						
Physical cell ID PCI		(PCI _{cell1} - PCI _{cell2})mod 3!= 0	Cell IDs are chosen such that CRS from cells 1 and 2 do not overlap in frequency					
ABS pattern		[100000000 1000000000]	TDD ABS Pattern Info IE, as defined in TS 36.423, clause 9.2.54. Configured in Cell 2. No MBSFN subframes are configured in the ABS subframes.					
Time domain measurement resource restriction pattern		[1000000000] TDM pattern for serving comeasurement signalled to UE in message measSubframePattern PC r10 as defined in TS 36.3: clause 6.3.2. Configured in Cell 1.						
Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference								

Note 1: PDCCH/PCFICH corresponding to the in-sync and out of sync transmission parameters need not be included in the Reference Measurement Channel.

FFS

7.3.12.4.2 Test procedure

FFS

7.3.12.4.3 Message contents

Message contents are according to TS $36.508\ [7]$ clause $4.6\ with the following exceptions:$

FFS

7.3.12.5 Test requirements

Table 7.3.12.5-1: Cell specific test requirement parameters for E-UTRAN TDD for in-sync radio link monitoring under time domain measurement resource restriction (elCIC)

Parameter	Unit	Cell 1						Cell 2					
		T1 T2 T3 T4 T5						T1 T2 T3 T4 T5					
E-UTRA RF Channel Number				1		1							
	MHz			10		40							
BW _{channel} Correlation Matrix	IVITZ	10							10				
		2x2 Low						2x2 Low					
and Antenna Configuration													
Special subframe		6						6					
configuration ^{Note1}				0			0						
Uplink-downlink configuration Note2				1					1				
PCFICH/PDCCH/PHI				R.9 TD	D				R.9 TD	D			
CH parameters													
Number of Control				3					3				
OFDM symbols													
OCNG Pattern				OP.2 TE	DD			(OP.2 T	DD			
defined in D.2.2													
(TDD)													
ρα, ρΒ				-3			-3						
PCFICH_RB	dB			1			Non-ABS and ABS subframe						
PDCCH_RA	dB			-3			channel powers defined in Table						
PDCCH_RB	dB			-3			C.3.1.1.2-2.						
PBCH_RA	dB												
PBCH_RB	dB												
PSS_RA	dB												
SSS_RA	dB												
PHICH_RA	dB			•									
PHICH_RB	dB			-3									
PDSCH_RA	dB												
PDSCH RB	dB												
OCNG_RA ^{Note 3}	dB												
OCNG RB ^{Note 3}	dB												
SNR Note 8	dB	-1.3 -5.4 -12.4 -7.3 -1.3						[5]					
N_{oc}	dBm/15 kHz	-98					-98						
Propagation condition		ETU30					ETU30						
	ial subframe o k-downlink co												

- OCNG shall be used such that the resources in cell # 1 are fully allocated and a constant total transmitted Note 3: power spectral density is achieved for all OFDM symbols.
- The uplink resources for CQI reporting are assigned to the UE prior to the start of time period T1. Note 4:
- The timers and layer 3 filtering related parameters are configured prior to the start of time period T1. Note 5:
- The signal contains PDCCH for UEs other than the device under test as part of OCNG. Note 6:
- Note 7: SNR levels correspond to the signal to noise ratio over the cell-specific reference signal REs.
- The SNR in time periods T1, T2, T3, T4 and T5 of active cell is denoted as SNR1, SNR2, SNR3, SNR4 and Note 8: SNR5 respectively in figure A.7.3.12.1-1.

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (420 ms after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink subframes configured for CQI transmission according to the configured CQI mode (PUCCH 1-0).

The rate of correct events observed during repeated tests shall be at least 90%.