PERSONAL HANDY PHONE SYSTEM

TEST ITEMS AND CONDITIONS FOR PRIVATE CELL STATION COMPATIBILITY CONFIRMATION

ARIB TECHNICAL REPORT

VERSION 2.2

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Association of Radio Industries and Businesses (ARIB)

General notes for the ARIB technical report in English version

The original "Personal Handy Phone system Test Items and Conditions for Private Call Station Compatibility Confirmation ARIB technical report Version 2.2 (ARIB TR-T5)" is written in Japanese and approved by the 23rd Standard Assembly Meeting February 2, 1999. This document is the translation of the technical report into English.

INTRODUCTION

The Association of Radio Industries and Businesses (ARIB) has been investigating and summarizing the basic technical requirements for establishing standards for developing various radio systems which utilize radiowaves. These will appear in the form of standards or technical reports governing the use of radio facilities and equipment for systems that transmit over radiowaves. Such standards are being developed based on the participation of and discussions with the various radio equipment manufacturers, operators and users.

Technical reports such as this serve as guidelines for developing private standards for regulating measurement and testing methods for use of the pertinent radio equipment based on the publicly established standard so as to ensure the necessary quality levels and compatibility of the radio equipment being developed.

This technical report specifies “Test Items and Conditions for Public Personal Station Compatibility Confirmation.” In order to ensure fairness, impartiality and openness among all parties involved, during the drafting stages, we are inviting operators and users both domestically and overseas to participate openly in the activities of the Standard Assembly so as to develop standards based on the total agreement of all parties involved.

The scope of application of this technical report covers the basic items for ensuring the compatibility of personal stations with the public cell stations of individual telecommunications operators. In order to put this technical report into practical use, it is necessary for telecommunications equipment operators and testing organizations dealing with the “Personal Handyphone System” to develop their own original sets of values which fall within the scope of this technical report.

We hope that this technical report will aid all parties involved, including radio equipment manufacturers, telecommunication operators and equipment users.

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Chapter 1 General Facts

1.1 Overview

Tests related to compatibility confirmation on “private cell station for the Personal Handy Phone System" (hereinafter referred to as "cell station") are performed for each cell station type within the scope of the basic functions and the standardization options prescribed in the Personal Handy Phone System ARIB Standard Version 3 (RCR STD-28) for private use. The purpose of these tests is to check the Cell Station's compatibility with the radio interfaces specified in the RCR STD-28. In principle, “types” as used in this standard shall refer to units that are identical to those subject to the certification of conformity with the technical standards conducted by Telecom Engineering Center (TELEC).

As a pre-condition for these tests, the operation of cell stations based on the said standard shall be confirmed thoroughly in the development and manufacturing stages under the sole responsibility of the manufacturers of the cell stations.

The tests are conducted within the scope of the general testing environment, and the settings for the test environment or assignments of functions to the cell station are chosen in a manner that will not burden the testing organizations or cell station manufacturers.

(Note) TELEC was formerly called as MKK (Radio Equipment Inspection and Certification Institute).

1.2 Classification of tests

There are two types of tests for compatibility of cell stations : (1) the connection simulator tests, and (2) the compatibility confirmation tests. These tests shall be mainly conducted by the cell station manufacturers.

The connection simulator tests shall be conducted to check the specified test items under the specified test conditions using a connection simulator.

The compatibility confirmation tests shall be conducted by connecting a cell station which has already undergone the connection simulator test for checking the specified test items under the specified test conditions using a test system.

Note that the schedule for these tests can be set freely, regardless of whether they are conducted before or after the tests for the certification of conformity with the technical standards are conducted.

Chapter 2 Connection simulator Tests

2.1 Purpose

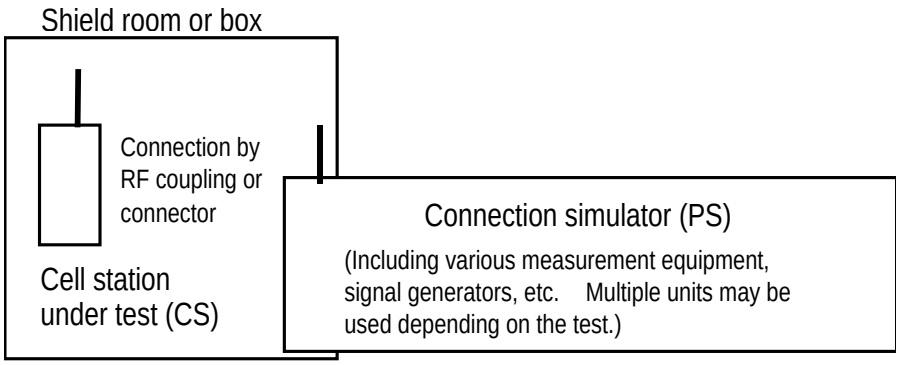
The connection simulator test is conducted using a connection simulator to check that cell stations produced by individual cell station manufacturers satisfy the private standard in the Personal Handy Phone System ARIB Standard Version 3 (RCR STD-28).

2.2 Configuration of the test system

Fig. 2.1 is an example of the configuration of the connection simulator test.

The connection simulator is generally referred to as a “personal station simulator” and features the functions for simulating the basic functions of a personal station, such as RF transmission and reception and transmission and reception with cell stations. This technical report does not specify the type of simulator to be used; however, it must be capable of simulating the specified functions.

Note that the connection simulator may sometimes be hereinafter referred to as "PS" and the cell station as "CS".



(Cell stations may include pseudo switches, telephones etc. Multiple units may be used depending on the test.)
The radiowave reception environment between the PS and CS must be extremely good

Basic functions for PS
- RF TX/RX characteristics functions
- Transmission power control
- Location registration reception
- Incoming call, communication, disconnection from CS
- Outgoing call, communication, disconnection to CS
- Channel switching during communication, handover
- Definition and transmission indication for LCCH
- Definition of various control sequences
- Control result output
- Connection with other measuring instruments

Fig. 2.1 System configuration for the connection simulator test

2.3 Test items and conditions

2.3.1 Test item lists

2.3.1.1 Test items related to the technical requirements for radio facilities

The following items related to the technical requirements for radio facilities are to be tested using a connection simulator.

Test no.	Test item
1-1	Transmission characteristics
1-1-1	Transmission power
1-1-2	Transient response characteristics of burst transmission
1-1-3	Frequency stability
1-1-4	Modulation accuracy
1-1-5	Transmission rate accuracy
1-1-6	Physical slot transmission condition
1-1-7	Transmission timing
1-1-8	Transmission jitter
1-2	Reception characteristics
1-2-1	Sensitivity
1-2-2	Receive signal strength indicator accuracy

2.3.1.2 Test items related to the communication control methods

The following items related to the communication control methods are to be tested by using a connection simulator.

Test no.	Test item
2-1	Basic operation tests
2-1-1	Location registration — Location registration on turning the power for the PS ON
2-1-2	En block sending / Overlap sending — PS originates a call and switches to the communication state (Note 1)
2-1-3	Disconnection (PS) — A call disconnected by the onhook operation for the PS during communication.
2-1-4	Incoming call — Paging (BCD 13 digits or less) (Note 1) Paging (BCD 12 digits or less) (Note 1) Paging (7 digits hexadecimal) (Note 1) Paging (13 digits hexadecimal) (Note 1) Zone paging (Note 1) — After a call is received by the PS, PS is switched to the communication state by the offhook operation.
2-1-5	Disconnection (CS) — CS disconnects the call during communication .
2-1-6	64k bit/s UDI outgoing call — Simulator originates a 64k bit/s UDI call and switch to the communication state (Note 3)
2-1-7	64k bit/s UDI disconnection (simulator)

— A call disconnected by simulator during a 64k bit/s UDI communication (Note 3)

2-1-8 64k bit/s UDI incoming call
—After simulator receiving a 64k bit/s UDI call, simulator is switched to the communication state by connecting operation (Note 3)

2-1-9 64k bit/s UDI disconnection (CS)
—Simulator receives “Disconnect” message from CS side during a 64k bit/s UDI communication and disconnects the call (Note 3)

2-1-10 64k bit/s UDI outgoing call
— Simulator originates a 64k bit/s UDI call and switch to the communication state (Note 4,5)

2-1-11 64k bit/s UDI incoming call
—After simulator receiving a 64k bit/s UDI call, simulator is switched to the communication state by connecting operation (Note 4,5)

2-2 Application operation tests

2-2-1 Channel switching operation tests during communication

2-2-1-1 Channel switching during communication with CS indication : the communication physical slot within carrier within CS (Note 7)

2-2-1-2 Channel switching during communication with CS indication : the communication physical slot between carrier within CS (Note 7)

2-2-1-3 Channel switching during communication with PS request : the communication physical slot within carrier within CS (Note 7)

2-2-1-4 Channel switching during communication with PS request : the communication physical slot between carrier within CS (Note 7)

2-2-1-5 Channel switching during communication with CS indication : the communication physical slot between carrier within CS (switching back)

2-2-1-6 Handover with CS indication : Recalling-type to the home CS (Note 1)

2-2-1-7 Handover with CS indication : Recalling-type to other CS (in the same paging area) (Note 1)

2-2-1-8 Handover with PS judgment : PS recalling-type to other CS (in the same paging area) (Note 1)

2-2-1-9 Handover with CS indication: Recalling-type to other CS (in the same paging area) (switching back) (Note 1)

2-2-1-10 Handover with PS judgment: PS recalling-type to other CS (in other paging area) (Note 1)

2-2-1-11 64k bit/s UDI channel switching during communication with CS indication : the same CS, 1st TCH (Note 3)

2-2-1-12 64k bit/s UDI channel switching during communication with CS indication : the same CS, 2nd TCH (Note 3)

2-2-1-13 64k bit/s UDI channel switching during communication with simulator request : the same CS, 1st TCH (Note 3)

2-2-1-14 64k bit/s UDI channel switching during communication with simulator request : the same CS, 2nd TCH (Note 3)

2-2-1-15 64k bit/s UDI channel switching during communication with CS indication : the same CS, 1st TCH (switching back) (Note 3)

2-2-1-16 64k bit/s UDI channel switching during communication with CS indication : the same CS, 2nd TCH (switching back) (Note 3)

2-2-1-17 64k bit/s UDI handover with CS indication : Recalling-type to the home CS (Note 3)

2-2-1-18 64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area) (Note 3)

2-2-1-19 64k bit/s UDI handover with simulator judgment : simulator recalling-type to other CS (in the same paging area) (Note 3)
2-2-1-20 64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area) (switching back) (Note 3)
2-2-1-21 64k bit/s UDI handover with simulator judgment : simulator recalling-type to other CS (in other paging area) (Note 3)
2-2-1-22 64k bit/s UDI handover with CS indication : Recalling-type to the home CS (Note 4,5)
2-2-1-23 64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area) (Note 4,5)
2-2-1-24 64k bit/s UDI handover with simulator judgment : simulator recalling-type to other CS (in the same paging area) (Note 4,5)
2-2-1-25 64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area) (switching back) (Note 4,5)
2-2-1-26 64k bit/s UDI handover with simulator judgment : simulator recalling-type to other CS (in other paging area) (Note 4,5)

2-2-2 Restriction operation tests
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2-2-2-2 Access restriction operation for PS (Note 2)

2-2-3 Semi-normal outgoing call operation tests
2-2-3-1 ID verification at link channel establishment
— Calling station ID code does not match up
2-2-3-2 ID verification at link channel establishment
— Called station ID code does not match up
2-2-3-3 Operation to transmit link channel assignment reject
2-2-3-4 Modifier of synchronization burst verification at link channel establishment - modifier code for 1st TCH does not match up
2-2-3-5 Modifier of synchronization burst verification at 64k bit/s communication - modifier code for 2nd TCH does not match up (Note 3,6)
2-2-3-6 Receiving the additional channel re-request message at 64k bit/s communication (Note 3)
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2-2-4 Semi-normal incoming call operation tests
2-2-4-1 In zone paging, PS stops its call terminating operation when one of the other PSs has responded to the call. (Note 1)
2-2-4-2 Disconnection of the call when there is no response from the PS that has received the call. (Note 1)
2-2-4-3 Additional TCH request rejection in combination of the Two slot fixed type CS and the Slot changeable type PS in 64k bits/s UDI call terminating (Note 3,6)
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2-2-5 Transmission stop operation test
2-2-5-1 Radio channel release

2-2-6 Additional channel establishment and disconnection during the communication tests
2-2-6-1 64k bit/s UDI additional channel synchronization establishment with CS indication (Note 4)
2-2-6-2 64k bit/s UDI 2nd TCH disconnection with CS indication (Note 4)
2-2-6-3 64k bit/s UDI additional channel synchronization establishing with PS judgement (Note 4)
2-2-6-4 64k bit/s UDI 2nd TCH disconnection with PS judgement (Note 4)
2-2-6-5 64k bit/s UDI additional channel synchronization establishment failure in PS judgement process (Note 4)

2-3 Tests for items specified in the Annex of the Standard
2-3-1 Authentication tests
2-3-2 Subscriber data write-in tests

Note 1 : This item should be selected depending on the kinds of functions each CS has.
Note 2 : Restriction operation tests are optional.
Note 3 : If CS is able to achieve a 64k bit/s communication with using 2 TCH simultaneously, these tests are required.
Note 4 : If CS is able to achieve a 64k bit/s UDI communication in the Slot changeable mode, these tests are required.
Note 5 : In these tests, it is confirmed that the 64k bit/s UDI communication is achieved by using a TCH.
Note 6 : In these tests, CS is set to operate the Two slot fixed type 64k bit/s UDI.
Note 7 : In these tests, the channel switching operation scheme, i.e. switching to same carrier and different slot or to different carrier and slot, can be selected depending on the kinds of functions each CS has. Thus, either or both scheme will be tested.

2.3.1.3 Test items related to network protection and effective use of frequency

Test no.	Test item
3-1	Function to prevent updating CS specific information
3-2	Restriction for autonomous response detection (Note)
3-3	Restriction for automatic re-calling (Note)
3-4	Transmission power other than for communication (Note)

Note : This item should be selected depending on the kinds of functions each CS has.

2.3.2 Basic parameters

The connection simulator (PS) shall be used to specify the control procedure based on the following parameters. Parameters which are not described in this section or which are to be modified shall be specified for individual test items and conditions.

2.3.2.1 Basic parameters

(1) Parameters which are pre-registered in the CS prior to tests

System identification code	:	1
Control carrier number	:	12, 18
Country code	:	same value of pattern A country code in 2.3.2.2 (3)

(2) Common parameters for the entire test items

PS-ID	:	1
PS number	:	9876
Peer party number	:	4321
Control carrier number	:	12, 18
System identification code	:	1
Paging area number	:	1
Additional ID	:	1
Area information	:	Designed value for CS
Transmission power	:	CS Rated value
	:	PS Max. 10mW

Bearer capability (downlink SETUP message) : Speech and 3.1kHz audio or Unrestricted digital information

Bearer capability (uplink SETUP message) : Speech or 3.1kHz audio or Unrestricted digital information

Note 1: When selecting “level degradation detection threshold value" during the test processes in each of the test items, it must be set by taking the deviation tolerated for the receive signal strength indicator accuracy for the CS into account.

When setting the level below the level degradation detection threshold value, the input level from the PS to the CS must be at least 7dB (i.e., upper allowance +1dB) lower than the said threshold value.

When setting the level above the level degradation detection threshold value, the input level from the PS to the CS must be at least 7dB (i.e., | lower allowance -1dB |) higher than the said threshold value.

Note 2: If each test is going by selecting bearer capability as UDI, words “converse” shall be recognized as same meaning of “communicate” and check shall be done by protocol sequence but not by transmission/reception volume using handset.

(3) Parameters specified for each test item

PS-ID	:	2	
Paging area number	:	2	
Additional ID	:	2	
Control slot number	:	Designed value for CS	
Communication carrier number	:	Number selected by CS	(note)
Communication slot number	:	Number selected by CS	(note)
User scrambling key	:	Must accord with the user scrambling key set value from PS	
BCCH	:	Radio channel information broadcasting, system information broadcasting, 2nd system information broadcasting	

Note : If the case of tests in bearer capability of 64k bit/s UDI, the condition of additional TCH assignment function type shall settled as different slot within the arbitrary carrier present.

2.3.2.2 LCCH pattern

(1) Radio channel information broadcasting
Radio channel information broadcasting signals may be determined freely by cell station manufacturers.

(2) System information broadcasting
It may be freely determined by cell station manufacturers whether system information broadcasting signals should be transmitted or not, and, if they are, specifically what kinds of signals should be used.

(3) 2nd System information broadcasting

Pattern no.	Country code	System type	RT/MM Protocol Version
A	*	2	version 3

* : The value for Country code can be freely decided by the CS manufacturer.

2.3.2.3 Confirmation of call quality, scramble and user scrambling

Call quality, scramble, standard user scrambling and definition information shall be checked during the compatibility tests.

- Call quality : Check that there is no abnormal audible quality while a call is in progress.

- Transmission/reception volume : Check that transmission/reception volume is normal.
- Scramble : Check that there is no abnormality.
- Standard user scrambling : Check that calls are set up normally for each test.
- Definition information : Check that operation based on the definition operation is performed normally.

2.3.2.4 Confirmation of authentication

Authentication random patterns must be tested for one or more values. (These values can be set freely by the CS manufacturer.)

2.3.3 Contents of tests

2.3.3.1 Contents of tests for the technical requirements for facilities

The content of tests related to the technical requirements for facilities shall be as listed below. Note that the measurement method shall be as described in the Personal Handy Phone System ARIB Standard (RCR STD-28), Chapter 7 Measurement methods.

Test no.	Test item	Specifications	Measurement carrier
1-1	Transmission characteristics		-
1-1-1	Transmission power	10mW or less Deviation: +20%/-50% of the rated value	1
			15
			37
1-1-2	Transient response characteristics of burst transmission	13μs or less, and must meet the template specifications for instantaneous power.	15
1-1-3	Frequency stability	Absolute accuracy ±3x10^{-6} or less	15
1-1-4	Modulation accuracy	Error 12.5% or less	15
1-1-5	Transmission rate accuracy	Absolute accuracy ±5x10^{-6} or less	15
1-1-6	Physical slot transmission condition	Can be used with 2nd level (44dBμV) or lower	15
1-1-7	Transmission timing	±1 symbol or less	15
1-1-8	Transmission jitter	At detection of 16 bit UW, 1/8 symbol or less	15
1-2	Reception characteristics		-
1-2-1	Sensitivity	BER must be 1x10^{-2} or less when RX level is 16dBμV.	15
1-2-2	Receive signal strength indicator accuracy	Absolute accuracy ±6dB (measured at 3 points: 16dBμV, 40dBμV and 60dBμV)	15

Note 1 : RCR STD-28, Measurement system diagram (1) shall apply to the measurement of transmission timing.

Note 2 : The following measurement methods shall apply to the measurement of reception sensitivity.

Reception sensitivity : Measuring BER at 16dBμV

2.3.3.2 Contents of tests for the communication control methods

The content of tests related to the communication control methods shall be as listed below:

2.3.3.2.1 Basic operation tests

Test no.	**2-1-1**	**Item**	**Basic operation : Location registration**
Overview: • Check that the CS acknowledges location registration when PS performs the location registration.			
Test conditions: Refer to common parameters for the entire test items (2.3.2.1(2)).			
Test procedure : 1. Start broadcasting LCCH from CS. 2. Perform the location registration procedure for the simulator. 3. Check the location registration sequence by the simulator.			
Check items: • Check that location registration by the pre-registered PS can be acknowledged. • Check that the content of information broadcasting and LCCH structure transmitted by the CS complies with RCR STD-28 (Version 2). • Check that the content of the message, “link channel assignment,” complies with RCR STD-28 (Version 2). • If “With report information reception instruction” is selected among the “Types of extended LCH protocol” of the content of the message, “link channel assignment,” check that functions of receiving definition information request and of transmitting response.			

Test no.	2-1-2	Item	Basic operation : Outgoing call

Overview:

- Originate a call on the PS and check that the PS is set for the communication state.

Test conditions:

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Originate a call on the simulator.
2. Check that the call can be set up normally between the simulator handset and the CS. At this point check that normal communication are possible and the transmission/reception volume level at the both ends.
3. Check the origination sequence using the simulator.

Check items:

- Select between overlap and en-bloc sending, depending on the kind of functions each CS has.
- After originating a call on the simulator, check that the call can be set up and it is possible to converse with the peer party normally.
- The communication states (scramble, standard user scrambling) and transmission/reception volume must be normal.
- Check that when bearer capability is set to non-restriction digital information, non-restriction digital information can be transmitted/received.

Test no.	2-1-3	Item	Basic operation : Disconnection (at PS side)

Overview:

- Check that the call can be ended normally during the call ending operation via the PS.

Test conditions:

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. CS and the simulator are set for the communication state (as outlined in test 2-1-2).
2. End the call using the simulator.
3. Check that the call has ended for both the simulator handset and the CS.
4. Check that the carrier is disconnected at the CS.
5. Check that the call has ended for the CS.
6. Check the disconnection sequence for the PS on the simulator.

Check items:

- Check that the call is ended by the call ending operation via the simulator and the call is disconnected.
- Check that the CS stops carrier transmission for communication.
- Check that the CS switches to the call ended state.

Test no.	2-1-4	Item	Basic operation : Incoming call

Overview:

- Allow the simulator to receive a call, then check that the call can be connected using the offhook operation for the simulator.

Test conditions:

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Location registration has been completed in a normal manner.
2. Allow the CS to receive a call from the simulator.
3. Check that ringing tones are generated on the simulator.
4. Offhook the simulator.
5. Check that the call is connected and communication is enabled between the simulator handset and the CS.
6. Check the call condition and the volume level on both the simulator and the CS.
7. Check the termination sequence on the simulator.

Check items:

- The method of receiving calls should be selected among the following, depending on the kinds of functions each CS has;
  Paging (BCD 13 digits or less), Paging (BCD 12 digits or less), Paging (13 digits hexadecimal), Paging (7 digits hexadecimal), and zone paging.
- Check that the call is connected and the simulator sets for the call state using the offhook operation from the simulator.
- Check that the call condition and the volume level are appropriate.
- Check that, when bearer capability is set to non-restriction digital information, non-restriction digital information can be transmitted and received.

Test no.	2-1-5	Item	Basic operation : Disconnection (at CS side)

Overview:

- Check that the call ends normally using the onhook operation via the CS while the simulator is in the communication state.

Test conditions:

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the simulator and CS for the communication state. (as outlined in test 2-1-4).
2. End the call on the CS.
3. Check that the call has ended on both the simulator handset and the CS.
4. Check that the carrier is disconnected for the CS.
5. Check that the call ended at the CS.
6. Check the disconnection sequence by the CS on the simulator.

Check items:

- Check that communication for the CS ends and the call is disconnected.
- Check that the CS stops carrier transmission for communication.
- Check that the CS switches to the call ended state.

Test no.	2-1-6	Item	Basic operation : 64k bit/s UDI outgoing call

Overview:

- Originate a 64k bit/s UDI call on the simulator and check that simulator is set for the communication state.

Test conditions:

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Originate a 64k bit/s UDI call on the simulator.
2. Check that the 64k bit/s UDI call using double TCH can be set up normally between the simulator and the CS.
3. Check the origination sequence using the simulator.

Check items:

- Select between overlap and en-bloc sending, depending on the kind of functions each CS has.
- After originating a 64k bit/s call on the simulator, check that the 64k bit/s UDI call can be set up and it is possible to communicate with the peer party normally.
- The communication state (scramble, standard user scrambling) must be normal.

Test no.	2-1-7	Item	Basic operation : 64k bit/s UDI call disconnection (simulator)

Overview:

- Check that the 64k bit/s call can be ended during the call ending operation via the simulator.

Test conditions:

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Originate a 64k bit/s UDI call on the simulator (as outlined in test 2-1-6) and set the CS for the communication state.
2. End the call using the simulator.
3. Check that the call has ended for both the simulator and the CS.
4. Check that the carriers of both 1st TCH and 2nd TCH are disconnected at the CS.
5. Check that the call has ended for the CS.
6. Check the disconnection sequence for the simulator on the simulator.

Check items:

- Check that the 64k bit/s UDI call is ended by the call ending operation via simulator and the call is disconnected.
- Check that the CS stops carrier transmission (for both 1st TCH and 2nd TCH) for communication.
- Check that the CS switches to the call ended state.

Test no.	2-1-8	Item	Basic operation : 64k bit/s UDI incoming call

Overview:

- Allow the simulator being tested to receive a 64k bit/s UDI call and indicates receiving call, then check that the 64k bit/s UDI call can be connected using the communication start operation for the simulator.

Test conditions:

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. End location registration normally.
2. Allow the simulator to receive a 64k bit/s UDI call from the CS.
3. Check that receiving call indication on the simulator.
4. Operates starting communication.
5. Check that the 64k bit/s UDI call using double TCH is connected and 64k bit/s UDI communication are enabled between the simulator and the CS.
6. Check the termination sequence on the simulator.

Check items:

- The method of receiving calls should be selected among the following, depending on the kinds of functions each CS has;
- Paging (BCD 13 digits or less), Paging (BCD 12 digits or less), Paging (13 digits hexadecimal), Paging (7 digits hexadecimal), and zone paging.
- Check that the 64k bit/s UDI call is connected and simulator sets for the call state and communication start operation from simulator.

Test no.	2-1-9	Item	Basic operation : 64k bit/s UDI call disconnection (CS)

Overview:

- Check that the 64k bit/s call can be ended normally during the call ending operation via the CS while the simulator is in the communication state.

Test conditions:

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Originate a 64k bit/s UDI call on the CS (as outlined in test 2-1-8) and set the simulator for the communication state.
2. End the call on the CS via the simulator.
3. Check that the call has ended for both the simulator and the CS.
4. Check that the carriers of both 1st TCH and 2nd TCH are disconnected for the CS.
5. Check that the call has ended at the CS
6. Check the disconnection sequence by the CS on the simulator.

Check items:

- Check that the 64k bit/s UDI call for the CS ends and the call is disconnected.
- Check that the CS stops carrier transmission (for both 1st TCH and 2nd TCH) for communication.
- Check that the CS switches to the call ended state.

Test no.	2-1-10	Item	Basic operation : 64k bit/s UDI outgoing call

Overview:

- Originate a 64k bit/s UDI call on the simulator and check that simulator is set for the communication state.

Test conditions:

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Originate a 64k bit/s UDI call on the simulator.
2. Check that the 64k bit/s UDI call using a TCH can be set up normally between the simulator and the CS.
3. Check the origination sequence using the simulator.

Check items:

- Select between overlap and en-bloc sending, depending on the kind of functions each CS has.
- After originating a 64k bit/s call on the simulator, check that the 64k bit/s UDI call using a TCH can be set up and it is possible to communicate with the peer party normally.
- The communication state (scramble, standard user scrambling) must be normal.

Test no.	2-1-11	Item	Basic operation : 64k bit/s UDI incoming call

Overview:

- Allow the simulator being tested to receive a 64k bit/s UDI call and indicates receiving call, then check that the 64k bit/s UDI call can be connected using the communication start operation for the simulator.

Test conditions:

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. End location registration normally.
2. Allow the simulator to receive a 64k bit/s UDI call from the CS.
3. Check that receiving call indication on the simulator.
4. Operates starting communication.
5. Check that the 64k bit/s UDI call using a TCH is connected and 64k bit/s UDI communication are enabled between the simulator and the CS.
6. Check the termination sequence on the simulator.

Check items:

- The method of receiving calls should be selected among the following, depending on the kinds of functions each CS has;

  Paging (BCD 13 digits or less), Paging (BCD 12 digits or less), Paging (13 digits hexadecimal), Paging (7 digits hexadecimal), and zone paging.

- Check that the 64k bit/s UDI call is connected and simulator sets for the call state and communication start operation from simulator.

2.3.3.2.2 Application operation tests

2.3.3.2.2.1 Channel switching operation tests during communication

Test no.	**2-2-1-1**	**Item**	**Application operation : Channel switching during communication with CS indication (the communication physical slot within carrier within CS)**

Overview:

- Check that the CS transmits TCH switching indication and switches to the channel specified by the indication and resumes communication, when, during the communication state, the number of slot errors reaches or exceeds the reception quality degradation detection threshold value.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1 (2)).
Conditions to set the TCH switching indication to the communication physical slot within carrier within CS can be determined arbitrarily.

Test procedure :

1. Originate a call on the simulator and set the communication state between the CS and the simulator.
2. Set the number of slot errors which arise on the part of the simulator in the frames during the communication to CS at or above the reception quality degradation detection threshold value.
.
3. Allow the CS to send a TCH switching indication to the PS.
4. Check that the simulator switches to the specified channel and resumes communication.
5. Check the sequence for the channel switching during communication via the simulator.

Check items:

- When the number of slot errors which arise on the part of the simulator in the frames during the communication to CS reaches or exceeds the reception quality degradation detection threshold value, CS must transmit TCH switching indication containing the communication physical slot within carrier within CS.
- The CS must switch to the specified channel and resume communication.

Test no.	2-2-1-2	Item	Application operation : Channel switching during communication with CS indication (the communication physical slot between carrier within CS)

Overview :

- Check that the CS transmits TCH switching indication and switches to the channel specified by the indication and resumes communication, when, during the communication state, the number of slot errors reaches or exceeds the reception quality degradation detection threshold value.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1 (2)).
Conditions to set the TCH switching indication to the communication physical slot between carrier within CS can be determined arbitrarily.

Test procedure :

1. Set the CS and simulator to the communication state (as outlined in test 2-2-1-1).
2. Set the number of slot errors that arise on the part of the simulator in the frames during the communication to CS at or above the reception quality degradation detection threshold value.
3. Check that CS sends a TCH switching indication to the PS.
4. Check that the simulator switches to the specified channel and resumes communication.
5. Check the sequence for the channel switching during communication via the simulator.

Check items:

- When the number of slot errors which arise on the part of the simulator in the frames during the communication to CS reaches or exceeds the reception quality degradation detection threshold value, CS must transmit TCH switching indication containing the communication physical slot between carrier within CS.
- The CS must switch to the specified channel and resume communication.

Test no.	2-2-1-3	Item	Application operation : Channel switching during communication with PS request (the communication physical slot within carrier within CS)

Overview :

- After receiving a TCH switching request from the simulator, the CS transmits a TCH switching indication in return. Then, check that the simulator switches to the channel according to this indication and resumes communication.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1 (2)).
Conditions to set the TCH switching indication to the communication physical slot within carrier within CS can be determined arbitrarily.

Test procedure :

1. Set the CS and the simulator for the communication state (as outlined in test 2-2-1-2).
2. The simulator sends a TCH switching request to CS.
3. Check that CS sends a TCH switching indication in response to the TCH switching request from the PS.
4. Check that the simulator switches to the specified channel and resumes communication.
5. Check the sequence for the channel switching during communication via the simulator.

Check items:

- The CS must send a TCH switching indication containing the same CS, the same carrier and different slot, when it has received a TCH switching request from PS.
- After CS has transmitted the TCH switching indication containing the communication physical slot within carrier within CS, the PS must switch to the specified channel and resume communication.

Test no.	2-2-1-4	Item	Application operation : Channel switching during communication with PS request (the communication physical slot between carrier within CS)

Overview :

- After receiving a TCH switching request from the simulator, the CS transmits a TCH switching indication in return. Then, check that the simulator switches to the channel according to this indication and resumes communication.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1 (2)).
Conditions to set the TCH switching indication to the communication physical slot between carrier within CS can be determined arbitrarily.

Test procedure :

1. Set the CS and the simulator for the communication state (as outlined in test 2-2-1-3).
2. The simulator sends a TCH switching request to CS.
3. Check that CS sends a TCH switching indication in response to the TCH switching request from the PS.
4. Check that the PS switches to the specified channel and resumes communication.
5. Check the sequence for the channel switching during communication via the simulator.

Check items :

- The CS must send a TCH switching indication containing the communication physical slot between carrier within CS, when in has received a TCH switching request from PS.
- After CS has transmitted the TCH switching indication containing the communication physical slot between carrier within CS, the PS must switch to the specified channel and resume communication.

Test no.	2-2-1-5	Item	Application operation : Channel switching during communication with CS indication (the communication physical slot between carrier within CS /switching back)

Overview:

- Check that, when, during the communication state, the number of slot errors reaches or exceeds the reception quality degradation detection threshold value, the CS transmits TCH switching indication and switches to the channel specified by the indication, but resumes communication through the switching back operation by the simulator.

Test conditions:

Refer to the common parameters for the entire test items (2.3.2.1 (2)).
Conditions to set the TCH switching indication to the communication physical slot between carrier within CS can be determined arbitrarily.

Test procedure :

1. Set the CS and simulator to the communication state (as outlined in test 2-2-1-4).
2. Set the number of slot errors that arise on the part of the simulator in the frames during the communication to CS at or above the reception quality degradation detection threshold value.
3. The simulator, after receiving a TCH switching indication, starts performing switching back operation.
4. The CS must complete the operation of switching back to the previous channel and resume communication.
5. Check the sequence for the channel switching during communication via the simulator.

Check items:

- After sending a TCH switching indication, the CS must transmit synchronization burst in the slot used before switching the channels.
- The communication must resume after the simulator has switched back to the previous channel.

Test no.	2-2-1-6	Item	Application operation : Channel switching during communication; Handover with CS indication (Recalling-type handover to the home CS)

Overview :

- Check that, when the reception level has dropped to or below level degradation detection threshold value during the communication state, the CS specifies the home CS, transmits a TCH switching indication which does not specify the carrier and slot numbers. Check that, the simulator performs the recalling-type handover and resume communication.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1 (2)).

Test procedure :

1. Set the CS and the simulator in the communication state (as outlined in test 2-2-1-5).
2. Set the reception level of the CS at or below the level degradation detection threshold value.
3. Check that the CS gives the recalling-type handover indication using the TCH switching indication.
4. Check that the simulator performs the recalling-type handover processing for the home CS and sets for the communication state.
5. Check the sequence for the channel switching during communication via the simulator.

Check items:

- The CS must transmit a TCH switching indication when the reception level has fallen to or below the level degradation detection threshold value.
- The CS must resume communication after handover.

Test no.	2-2-1-7	Item	Application operation : Channel switching during communication; Handover with CS indication (recalling-type handover to other CS/the same paging area)

Overview :

- When the CS transmits a TCH switching indication without the CS-ID information element, check that the simulator performs the recalling-type handover and resumes communication.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1.(2)).

- Additional ID : 2 (No. 2 CS)

Test procedure :

1. Set the simulator in the communication state with CS No. 1 (as outlined in test 2-2-1-6).
2. Perform transmission of another broadcasting signal (No. 2).
3. Set the reception level for the No. 1 CS at or below the level degradation detection threshold value.
4. Check that the CS sends a recalling-type handover indication to the PS using the TCH switching indication.
5. Check that the simulator activates the recalling-type handover processing for No. 2 CS and sets for the communication state with No. 2 CS.
6. Check the sequence for the channel switching during communication via the simulator.

Check items:

- No. 1 CS must transmit a TCH switching indication, when the reception level has fallen to or below the level degradation detection threshold value.
- No. 2 CS must resume communication after handover.

Test no.	2-2-1-8	Item	**Application operation : Channel switching during communication (Handover with PS judgment; Recalling-type handover to different CS/the same paging area)**

Overview :

- Check that, during the communication state, CS performs handover to resume communication upon the PS recalling-type handover operation by the simulator.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1.(2)).

- Additional ID : 2 (No. 2 CS)

Test procedure

1. Set the CS and the simulator in the communication state (as outlined in test 2-2-1-7).
2. Activate the recalling-type handover to No. 1 CS via the simulator.
3. Check that communication resume after the handover.
4. Check the sequence for the recalling-type handover via the simulator.

Check items :

- When the PS has performed PS judgment recalling-type handover, the CS must resume communication after handover.

Test no.	2-2-1-9	Item	Application operation : Channel switching during communication (Handover with CS indication; Recalling-type handover to different CS/the same paging area) (switching back)

Overview:

- Check that, when the reception level has dropped to or below the level degradation detection threshold value during the communication, the CS must transmit a TCH switching indication and resume communication upon the switching back operation following the failure in handover by the simulator.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1.(2)).

Test procedure

1. Set the CS and the simulator in the communication state (as outlined in test 2-2-1-8).
2. Set the reception level for the CS at or below the level degradation detection threshold value.
3. Check that the CS sends recalling-type handover indication using the TCH switching indication.
4. The simulator starts the operation to switch back to the previous slot.
5. Check that the switching back operation triggers communication to resume.
6. Check the sequence for the recalling-type handover via the simulator.

Check items :

- After sending a TCH switching indication, the CS must transmit synchronization burst in the slot used before switching the channels.
- The CS must resume communication after the switching back operation.

Test no.	2-2-1-10	Item	**Application operation : Channel switching during communication (Handover with PS judgment; Recalling-type handover to different CS/other paging area)**

Overview :

- Check that, during the communication state, CS performs handover to resume communication upon the PS recalling-type handover operation by the simulator.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1.(2)).

- Paging area number: 2 (No. 2)
- Additional ID : 1 (No. 2)

Test procedure :

1. Originate a call on the simulator and set the simulator for the communication state with No. 2 CS.
2. Transmit LCCH No. 2.
3. The simulator activates the recalling-type handover after capturing LCCH No. 2.
4. After making sure that the simulator resumes communication, end the call with the simulator.
5. Check the sequences for the recalling-type handover via the simulator.

Check items :

- When the PS has performed PS judgment recalling-type handover, the CS must resume communication after handover.

Test no.	2-2-1-11	Item	Application operation : 64k bit/s UDI channel switching during communication with CS indication (the same CS/1st TCH)

Overview :

- Check that the CS transmits TCH switching indication on the 1st TCH and switches to the channel specified by the indication and resume 64k bit/s communication, when, during 64k bit/s UDI communication state, the number of slot errors of 1st TCH reaches or exceeds the reception quality degradation detection threshold value.

Test conditions :

Refer to common parameters for the entire test items (2.3.2.1(2)).
The information elements of the new channel which is indicated by the TCH switching indication should be selected as same CS and the different slot from 2nd TCH.

Test procedure :

1. Originate a 64k bit/s UDI call on the simulator and set the 64k bit/s UDI communication state between the simulator and the CS.

2. Set the number of slot errors of 1st TCH which arise in the communication frame for the CS to exceed the channel switching FER threshold value via simulator.

3. Check that the CS sends a TCH switching indication to the simulator on 1st TCH.

4. Check that the simulator switches the 1st TCH to the channel specified by the TCH switching indication and resume 64k bit/s UDI communication.

5. Check the sequence for the channel switching during communication via the simulator.

Check items :

- The CS must send a TCH switching indication on 1st TCH when slot errors of 1st TCH exceed the channel switching FER threshold value during 64k bit/s communication.

- 1st TCH must be switched to the channel specified by the TCH switching indication and 64k bit/s UDI communication must be resumed.

Test no.	2-2-1-12	Item	Application operation : 64k bit/s UDI channel switching during communication with CS indication (the same CS/2nd TCH)

Overview :

- Check that the CS transmits TCH switching indication on the 2nd TCH and switches to the channel specified by the indication and resume 64k bit/s communication, when, during 64k bit/s UDI communication state, the number of slot errors of 2nd TCH reaches or exceeds the reception quality degradation detection threshold value.

Test conditions :

Refer to common parameters for the entire test items (2.3.2.1(2)).
The information elements of the new channel which is indicated by the TCH switching indication should be selected as same CS and the different slot from 1st TCH.

Test procedure :

1. Originate a 64k bit/s UDI call on the simulator and set the 64k bit/s UDI communication state between the simulator and the CS.

2. Set the number of slot errors of 2nd TCH which arise in the communication frame for the CS to exceed the channel switching FER threshold value via simulator.

3. Check that the CS sends a TCH switching indication to the simulator on 2nd TCH.

4. Check that the simulator switches the 2nd TCH to the channel specified by the TCH switching indication and resume 64k bit/s UDI communication.

5. Check the sequence for the channel switching during communication via the simulator.

Check items :

- The CS must send a TCH switching indication on 2nd TCH when slot errors of 2nd TCH exceed the channel switching FER threshold value during 64k bit/s communication.

- 2nd TCH must be switched to the channel specified by the TCH switching indication and 64k bit/s UDI communication must be resumed.

Test no.	2-2-1-13	Item	Application operation : 64k bit/s UDI channel switching during communication with PS request (the same CS/1st TCH)

Overview :

- After receiving a TCH switching request on 1st TCH from the simulator, the CS transmits a TCH switching indication in return. Then check that the simulator switches the 1st TCH to the channel according to this indication and resume communication.

Test conditions :

Refer to common parameters for the entire test items (2.3.2.1(2)).
The information elements of the new channel which is indicated by the TCH switching indication should be selected as same CS and the different slot from 2nd TCH.

Test procedure :

1. Set the CS and the simulator to the 64k bit/s UDI communication state (as outlined in test 2-2-1-12).
2. The simulator sends a TCH switching request on 1st TCH to the CS.
3. Check that the CS sends a TCH switching indication on 1st TCH in response to the TCH switching request from the simulator.
4. Check that the simulator switches the 1st TCH to the channel specified by the TCH switching indication and resume 64k bit/s UDI communication.
5. Check the sequence for the channel switching during communication via the simulator.

Check items :

- The CS must send a TCH switching indication containing the same CS on 1st TCH when it has received a TCH switching request on 1st TCH from the PS.
- After CS has transmitted the TCH switching indication containing the same CS on 1st TCH, 1st TCH must be switched to the specified channel and 64k bit/s UDI communication must be resumed.

Test no.	2-2-1-14	Item	Application operation : 64k bit/s UDI channel switching during communication with simulator request (the same CS/2nd TCH)

Overview :

- After receiving a TCH switching request on 2nd TCH from the simulator, the CS transmits a TCH switching indication in return. Then check that the simulator switches the 2nd TCH to the channel according to this indication and resume communication.

Test conditions :

Refer to common parameters for the entire test items (2.3.2.1(2)).
The information elements of the new channel which is indicated by the TCH switching indication should be selected as same CS and the different slot from 1st TCH.

Test procedure :

1. Set the CS and the simulator to the 64k bit/s UDI communication state (as outlined in test 2-2-1-13).

2. The simulator sends a TCH switching request on 2nd TCH to the CS.

3. Check that the CS sends a TCH switching indication on 2nd TCH in response to the TCH switching request from the simulator.

4. Check that the simulator switches the 2nd TCH to the channel specified by the TCH switching indication and resume 64k bit/s UDI communication.

5. Check the sequence for the channel switching during communication via the simulator.

Check items :

- The CS must send a TCH switching indication containing the same CS on 2nd TCH when it has received a TCH switching request on 1st TCH from the PS.

- After CS has transmitted the TCH switching indication containing the same CS on 2nd TCH, 2nd TCH must be switched to the specified channel and 64k bit/s UDI communication must be resumed.

Test no.	2-2-1-15	Item	**Application operation : 64k bit/s UDI channel switching during communication with CS indication (the same CS/1st TCH/switching back)**

Overview :

- Check that, when, during the 64k bit/s communication state, the number of slot errors of 1st TCH reaches or exceeds the reception quality degradation detection threshold value, the CS transmits TCH switching indication on the 1st TCH and switches to the channel specified by the indication.
  However, if the CS cannot receive a synchronization burst in the new channel, check that the CS resumes communication using an old 1st TCH.

Test conditions :

Refer to common parameters for the entire test items (2.3.2.1(2)).
The information elements of the new channel which is indicated by the TCH switching indication should be selected as same CS and the different slot from 2nd TCH.

Test procedure :

1. Set the CS to the 64k bit/s UDI communication state (as outlined in test 2-2-1-14).
2. Set the number of slot errors of 1st TCH which arise in the communication frame for the CS to exceed the channel switching FER threshold value via simulator.
3. After receiving a TCH switching indication on 1st TCH, the simulator starts performing switching back operation.
4. The CS must complete the operation of switching back to the previous 1st TCH and resume 64k bit/s UDI communication.
5. Check the sequence for the channel switching during communication via the simulator.

Check items :

- After sending a TCH switching indication on 1st TCH, the CS must transmit synchronization burst in the slot used before switching the channels.
- The 64k bit/s UDI communication must resume after the simulator has switched back to the previous channel

Test no.	2-2-1-16	Item	**Application operation : 64k bit/s UDI channel switching during communication with CS indication (the same CS/2nd TCH/switching back)**

Overview :

- Check that, when, during the 64k bit/s communication state, the number of slot errors of 2nd TCH reaches or exceeds the reception quality degradation detection threshold value, the CS transmits TCH switching indication on the 2nd TCH and switches to the channel specified by the indication.
  However, if the CS cannot receive a 2nd synchronization burst in the new channel, check that the CS resumes communication using an old 2nd TCH.

Test conditions :

Refer to common parameters for the entire test items (2.3.2.1(2)).
The information elements of the new channel which is indicated by the TCH switching indication should be selected as same CS and the different slot from 1st TCH.

Test procedure :

1. Set the CS to the 64k bit/s UDI communication state (as outlined in test 2-2-1-15).
2. Set the number of slot errors of 2nd TCH which arise in the communication frame for the CS to exceed the channel switching FER threshold value via simulator.
3. After receiving a TCH switching indication on 2nd TCH, the simulator starts performing switching back operation.
4. The CS must complete the operation of switching back to the previous 2nd TCH and resume 64k bit/s UDI communication.
5. Check the sequence for the channel switching during communication via the simulator.

Check items :

- After sending a TCH switching indication on 2nd TCH, the CS must transmit 2nd synchronization burst in the slot used before switching the channels.
- The 64k bit/s UDI communication must resume after the simulator has switched back to the previous channel.

Test no.	2-2-1-17	Item	Application operation : 64k bit/s UDI channel switching during communication ; Handover with CS indication (Recalling type handover to the home CS)

Overview :

- When the reception level for the communication carriers decrease to or below level degradation detection threshold value during the 64k bit/s communication state, check that the CS specifies the home CS, transmits a TCH switching indication which does not specify the carrier and slot numbers. Check that the simulator performs the recalling-type handover and resume communication.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the CS and the simulator in the 64k bit/s UDI communication state. (as outlined in test 2-2-1-16).
2. Set the reception level of the CS at or below the l level degradation detection threshold value .
3. Check that the CS transmits the recalling-type handover indication using the TCH switching indication.
4. Check that the simulator performs the recalling-type handover processing for the home CS and sets for the 64k bit/s UDI communication state.
5. Check the sequence for the recalling-type handover via the simulator.

Check items :

- The CS must transmit a TCH switching indication when the reception level has dropped at or below the level degradation detection threshold value.
- The CS must resume communication after handover.

Test no.	2-2-1-18	Item	Application operation : 64k bit/s UDI channel switching during communication ; Handover with CS indication (Recalling type handover to other CS/the same paging area)

Overview :

- When the CS transmits a TCH switching indication without the CS-ID information element during the 64k bit/s communication state, check that the simulator performs the recalling-type handover and resume communication.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

- Additional ID : 2 (No. 2 CS)

Test procedure :

1. Set the simulator to the 64k bit/s UDI communication state with CS No. 1 (as outlined in test 2-2-1-17).
2. Perform transmission of another broadcasting signal (CS No. 2).
3. Set the reception level for the CS No. 1 at or below the level degradation detection threshold value.
4. Check that the CS sends to the simulator a TCH switching indication without CS-ID information element (recalling-type handover indication).
5. Check that the simulator performs the recalling-type handover processing for CS No. 2 and sets for the 64k bit/s UDI communication state with CS No. 2.
6. Check the sequence for the recalling-type handover via the simulator.

Check items :

- CS No. 1 must transmits a TCH switching indication when the reception level has dropped at or below the level degradation detection threshold value.
- CS No. 2 must resume 64k bit/s UDI communication after handover.

Test no.	2-2-1-19	Item	Application operation : 64k bit/s UDI channel switching during communication ; Handover with simulator judgment (Recalling type handover to other CS/the same paging area)

Overview :

- Check that, during 64k bit/s UDI communication, CS performs handover to resume communication upon the PS recalling-type handover operation by the simulator.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

- Additional ID : 2 (No. 2 CS)

Test procedure :

1. Set the simulator to the 64k bit/s UDI communication state with CS No. 2 (as outlined in test 2-2-1-18).
2. The simulator activates the recalling-type handover to other CS (No. 1).
3. Check that the 64k bit/s UDI communication resume after handover.
4. Check the sequence for the recalling-type handover via the simulator.

Check items :

- When the PS has performed PS judgment recalling-type handover, the CS must resume communication after handover.

Test no.	2-2-1-20	Item	Application operation : 64k bit/s UDI channel switching during communication (Handover with CS indication ; recalling-type to other CS/the same paging area/switching back)

Overview :

- When the reception level for the communication carriers decrease to or below level degradation detection threshold value during the 64k bit/s communication state, check that the CS transmits TCH switching indication on the 1st TCH and switches to the channel specified by the indication.
  However, if the CS cannot receive a synchronization burst in the new channel, check that the CS resumes communication upon the switching back operation following the failure in handover by simulator.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the CS to the 64k bit/s UDI communication state (as outlined in test 2-2-1-19).
2. Set the reception level for the CS at or below the level degradation detection threshold value.
3. Check that the CS sends the recalling-type handover indication using TCH switching indication.
4. The simulator starts the operation to switch back to previous slots.
5. Check that the CS completes the operation of switching back to the previous slots and resume 64k bit/s UDI communication.
6. Check the sequence for the recalling-type handover via the simulator.

Check items :

- After sending a TCH switching indication, the CS must transmit synchronization burst and 2nd synchronization burst in the slots used before switching the channels.
- The 64k bit/s UDI communication must resume after the simulator has switched back to the previous channels.

Test no.	2-2-1-21	Item	Application operation : 64k bit/s UDI channel switching during communication ; Handover with simulator judgment (Recalling type handover to other CS/other paging area)

Overview :

- Check that, during 64k bit/s UDI communication, CS performs handover to resume communication upon the PS recalling-type handover operation by the simulator.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

- Paging area number : 2 (No. 2 CS)
- Additional ID : 2 (No. 2 CS)

Test procedure :

1. Set the simulator to the 64k bit/s UDI communication state with CS No. 1.
2. Perform transmission of another broadcasting signal (CS No. 2).
3. The simulator activates the recalling-type handover after capturing LCCH NO. 2.
4. After checking that the simulator resumes 64k bit/s UDI communication, end the call with the simulator.
5. Check the sequence for the recalling-type handover via the simulator.

Check items :

- When the PS has performed PS judgment recalling-type handover, the CS must resume 64k bit/s UDI communication after handover.

Test no.	2-2-1-22	Item	Application operation : 64k bit/s UDI channel switching during communication ; Handover with CS indication (Recalling type handover to the home CS)

Overview :

- When the reception level for the communication carriers decrease to or below level degradation detection threshold value during the 64k bit/s communication state, check that the CS specifies the home CS, transmits a TCH switching indication which does not specify the carrier and slot numbers. Check that the simulator performs the recalling-type handover and resume 64k bit/s UDI communication using a TCH even if the 2nd TCH cannot be established.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the CS and the simulator in the 64k bit/s UDI communication state.
2. Set the reception level of the CS at or below the l level degradation detection threshold value .
3. Check that the CS transmits the recalling-type handover indication using the TCH switching indication.
4. Check that the simulator performs the recalling-type handover processing for the home CS and sets for the 64k bit/s UDI communication state using a TCH.
5. Check the sequence for the recalling-type handover via the simulator.

Check items :

- The CS must transmit a TCH switching indication when the reception level has dropped at or below the level degradation detection threshold value.
- The CS must resume 64k bit/s UDI communication using a TCH after handover.

Test no.	2-2-1-23	Item	Application operation : 64k bit/s UDI channel switching during communication ; Handover with CS indication (Recalling type handover to other CS/the same paging area)

Overview :

- When the CS transmits a TCH switching indication without the CS-ID information element during the 64k bit/s communication state, check that the simulator performs the recalling-type handover and resume 64k bit/s UDI communication using a TCH.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

- Additional ID : 2 (No. 2 CS)

Test procedure :

1. Set the simulator to the 64k bit/s UDI communication state with CS No. 1. (as outlined in test 2-2-1-22)
2. Perform transmission of another broadcasting signal (CS No. 2).
3. Set the reception level for the CS No. 1 at or below the level degradation detection threshold value.
4. Check that the CS sends to the simulator a TCH switching indication without CS-ID information element (recalling-type handover indication).
5. Check that the simulator performs the recalling-type handover processing for CS No. 2 and sets for the 64k bit/s UDI communication state using a TCH with CS No. 2.
6. Check the sequence for the recalling-type handover via the simulator.

Check items :

- CS No. 1 must transmits a TCH switching indication when the reception level has dropped at or below the level degradation detection threshold value.
- CS No. 2 must resume 64k bit/s UDI communication using a TCH after handover.

Test no.	2-2-1-24	Item	**Application operation : 64k bit/s UDI channel switching during communication ; Handover with simulator judgment (Recalling type handover to other CS/the same paging area)**

Overview :

- Check that, during 64k bit/s UDI communication, CS performs handover to resume 64k bit/s UDI communication using a TCH upon the PS recalling-type handover operation by the simulator.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

- Additional ID : 2 (No. 2 CS)

Test procedure :

1. Set the simulator to the 64k bit/s UDI communication state with CS No. 2. (as outlined in test 2-2-1-23)
2. The simulator activates the recalling-type handover to other CS (No. 1).
3. Check that the 64k bit/s UDI communication using a TCH resume after handover.
4. Check the sequence for the recalling-type handover via the simulator.

Check items :

- When the PS has performed PS judgment recalling-type handover, the CS must resume 64k bit/s UDI communication using a TCH after handover.

Test no.	2-2-1-25	Item	Application operation : 64k bit/s UDI channel switching during communication (Handover with CS indication ; recalling-type to other CS/the same paging area/switching back)

Overview :

- When the reception level for the communication carriers decrease to or below level degradation detection threshold value during the 64k bit/s communication state, check that the CS transmits TCH switching indication on the 1st TCH and switches to the channel specified by the indication.
  However, if the CS cannot receive a synchronization burst in the new channel, check that the CS resumes 64k bit/s UDI communication using a TCH upon the switching back operation following the failure in handover by simulator.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the CS to the 64k bit/s UDI communication state (as outlined in test 2-2-1-24)
2. Set the reception level for the CS at or below the level degradation detection threshold value.
3. Check that the CS sends the recalling-type handover indication using TCH switching indication.
4. The simulator starts the operation to switch back to previous slot.
5. Check that the CS completes the operation of switching back to the previous slot and resume 64k bit/s UDI communication using a TCH.
6. Check the sequence for the recalling-type handover via the simulator.

Check items :

- After sending a TCH switching indication, the CS must transmit synchronization burst and in the slot used before switching the channels.
- The 64k bit/s UDI communication using a TCH must resume after the simulator has switched back to the previous channels.

Test no.	2-2-1-26	Item	Application operation : 64k bit/s UDI channel switching during communication ; Handover with simulator judgment (Recalling type handover to other CS/other paging area)

Overview :

- Check that, during 64k bit/s UDI communication, CS performs handover to resume communication upon the PS recalling-type handover operation by the simulator.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

- Paging area number : 2 (No. 2 CS)
- Additional ID : 2 (No. 2 CS)

Test procedure :

1. Set the simulator to the 64k bit/s UDI communication state with CS No. 1.
2. Perform transmission of another broadcasting signal (CS No. 2).
3. The simulator activates the recalling-type handover after capturing LCCH NO. 2.
4. After checking that the simulator resumes 64k bit/s UDI communication using a TCH, end the call with the simulator.
5. Check the sequence for the recalling-type handover via the simulator.

Check items :

- When the PS has performed PS judgment recalling-type handover, the CS must resume 64k bit/s UDI communication using a TCH after handover.

2.3.3.2.2.2 Restriction operation tests

Test no.	2-2-2-1	Item	Application operation : Restriction; Access group restriction, Access cycle restriction

Overview :

- When access group restriction is necessary, check that the CS performs group restriction control and access cycle interval restriction control, using system information broadcasting.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the conditions in which the CS needs access group restriction. (Procedures can be determined arbitrarily.)

2. Allow the simulator to perform LCCH reception, and check by using system information broadcasting that group restriction control and access cycle interval control are performed.

Check items :

- When access group restriction is necessary, check that the CS must perform group restriction control and access cycle interval restriction control, using system information broadcasting.

Test no.	2-2-2-2	Item	Application operation :Priority PSs Access restriction

Overview :

- When priority PS restriction is necessary, check that the CS performs priority PS restriction control, using system information broadcasting.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the conditions in which the CS needs priority PS restriction. (Procedures can be determined arbitrarily.)

2. Allow the simulator to perform LCCH reception, and, by using system information broadcasting, perform priority PS restriction control.

Check items :

- When priority PS restriction is necessary, check that the CS must perform priority PS restriction control, using system information broadcasting.

2.3.3.2.2.3 Semi-normal outgoing call tests

Test no.	2-2-3-1	Item	Application operation : Semi-normal outgoing call operation : Verification of ID at link channel establishment (Calling station ID code does not match up)

Overview :

- When the calling station ID code for the uplink synchronization burst does not match up after the link channel assignment at origination, check that the CS switches back to the standby state after the specified period of time.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

- PS-ID for synchronization burst : PS-ID code : 2

Test procedure :

1. Perform the originating operation on the simulator. After the simulator receives a link channel assignment, check that the simulator sends an uplink synchronization burst with a different PS-ID code.

2. Check that the CS, since it cannot receive a normal synchronization burst before timer TR101C-1 sets time out (within 100ms), and switches to the standby state.

Check items :

- The CS receives an uplink synchronization burst after sending the link channel assignment. When the CS detects that the calling station ID code in the uplink synchronization burst does not match up, the CS must switch back to the standby state when timer TR101C-1 (100ms) expires.

Test no.	2-2-3-2	Item	Application operation : Semi-normal outgoing call operation : Verification of ID at link channel establishment (Called station ID code does not match up)

Overview :

- When the called station ID code for the uplink synchronization burst does not match up after the link channel assignment at origination, check that the CS switches back to the standby state after the specified period of time.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

- CS-ID for synchronization burst : system-ID code : 2

Test procedure :

1. Perform the originating operation on the simulator. After the simulator receives a link channel assignment, the simulator sends a uplink synchronization burst with a different system-ID code.

2. Check that the CS, since it cannot receive a normal synchronization burst before timer TR101C-1 sets time out (within 100ms), and switches to the standby state.

Check items :

- The CS receives an uplink synchronization burst after sending the link channel assignment. When the CS detects that the called station ID code in the uplink synchronization burst does not match up, the CS must switch back to the standby state when timer TR101C-1 (100ms) expires.

Test no.	2-2-3-3	Item	Application operation : Semi-normal outgoing call operation : Link channel assignment reject transmission operation

Overview :

- Check that, when the CS receives link channel establishment request, and judges based on CS resources and the contents of the message requesting the link channel establishment that it cannot perform link channel assignment, the CS transmits link channel assignment reject.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the condition of the CS which cannot transmit link channel assignment in response to link channel establishment request. (The method to set such conditions can be chosen arbitrarily.)

2. Originate a call on the simulator.

3. Check that the CS transmits link channel assignment reject in response to link channel establishment request.

4. Check that call originating sequence has not been completed normally on the simulator.

Check items :

- When the CS receives link channel establishment request, and judges that it cannot perform link channel assignment, the CS transmits link channel assignment reject for reasons appropriate for each of the particular situations.

Test no.	2-2-3-4	Item	**Application operation : Semi-normal outgoing call operation ; Modifier of synchronization burst verification at link channel establishment (Modifier code for 1st TCH does not match up)**

Overview :

- When the modifier code for 1st TCH uplink synchronization burst does not match up with the correct modifier code for 1st TCH synchronization burst after the link channel assignment at origination, check that the CS switches back to the standby state after the specified period of time.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Perform the originating operation on the simulator. After the simulator receives a link channel assignment, the simulator sends a uplink synchronization burst with modifier code for 2nd TCH.

2. Check that the CS switches to the standby state if it has not received a normal synchronization burst before timer TR101C-1 expires (within 100 ms).

Check items :

- When the CS detect that the modifier code in the uplink synchronization burst does not match up with the correct modifier code for 1st TCH synchronization burst after sending a link channel assignment, the CS must switch back to the standby state after timer TR101C-1 expires (100 ms).

Test no.	2-2-3-5	Item	**Application operation : 64k bit/s UDI semi-normal outgoing call operation ; Modifier of 2nd synchronization burst verification at 64k bit/s UDI communication (Modifier code for 2nd TCH does not match up)**

Overview :

- When the modifier code for 2nd TCH uplink synchronization burst does not match up with the correct modifier code for 2nd TCH synchronization burst after the additional channel assignment at origination, check that the CS switches back to the standby state after the specified period of time.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Perform the 64k bit/s UDI originating operation on the simulator. After the simulator receives a additional channel assignment, the simulator sends a uplink synchronization burst with modifier code for 1st TCH.

2. Check that the CS switches to the standby state if it has not received a normal 2nd synchronization burst on 2nd TCH before timer TR101C-1 expires (within 100 ms).

Check items :

- When the CS detect that the modifier code in the uplink 2nd synchronization burst does not match up with the correct modifier code for 2nd synchronization burst after sending the additional channel assignment, the CS must switch 2nd TCH back to the standby state after timer TR101C-1 expires (100 ms).

Test no.	2-2-3-6	Item	**Application operation : 64k bit/s UDI semi-normal outgoing call operation ; Receiving the additional channel re-request message at 64k bit/s communication**

Overview :

- When the CS receives the additional channel re-request message after sending additional channel assign in 64k bit/s UDI outgoing call proceeding, the CS sends additional channel assign message for establishing 2nd TCH and set for the 64k bit/s UDI communication state.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Perform the 64k bit/s UDI originating operation on the simulator. After the simulator receives a additional channel assign message, the simulator sends the additional channel re-request message containing the cause of assigned channel use not possible (assigned channel cannot be used due to interference etc.).

2. Check that the CS sends the additional channel assign message in return to the additional channel re-request and set for the 64k bit/s UDI communication state after establishing synchronization on 2nd TCH.

3. Check the sequence for the 64k bit/s UDI originating call via the simulator.

Check items :

- When the CS receives the additional channel assign re-request, the CS stops receiving uplink 2nd synchronization burst at the channel assigned by additional channel assign message. Then the CS starts establishing 2nd TCH on the channel assigned by the additional channel assign message in return to the additional channel re-request and set for the 64k bit/s UDI communication state.

Test no.	2-2-3-7	Item	**Application operation : 64k bit/s UDI semi-normal outgoing call operation ; Additional channel assign reject message transmission operation**

Overview :

- When the CS receives the additional channel request message, the CS sends additional channel assign reject message if the CS cannot assign 2nd TCH because of the shortage of channel resources CS has or channel select limitation indicated in the additional channel request message.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. The simulator select contents of the additional channel request as the CS not to be able to assign 2nd TCH.

2. Perform the 64k bit/s UDI originating operation on the simulator and the simulator sends the additional channel request message.

3. Check that the CS sends the additional channel assign reject message in return to the additional channel request.

Check items :

- When the CS cannot assign 2nd TCH, the CS sends the additional channel assign reject message containing the cause for unavailable to assign.

Test no.	2-2-3-8	Item	**Application operation : 64k bit/s UDI semi-normal outgoing call operation ; Modifier of 2nd synchronization burst verification at 64k bit/s UDI communication (Modifier code for 2nd TCH does not match up)**

Overview :

- When the modifier code for 2nd TCH uplink synchronization burst does not match up with the correct modifier code for 2nd TCH synchronization burst after the additional channel assignment at origination, check that the CS releases 2nd TCH to idle state after the specified period of time and starts 64k bit/s UDI communication using a TCH..

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Perform the 64k bit/s UDI originating operation on the simulator. After the simulator receives a additional channel assignment, the simulator sends a uplink synchronization burst with modifier code for 1st TCH.

2. Check that the CS releases 2nd TCH to idle state and starts 64k bit/s UDI communication using a TCH if it has not received a normal 2nd synchronization burst before timer TR101C-1 expires (within 100 ms).

Check items :

- When the CS detect that the modifier code in the uplink 2nd synchronization burst does not match up with the correct modifier code for 2nd synchronization burst after sending the additional channel assignment, the CS must release 2nd TCH to idle state and starts 64k bit/s communication using a TCH when timer TR101C-1 expires.

Test no.	2-2-3-9	Item	Application operation : 64k bit/s UDI semi-normal originating call Additional TCH request rejection in combination of the Two slot fixed type CS and the Slot changeable type PS in 64k bit/s call originating

Overview :

- When the 64k UDI service type which PS request in Additional channel request message is not applicable to CS, check that the CS sends Additional channel assign reject message to PS.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Simulator set the slot changeable type in the Information Element of the Additional channel request message

2. Perform the 64k bit/s UDI originating operation on the simulator. After 1st TCH is established, the simulator sends the Additional channel request message.

3. CS which supports the Two slots fixed type 64k bit/s UDI sends Additional channel assign reject message in response to Additional channel request message with the Slot changeable type indication from the PS.

Check items :

- The CS must send the Additional channel assign reject message after the PS sends a Additional channel request with the inapplicable 64k UDI service type by 64k bit/s UDI originating operation on the PS.

Test no.	2-2-3-10	Item	Application operation : 64k bit/s UDI semi-normal outgoing call Additional TCH request rejection in combination of the Slot changeable type CS and the Two slot fixed type PS in 64k bit/s call originating

Overview :

- When the 64k UDI service type which PS request in Additional channel request message is not applicable to CS, check that the CS sends Additional channel assign reject message to PS.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Simulator set the Two slots fixed type in the Information Element of the Additional channel request message

2. Perform the 64k bit/s UDI originating operation on the simulator. After 1st TCH is established, the simulator sends the Additional channel request message.

3. CS which supports the Slot changeable type 64k bit/s UDI sends Additional channel assign reject message in response to Additional channel request message with the Two slots fixed type indication from the PS.

Check items :

- The CS must send the Additional channel assign reject message after the PS sends a Additional channel request with the inapplicable 64k UDI service type by 64k bit/s UDI originating operation on the PS .

2.3.3.2.2.4 Semi-normal incoming call tests

Test no.	2-2-4-1	Item	Application operation : Semi-normal incoming call operation: PS stops its call terminating operation when one of the other PSs has responded to the call in zone paging.

Overview :

- Check that, in zone paging, a response by PS will trigger the operation to stop ringing tone.

Test conditions :

Refer to common parameters for the entire test items (2.3.2.1(2))

Test procedure :

1. The simulator has completed location registration.
2. Check that CS performs zone paging to PS, and that PS generates ringing tones.
3. Allow the simulator to perform off-hook operation to respond to the call.
4. Check via the simulator that the CS transmits a signal indicating the suspension of ringing tones.

Check items :

•The CS must transmit a signal indicating the suspension of ringing tones, when PS responded to the call during zone paging.

Test no.	2-2-4-2	Item	Application operation : Semi-normal incoming call operation; Disconnection when there is no response from PS that has received the call.

Overview :

- Check that the CS performs operation to restore disconnection.

Test conditions :

Refer to common parameters for the entire test items (2.3.2.1(2))

Test procedure :

1. The CS terminates a call to the PS.
2. The simulator does not perform operation to respond to the call.
3. If the PS that has received the call does not respond until the timer TC-301-C expires, the CS performs operation to restore disconnection.
4. Check the termination sequence on the simulator.

Check items :

- If the PS that has received the call does not respond until the timer TC-301-C expires, the CS must perform operation to restore disconnection.

Test no.	2-2-4-3	Item	Application operation : 64k bit/s UDI semi-normal incoming call Additional TCH request rejection in combination of the Two slot fixed type CS and the Slot changeable type PS in 64k bit/s call terminating

Overview :

- When the 64k UDI service type which PS request in Additional channel request message is not applicable to CS, check that the PS receives Additional channel assign reject message.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Simulator set the slot changeable type in the Information Element of the Additional channel request message.

2. CS terminates a 64k bit/s UDI call to the simulator. After 1st TCH is established, the simulator sends the Additional channel request message.

3. CS which supports the Two slots fixed type 64k bit/s UDI sends Additional channel assign reject message in response to Additional channel request message with the Slot changeable type indication from the PS.

Check items :

- The CS must send the Additional channel assign reject message after the PS sends a Additional channel request with the inapplicable 64k UDI service type by 64k bit/s UDI originating operation on the PS.

Test no.	2-2-4-4	Item	Application operation : 64k bit/s UDI semi-normal incoming call Additional TCH request rejection in combination of the Slot changeable type CS and the Two slot fixed type PS in 64k bit/s call terminating

Overview :

- When the 64k UDI service type which PS request in Additional channel request message is not applicable to CS, check that the PS receives Additional channel assign reject message.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Simulator set the Two slots fixed type in the Information Element of the Additional channel request message .

2. CS terminates a 64k bit/s UDI call to the simulator. After 1st TCH is established, the simulator sends the Additional channel request message.

3. CS which supports the Slot changeable type 64k bit/s UDI sends Additional channel assign reject message in response to Additional channel request message with the Two slots fixed type indication from the PS.

Check items :

- The CS must send the Additional channel assign reject message after the PS sends a Additional channel request with the inapplicable 64k UDI service type by 64k bit/s UDI originating operation on the PS.

2.3.3.2.2.5 Transmission stop operation tests

Test no.	2-2-5-1	Item	Application operation : Transmission stop Radio channel release

Overview :

- When consecutive slot errors occur during the communication state, check that the time CS takes to release radio channel satisfies the specified time.

Test conditions :

Refer to common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the CS and the simulator for the communication state (as outlined in test 2-2-1-3).
2. The simulator sets consecutive slot errors for the transmission signal to the CS.
3. Check that the CS is in the radio channel release state in 60 sec after slot errors started.

Check items

- If consecutive slot errors continue for at least 60 sec, the CS must release the radio channel regardless of the reception level.

2.3.3.2.2.6 Additional channel establishment and disconnection during the communication tests

Test no.	2-2-6-1	Item	**Application operation : Additional channel establishment and disconnection** **64k bit/s UDI additional channel synchronization establishment with CS indication**

Overview :

- When the CS sends the Additional channel assign request indicate message during 64k bit/s UDI communication using a TCH, check that CS starts establishing 2nd TCH and continues 64k bit/s UDI communication by using double TCH.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Perform the 64k bit/s UDI originating operation on the simulator and set for the 64k bit/s UDI communication state using a TCH.
2. The CS sends the Additional channel assign request indicate message.
3. Check that the CS receives the Additional channel request message in response to the Additional channel assign request indicate message.
4. The CS assigns 2nd TCH in Additional channel assign message
4. Check that the 64k bit/s UDI communications using double TCH are enabled between the simulator and the CS
5. Check the 2nd TCH establishment sequence on the simulator

Check items

- CS must establishes 2nd TCH specified by the Additional channel assign message and 64k bit/s UDI communication using double TCH must be set to.

- 1st TCH must not be changed during the channel adding operation of 2nd TCH.

Test no.	2-2-6-2	Item	Application operation : Additional channel establishment and disconnection 64k bit/s UDI 2nd TCH release during communication with CS indication

Overview :

- When the CS sends Radio-channel disconnect message on 2nd TCH during the 64k bit/s UDI communication using double TCH, check that the CS releases 2nd TCH and continues 64k bit/s UDI communication by using a TCH.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the CS for the 64k bit/s UDI communication state. (As outlined in the test 2-2-6-1)
2. The CS sends the Radio-channel disconnect message on 2nd TCH.
3. The CS sends the Radio-channel disconnect complete message on 2nd TCH in response to Radio-channel disconnect message
4. Check that the CS receives the Radio-channel disconnect complete message and releases 2nd TCH.
5. Check that the 64k bit/s UDI communications using a TCH are enabled between the simulator and the CS.
6. Check the sequence of the 2nd TCH release on the simulator.

Check items

- CS must continue 64k bit/s UDI communication using a TCH after 2nd TCH releasing.
- 1st TCH must not be changed during the channel adding operation of 2nd TCH.

Test no.	2-2-6-3	Item	Application operation : Additional channel establishment and disconnection 64k bit/s UDI additional channel synchronization establishment with PS judgement

Overview :

- When the CS receives the Additional channel request message during 64k bit/s UDI communication using a TCH, check that CS starts establishing 2nd TCH and continues 64k bit/s UDI communication by using double TCH.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the CS for the 64k bit/s UDI communication state. (As outlined in the test 2-2-6-2)
2. The simulator sends the Additional channel request message.
3. Check that the CS assigns 2nd TCH in Additional channel assign message in response to the Additional channel request message.
4. Check that the 64k bit/s UDI communications using double TCH are enabled between the simulator and the CS.
5. Check the 2nd TCH establishment sequence on the simulator

Check items

- CS must establishes 2nd TCH specified by the Additional channel assign message and 64k bit/s UDI communication using double TCH must be set to.

- 1st TCH must not be changed during the channel adding operation of 2nd TCH.

Test no.	2-2-6-4	Item	Application operation : Additional channel establishment and disconnection 64k bit/s UDI 2nd TCH release during communication with PS judgement

Overview :

- When the CS receives Radio-channel disconnect complete message on 2nd TCH during the 64k bit/s UDI communication using double TCH, check that CS releases 2nd TCH and continues 64k bit/s UDI communication by using a TCH.

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the CS for the 64k bit/s UDI communication state. (As outlined in the test 2-2-6-3)
2. The PS sends the Radio-channel disconnect complete message on 2nd TCH.
3. Check that the CS receives the Radio-channel disconnect message and releases 2nd TCH.
4. Check that the 64k bit/s UDI communications using a TCH are enabled between the simulator and the CS.
5. Check the sequence of the 2nd TCH release on the simulator.

Check items

- CS must receive Radio-channel disconnect complete message on 2nd TCH and release the channel.
- CS must continue 64k bit/s UDI communication using a TCH after 2nd TCH releasing.
- 1st TCH must not be changed during the channel adding operation of 2nd TCH.

Test no.	2-2-6-5	Item	Application operation : Additional channel establishment and disconnection 64k bit/s UDI failure of additional channel synchronization establishment with PS judgement

Overview :

- When the CS sends the Additional channel assign message and fail to receive the 2nd synchronization burst in additional channel establishing process within the specified period of time, check that the CS releases 2nd TCH to idle state and resumes 64k bit/s UDI communication using a TCH..

Test conditions :

Refer to the common parameters for the entire test items (2.3.2.1(2)).

Test procedure :

1. Set the CS for the 64k bit/s UDI communication state. (As outlined in the test 2-2-6-4)
2. The CS sends the Additional channel assign message
3. The Simulator receives the additional channel assign message and does not send 2nd synchronization burst on assigned channel.
4. Check that the CS releases 2nd TCH to idle state and resumes 64k bit/s UDI communication using a TCH if it has not received a 2nd synchronization burst before timer TR101C-1 expires (within 100 ms).

Check items

- CS must continue 64k bit/s UDI communication using a TCH even if the additional channel synchronization establishment is failed.

2.3.3.3 Tests for items specified in the Attachment

2.3.3.3.1 Authentication tests

Regarding authentication, tests shall be conducted to confirm the authentication for the algorithms described in the Personal Handy Phone System ARIB Standard Version 3 Annex 3 "Standard Pertaining to Authentication of Personal Handy Phone System (Private)"

The authentication random pattern for authentication shall be tested on one or more values. These values can be decided freely by the CS manufactures.

2.3.3.3.2 Subscriber data write-in tests

Regarding subscriber data write-in, the tests specified in the Personal Handy Phone System ARIB Standard Version 3 Annex 4 "Standard Pertaining to Subscriber Data Write-in of Personal Handy Phone System (Private)" shall be conducted

2.3.3.4 Contents of tests for network protection and effective use of frequency

If the cell station has the following functions as part of the “technical conditions required of cell stations as terminal facilities”, tests should be conducted in regard to the relevant functions.

Test no.	**3-1**	**Item**	**Function to prevent updating CS specific information**
Check Items: The device to store CS specific information (i.e., information to identify the particular CS and used in setting channels) in memory should not be easily detached. It should not be easy, moreover, to update the CS specific information. In addition, the part of the CS specific information which is not for direct use by end-users should be hard to get access to or know about.			

Test no.	**3-2**	**Item**	**Restriction for autonomous response detection**
Check Items: This item is applied only to the kind of CS that has the function to automatically confirm that there was a response from the called party terminal to the call originated by the CS. If such CS cannot verify there has been any response from the called party terminal, it must first transmit a signal to specify the terminal facility of the called party, and then send a signal to disconnect the channel within one minute to stop transmission.			

Test no.	3-3	Item	Restriction for automatic recalling

Check Items:

Automatic recalling (i.e., automatically originating calls repeatedly to the party who does not respond) should be limited to twice or less. However, if the recalling is performed after 3 minutes or longer from the first call, or in case of fire, theft and other emergencies, this rule does not have to be applied.

Remarks

- In counting the number of times of recalling, the first originating call must be excluded.
- If the recalling is performed after 3 minutes or longer from the first originating call, it must be regarded as a separate call and not as recalling.

Test no.	3-4	Item	Transmission power other than for communication

Check Items:

In case the CS is used for purposes other than communication,

- If the relevant CS is connected to the analog network, transmission power to the network must be at (-15 + L) dBm or less on the average, and must not exceed 0dBm at the maximum level.

- If the relevant CS is connected to the digital network, transmission power at the time of conversion from digital to analog signals must be at -15 dBm or less on the average, and must not exceed 0dBm at the maximum level.

Note L means line transmission loss at 1,500Hz from the switch facility of Type I telecommunication business operators to the connection point with the terminal facility.

Chapter 3 Compatibility Confirmation Tests

3.1 Purpose

Compatibility confirmation tests shall be conducted for cell stations which have already undergone the simulator tests conducted by individual manufacturers. For these tests, cell stations are connected with the testing system to check that the cell station operates normally when using the basic functions, including outgoing call, incoming call, location registration, communication, channel switching during communication, call ending, etc.

3.2 Configuration of the test system

Fig. 3.1 shows an example configuration for the compatibility confirmation test system.

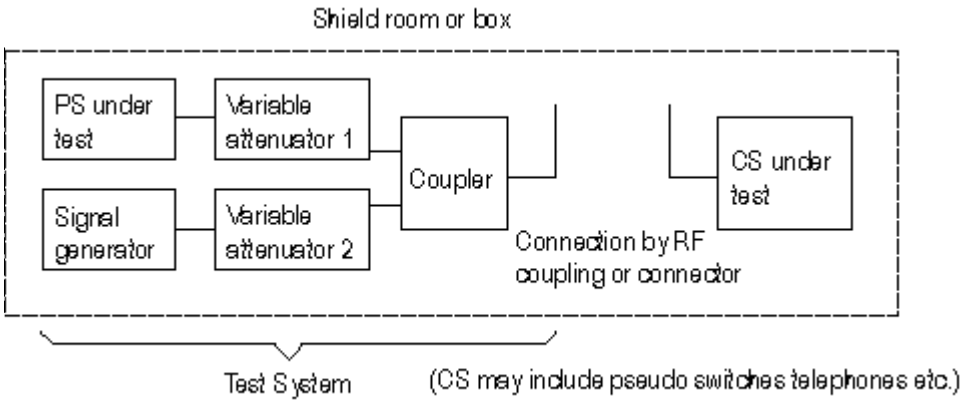

Fig. 3.1 Example configuration for compatibility confirmation tests

3.3 Implementation of compatibility confirmation tests

Compatibility confirmation tests shall be conducted on the test system for cell stations which have already undergone the test using the simulator.

3.4 Test items and conditions

3.4.1 List of test items

Test items for compatibility confirmation tests shall be as listed below:

Test number	Test item	
3-1	Location registration operation tests	
3-1-1	Location registration	
3-2	Outgoing call/disconnection operation tests	
3-2-1	Outgoing call/communication/disconnection by the test system	(Note 4)
3-2-2	64k bit/s UDI outgoing call/communication/disconnection by the test system	(Note 3)
3-3	Incoming call/call ending operation tests	
3-3-1	Incoming call/communication/disconnection by CS	(Note 4)
3-3-2	64k bit/s UDI incoming call/communication/disconnection by CS	(Note 3)
3-4	Tests for channel switching operation during communication (note 1)	
3-4-1	Channel switching during communication	(Note 4)
3-4-2	64k bit/s UDI channel switching during communication	(Note 3)
3-5	Tests for items specified in the Annex of the Standard	
3-5-1	Authentication test	
3-5-2	Subscriber data write-in test (note 2)	

Note 1: The test conditions for channel switching operation during communication shall be personal station initiative type.

Note 2: This item should be selected depending on the kinds of functions each CS has. If the relevant CS does not have the function to write in subscriber data, the parameters used in compatibility confirmation tests should be memorized beforehand.

Note 3 : If CS able to achieve a 64k bit/s communication with using 2 TCH simultaneously, these tests are required.

Note 4 : If each test is going by selecting bearer capability as UDI, words “converse” shall be recognized same meaning of “communicate” and check shall be done by protocol sequence but not by transmission/reception volume using handset.

3.4.2 Test conditions at start of testing

(1) Set attenuation for variable attenuator 2 to maximum.

(2) Adjust variable attenuator 1 so that the reception for the cell station increases to a sufficiently high level to switch to the standby state. The attenuation level set here is hereinafter referred to as "specified attenuation".

3.4.3 Contents of tests

The contents of compatibility confirmation tests shall be as listed below:

3.4.3.1 Location registration operation tests

Test no.	3-1-1	Item	Location registration
Overview : • Check that the CS acknowledges location registration normally.			
Test procedure : 1. Perform location registration by using the location registration operation of the test system. 2. Check that the location registration sequence ends normally using the test system.			

3.4.3.2 Outgoing call/disconnection operation tests

Test no.	3-2-1	Item	Outgoing call/communication/disconnection by the test system
Overview : • Originate a call from the test system and check that the test system end the call normally.			
Test procedure : 1. Set the test system for the standby state 2. Originate a call from the test system. 3. Check that the call is setup normally. (Note) 4. End the call using the test system. 5. Check that the sequence ends normally using the test system.			

(Note) If the bearer capability is selected as unrestricted digital information (UDI), test procedure 3 is replaced as “Check that the call is setup and communication starts normally by protocol sequence using the test system”.

Test no.	3-2-2	Item	64k bit/s UDI outgoing call/communication/disconnection by the test system

Overview :

- Originate a 64k bit/s UDI call from the test system and check that the test system end the call normally.

Test procedure :

1. Set the test system for the standby state
2. Originate a 64k bit/s UDI call from the test system.
3. Check that the call is setup and 64k bit/s UDI communication starts normally by protocol sequence using the test system.
4. End the call using the test system.
5. Check that the sequence ends normally using the test system.

3.4.3.3 Incoming call/call ending operation tests

Test no.	3-3-1	Item	Incoming call/communication/disconnection by CS

Overview :

- Allow the test system to receive a call originated using the CS, then check that the call can be ended normally from the CS.

Test procedure :

1. Set the test system for the standby state
2. Originate a call from the CS.
3. Check that ringing tone is generated by the test system, then answer the call. (Note 1)
4. Check that the call is setup normally. (Note 2)
5. End the call using the CS.
6. Check that the sequence ends normally using the test system.

(Note 1) If the bearer capability is selected as unrestricted digital information (UDI), the word "ringing tone" in test procedure 3 shall be recognized same meaning as "receiving call indication".

(Note 2) If the bearer capability is selected as unrestricted digital information (UDI), test procedure 4 is replaced as "Check that the call is setup and communication starts normally by protocol sequence using the test system".

Test No.	3-3-2	Item	64k bit/s UDI Incoming call/communication/disconnection by CS

Overview :

- Allow the test system to receive a 64k bit/s UDI call originated using the CS, then check that the call can be ended normally from the CS.

Test procedure :

1. Set the test system for the standby state
2. Originate a 64k bit/s UDI call from the CS.
3. Check the receiving call indication by the test system,, then answer the call.
4. Check that the call is setup and 64k bit/s UDI communication starts normally by protocol sequence using the test system
5. End the call using the CS.
6. Check that the sequence ends normally using the test system.

3.4.3.4 Tests for channel switching operation during communication

Test no.	3-4-1	Item	Channel switching during communication

Overview :

- Check that the CS can perform channel switching during communication

Test procedure :

1. Set the test system for the standby state
2. Originate a call from the test system.
3. Check that the call is put through normally. (Note 1)
4. Adjust the frequency of the signal generator to the channel in use for communication, and set variable attenuator 2 to the specified attenuation.
5. Check that the call is connected normally after channel switching during communication. (Note 2)
6. End the call using the CS.
7. Check that the sequence normally using the test system.

(Note 1) If the bearer capability is selected as unrestricted digital information (UDI), test procedure 3 is replaced as “Check that the call is setup and communication starts normally by protocol sequence using the test system”.

(Note 2) If the bearer capability is selected as unrestricted digital information (UDI), test procedure 5 is replaced as “Check that the call is connected normally after channel switching during communication by protocol sequence using the test system”.

Test no.	3-4-2	Item	64k bit/s UDI Channel switching during communication

Overview :

- Check that the CS switches can perform channel switching during 64k bit/s UDI communication.

Test procedure :

1. Set the test system for the standby state
2. Originate a 64k bit/s UDI call from the test system.
3. Check that the call is setup and communication starts normally by protocol sequence using the test system.
4. Adjust the frequency of the signal generator to the channel in use for communication, and set variable attenuator 2 to the specified attenuation.
5. Check that the call is connected normally after channel switching during communication by protocol sequence using the test system
6. End the call using the CS.
7. Check that the sequence normally using the test system.

3.4.3.5 Tests for items specified in the Annex of the Standard

3.4.3.5.1 Authentication tests

Authentication tests shall be conducted as a part of the test items in section 3.4.1. Note, however, that authentication random patterns used for these tests shall be decided by the testing organization.

3.4.3.5.2 Subscriber data write-in tests

In relation to subscriber data write-in, the tests specified in the Personal Handy Phone System ARIB Standard Version 3 (RCR STD-28) Annex 4 “Standard Pertaining to Subscriber Data Write-in of Personal Handy Phone System (Private)” shall be conducted.

Appendix A : Test items and conditions related to compatibility confirmation on private cell stations used outside Japan

INTRODUCTION

This appendix has been prepared for test items and conditions related to compatibility confirmation of private cell stations used outside Japan which comply with Standard Specifications and Appendix AC of “The Personal Handy Phone System ARIB Standard Version 3 (RCR STD-28).

About description methods in this appendix

1. This appendix (The test items and conditions related to compatibility confirmation on private cell stations used outside Japan) has the same structure as the one of the main text (The main text is defined in the next item No. 3.). The appendix, however, describes only the parts changed from the main text and refers to the main text when the contents of this appendix have the same as the main text.

2. The chapter 1, 2 and 3 only describe the parts changed from the main text.

3. The "main text" used in this appendix refers to the chapters from 1 to 3 of "PERSONAL HANDY PHONE SYSTEM TEST ITEMS AND CONDITIONS FOR PRIVATE CELL STATION COMPATIBILITY CONFIRMATION ARIB TECHNICAL REPORT (ARIB TR-T5)".

Note: This appendix is not applied to the systems in Japan. The cell stations tested according to this appendix alone should not be used in Japan.

Chapter 1 General Facts

1.1 Overview

Test related to compatibility confirmation on "private cell stations used outside Japan for the Personal Handy Phone System" (hereinafter referred to as "cell stations") are performed for each private cell station type within the scope of the basic functions and the standardization options specified in the Personal Handy Phone System ARIB Standard Version 3 (RCR STD-28). The purpose of these tests is to check the private cell station's compatibility with the radio interfaces specified in the appendix AC and private-use specifications of the RCR STD-28.

As a pre-condition for these tests, the operation of cell stations based on private-use specifications and appendix AC of the said standard shall be confirmed thoroughly in the development and manufacturing stages under the sole responsibility of the cell station manufacturers.

The tests are conducted within the scope of the general testing environment, and the setting for the test environment or assignment of functions to the cell station are chosen in a manner that will not burden the testing organizations or cell station manufacturers.

1.2 Classification of tests

There are two types of tests for compatibility of cell stations : (1) the connection simulator test, and (2) the compatibility confirmation test. These tests shall be mainly conducted by the cell station manufacturers.

The connection simulator test shall be conducted to check the specified test items under the specified test conditions using a connection simulator.

The compatibility confirmation test shall be conducted by connecting a cell station which has already undergone the connection simulator test for checking the specified test items under the specified test conditions using a test system.

Chapter 2 Connection simulator tests

2.1 Purpose

The connection simulator test is conducted using a connection simulator to check that cell stations produced by individual cell station manufacturers satisfy the carrier standard for control/communication of private systems used outside Japan specified in the private-use specifications and appendix AC of the Personal Handy Phone System ARIB Standard Version 3 (RCR STD-28).

2.3.2 Basic test parameters

2.3.2.1 Basic parameters

Except for the following items changed, this section conforms to the contents in the section 2.3.2.1 of the main text.

(1) Parameters which are pre-registered in the CS prior to tests
- Control carrier number : 30, 36

(2) Common parameters for the entire test items

- Control carrier number : 30, 36

Chapter 3 Compatibility Confirmation Tests

3.1 Purpose

Compatibility confirmation tests shall be conducted for cell stations which have already undergone the simulator tests conducted by individual manufacturers. For these tests, cell stations are connected with the testing system to check that the cell stations operate normally when using the basic functions, including outgoing call, incoming call, location registration, communication, call ending, etc.

3.4 Tests items and conditions

3.4.3.5 Tests for items specified in the Appendix of the Standard

These tests are outside the scope of those required under this appendix.

Annex 1 : List of test items using the connection simulator

(1) Test items related to the technical requirements for radio facilities

Test no.	Test item	M/O
1-1	Transmission characteristics	-
1-1-1	Transmission power	M
1-1-2	Transient response characteristics of burst transmission	M
1-1-3	Frequency stability	M
1-1-4	Modulation accuracy	M
1-1-5	Transmission rate accuracy	M
1-1-6	Physical slot transmission condition	M
1-1-7	Transmission timing	M
1-1-8	Transmission jitter	M
1-2	Reception characteristics	-
1-2-1	Sensitivity	M
1-2-2	Receive signal strength indicator accuracy	M

M: mandatory

O: optional (These should be selected depending on the functions of each CS)

(2) Test items for communication control methods

Test no.	Test item	M/O
2-1	Basic operation tests	-
2-1-1	Location registration — Location registration on turning the power for PS ON	M
2-1-2	Outgoing call — PS originates a call and switches to the communication state	M
2-1-3	Disconnection (PS) — A call disconnected by the onhook operation for the PS during communication.	M
2-1-4	Incoming call — After a call is received by the PS, PS is switched to the communication state by the offhook operation	M
2-1-5	Disconnection (CS) — PS receives "disconnect" message from the CS side during communication and disconnects the call.	M
2-1-6	64k bit/s UDI outgoing call - simulator originates a 64k bit/s UDI call and switch to the communication state	O
2-1-7	64k bit/s UDI disconnection (simulator) - A call disconnected by simulator during a 64k bit/s UDI communication	O
2-1-8	64k bit/s UDI incoming call - After simulator receiving a 64k bit/s UDI call, simulator is switched to the communication state by connecting operation	O
2-1-9	64k bit/s UDI disconnection (CS) - simulator receives “Disconnect” message from CS side during a 64k bit/s UDI communication and disconnects the call	O
2-1-10	64k bit/s UDI outgoing call - simulator originates a 64k bit/s UDI call and switch to the communication state	O
2-1-11	64k bit/s UDI incoming call - After simulator receiving a 64k bit/s UDI call, simulator is switched to the communication state by connecting operation	O
2-2	Application operation tests	-
2-2-1	Channel switching operation tests during communication	-
2-2-1-1	Channel switching during communication with CS indication : the communication physical slot within carrier within CS	O(Note)
2-2-1-2	Channel switching during communication with CS indication : the communication physical slot between carrier within CS	O(Note)
2-2-1-3	Channel switching during communication with PS request : the communication physical slot within carrier within CS	O(Note)
2-2-1-4	Channel switching during communication with PS request : the communication physical slot between carrier within CS	O(Note)
2-2-1-5	Channel switching during communication with CS indication : the communication physical slot between carrier within CS (switching back)	O
2-2-1-6	Handover during communication with CS indication : Recalling-type to the home CS	O
2-2-1-7	Handover during communication with CS indication : Recalling-type to other CS (in the same paging area)	O
2-2-1-8	Handover with PS judgment : PS recalling-type to other CS (in the same paging area)	O
2-2-1-9	Handover with CS indication: Recalling-type to other CS (in the same paging area) (switching back)	O
2-2-1-10	Handover with PS judgment: PS recalling-type to other CS (in other paging area)	O

M: mandatory
O: optional (These should be selected depending on the functions of each CS)

(Note) In these tests, the channel switching operation scheme, i.e. switching to same carrier and different slot or to different carrier and slot, can be selected depending on the kinds of functions each CS has. Thus, either or both scheme will be tested.

Test no.	Test item	M/O
2-2-1-11	64k bit/s UDI channel switching during communication with CS indication : the same CS, 1st TCH	O
2-2-1-12	64k bit/s UDI channel switching during communication with CS indication : the same CS, 2nd TCH	O
2-2-1-13	64k bit/s UDI channel switching during communication with simulator request : the same CS, 1st TCH	O
2-2-1-14	64k bit/s UDI channel switching during communication with simulator request : the same CS, 2nd TCH	O
2-2-1-15	64k bit/s UDI channel switching during communication with CS indication : the same CS, 1st TCH (switching back)	O
2-2-1-16	64k bit/s UDI channel switching during communication with CS indication : the same CS, 2nd TCH (switching back)	O
2-2-1-17	64k bit/s UDI handover with CS indication : Recalling-type to the home CS	O
2-2-1-18	64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area)	O
2-2-1-19	64k bit/s UDI handover with simulator judgment : simulator recalling-type to other CS (in the same paging area)	O
2-2-1-20	64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area) (switching back)	O
2-2-1-21	64k bit/s UDI handover with simulator judgment : simulator recalling-type to other CS (in other paging area)	O
2-2-1-22	64k bit/s UDI handover with CS indication : Recalling-type to the home CS	O
2-2-1-23	64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area)	O
2-2-1-24	64k bit/s UDI handover with simulator judgment : simulator recalling-type to other CS (in the same paging area)	O
2-2-1-25	64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area) (switching back)	O
2-2-1-26	64k bit/s UDI handover with simulator judgment : simulator recalling-type to other CS (in other paging area)	O

M: mandatory
O: optional (These should be selected depending on the functions of each CS)

Test no.	Test item	M/O
2-2-2	Restriction operation tests	-
2-2-2-1	Operation by restriction group assigned : Restriction group applicable : No access cycle restriction	O
2-2-2-2	Operation by restriction group assigned : Restriction group non-applicable : No access cycle restriction	O
2-2-3	Semi-normal outgoing call operation tests	-
2-2-3-1	ID verification at link channel establishment Calling station ID code does not matched up	M
2-2-3-2	ID verification at link channel establishment Called station ID code does not match up	M
2-2-3-3	Operation to transmit link channel assignment reject	M
2-2-3-4	Modifier of synchronization burst verification at link channel establishment - modifier code for 1st TCH does not match up	M
2-2-3-5	Modifier of synchronization burst verification at 64k bit/s communication - modifier code for 2nd TCH does not match up	O
2-2-3-6	Receiving the additional channel re-request message at 64k bit/s communication	O
2-2-3-7	Operation to transmit the additional channel assign reject message at 64k bit/s communication	O
2-2-3-8	Modifier of synchronization burst verification at 64k bit/s communication - modifier code for 2nd TCH does not match up	O
2-2-3-9	Additional TCH request rejection in combination of the Two slot fixed type CS and the Slot changeable type PS in 64k bits/s UDI call originating	O
2-2-3-10	Additional TCH request rejection in combination of the Slot changeable type CS and the Two slot fixed type PS in 64k bits/s UDI call originating	O
2-2-4	Semi-normal incoming call operation tests	-
2-2-4-1	In zone paging, PS stops its call terminating operation when one of the other PS's has responded to the call	O
2-2-4-2	Disconnection when there is no response from PS that has received the call.	O
2-2-4-3	Additional TCH request rejection in combination of the Two slot fixed type CS and the Slot changeable type PS in 64k bits/s UDI call terminating	O
2-2-4-4	Additional TCH request rejection in combination of the Slot changeable type CS and the Two slot fixed type PS in 64k bits/s UDI call terminating	O
2-2-5	Transmission stop operation test	-
2-2-5-1	Radio channel release	M
2-2-6	Additional channel establishment and disconnection during the communication tests	
2-2-6-1	64k bit/s UDI additional channel synchronization establishment with CS	O
2-2-6-2	64k bit/s UDI 2nd TCH disconnection with CS	O
2-2-6-3	64k bit/s UDI additional channel synchronization establishing with PS	O
2-2-6-4	64k bit/s UDI 2nd TCH disconnection with PS judgement	O
2-2-6-5	64k bit/s UDI additional channel synchronization establishment failure in PS judgement process	O

M: mandatory
O: optional (These should be selected depending on the functions of each CS.)

(3) Test items for those specified by the Annex of the Standard

Test no.	Test item	M/O
2-3	Tests for items specified in the Annex	-
2-3-1	Authentication tests	M
2-3-2	Subscriber data write-in tests	O

M: mandatory
O: optional (These should be selected depending on the functions of each CS)

(4) Reference tests for network protection and efficient use of frequencies

Test no.	Test item	M/O
3-1	Function to prevent updating of CS specific information	M
3-2	Restriction for autonomous response detection	O
3-3	Restriction for automatic recalling	O
3-4	Transmission power other than for communication	O

M: mandatory
O: optional (These should be selected depending on the functions of each CS)

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AMENDMENT HISTORY

"____" Added; "~~====~~" Deleted

Number	Page	Amendments
2.3-1	4	2.3.1.2 Test items related to the communication control methods 2-1 Basic operation tests 2-1-10 64k bit/s UDI outgoing call — Simulator originates a 64k bit/s UDI call and switch to the communication state (Note 4,5) 2-1-11 64k bit/s UDI incoming call —After simulator receiving a 64k bit/s UDI call, simulator is switched to the communication state by connecting operation (Note 4,5)
2.3-2	4~5	2-2 Application operation tests 2-2-1 Channel switching operation tests during communication 2-2-1-1 Channel switching during communication with CS indication : ~~the same CS, same carrier, different slot~~ the communication physical slot within carrier within CS (Note 7) 2-2-1-2 Channel switching during communication with CS indication : ~~the same CS, different carrier and slot~~ the communication physical slot between carrier within CS (Note 7) 2-2-1-3 Channel switching during communication with PS request : ~~the same CS, same carrier and different slot~~ the communication physical slot within carrier within CS (Note 7) 2-2-1-4 Channel switching during communication with PS request : ~~the same CS, different carrier and slot~~ the communication physical slot between carrier within CS (Note 7) 2-2-1-5 Channel switching during communication with CS indication : ~~the same CS, different carrier and slot~~ the communication physical slot between carrier within CS (switching back) 2-2-1-22 64k bit/s UDI handover with CS indication : Recalling-type to the home CS (Note 4,5) 2-2-1-23 64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area) (Note 4,5) 2-2-1-24 64k bit/s UDI handover with simulator judgment : simulator recalling-type to other CS (in the same paging area) (Note 4,5) 2-2-1-25 64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area) (switching back) (Note 4,5) 2-2-1-26 64k bit/s UDI handover with simulator judgment : simulator recalling-type to other CS (in other paging area) (Note 4,5)
2.3-3	5	2-2-3 Semi-normal outgoing call operation tests 2-2-3-5 Modifier of synchronization burst verification at 64k bit/s communication - modifier code for 2nd TCH does not match up (Note 3,6) 2-2-3-8 Modifier of synchronization burst verification at 64k bit/s communication - modifier code for 2nd TCH does not match up (Note 4,5) 2-2-3-9 Additional TCH request rejection in combination of the Two slot fixed type CS and the Slot changeable type PS in 64k bits/s UDI call originating (Note 3,6) 2-2-3-10 Additional TCH request rejection in combination of the Slot changeable type CS and the Two slot fixed type PS in 64k bits/s UDI call originating (Note 4)
2.3-4	5	2-2-4 Semi-normal incoming call operation tests 2-2-4-3 Additional TCH request rejection in combination of the Two slot fixed type CS and the Slot changeable type PS in 64k bits/s UDI call terminating (Note 3,6) 2-2-4-4 Additional TCH request rejection in combination of the Slot changeable type CS and the Two slot fixed type PS in 64k bits/s UDI call terminating (Note 4)
2.3-5	6	2-2-6 Additional channel establishment and disconnection during the communication tests 2-2-6-1 64k bit/s UDI additional channel synchronization establishment with CS indication (Note 4) 2-2-6-2 64k bit/s UDI 2nd TCH disconnection with CS indication (Note 4) 2-2-6-3 64k bit/s UDI additional channel synchronization establishing with PS judgement (Note 4) 2-2-6-4 64k bit/s UDI 2nd TCH disconnection with PS judgement (Note 4) 2-2-6-5 64k bit/s UDI additional channel synchronization establishment failure in PS judgement process (Note 4)

<table>
<tr><th>Number</th><th>Page</th><th>Amendments</th></tr>
<tr><td>2.3-6</td><td>6</td><td>Note 4 : If CS is able to achieve a 64k bit/s UDI communication in the Slot changeable mode, these tests are required.
Note 5 : In these tests, it is confirmed that the 64k bit/s UDI communication is achieved by using a TCH.
Note 6 : In these tests, CS is set to operate the Two slot fixed type 64k bit/s UDI.
Note 7 : In these tests, the channel switching operation scheme, i.e. switching to same carrier and different slot or to different carrier and slot, can be selected depending on the kinds of functions each CS has. Thus, either or both scheme will be tested.</td></tr>
<tr><td>2.3-7</td><td>9</td><td>2.3.3.1 Contents of tests for the technical requirements for facilities
<table>
<tr><th>Test no.</th><th>Test item</th><th>Specifications</th><th>Measurement carrier</th></tr>
<tr><td>1-1-6</td><td>Physical slot transmission condition</td><td>Can be used with 2nd level (~~40~~ 44dBμV) or lower</td><td>15</td></tr>
</table></td></tr>
<tr><td>2.3-8</td><td>19~20</td><td>Test No. 2-1-10, 2-1-11 are added.</td></tr>
<tr><td>2.3-9</td><td>21~24</td><td>Test No. 2-2-1-1
Item Application operation : Channel switching during communication with CS indication (~~the same CS/the same carrier/different slot~~ the communication physical slot within carrier within CS)
Test conditions :
Conditions to set the TCH switching indication to ~~the same CS/the same carrier/different slot~~ the communication physical slot within carrier within CS can be determined arbitrarily.
Check items:
• When the number of slot errors which arise on the part of the simulator in the frames during the communication to CS reaches or exceeds the reception quality degradation detection threshold value, CS must transmit TCH switching indication containing ~~the same CS, the same carrier and different slot~~ the communication physical slot within carrier within CS.
Test No. 2-2-1-2
Item Application operation : Channel switching during communication with CS indication (~~the same CS/different carrier and slot~~ the communication physical slot between carrier within CS)
Test conditions :
Conditions to set the TCH switching indication to ~~the same CS/different carrier/different slot~~ the communication physical slot between carrier within CS can be determined arbitrarily.
Check items:
• When the number of slot errors which arise on the part of the simulator in the frames during the communication to CS reaches or exceeds the reception quality degradation detection threshold value, CS must transmit TCH switching indication containing ~~the same CS, different carrier and slot~~ the communication physical slot between carrier within CS.
Test No. 2-2-1-3
Item Application operation : Channel switching during communication with PS request (~~the same CS/the same carrier/different slot~~ the communication physical slot within carrier within CS)
Test conditions :
Conditions to set the TCH switching indication to ~~the same CS/the same carrier/different slot~~ the communication physical slot within carrier within CS can be determined arbitrarily.
Check items:
• After CS has transmitted the TCH switching indication containing ~~the same CS, the same carrier and different slot slot~~ the communication physical slot within carrier within CS, the PS must switch to the specified channel and resume communication.
Test No. 2-2-1-4
Item Application operation : Channel switching during communication with PS request (~~the same CS/different carrier/different slot~~ the communication physical slot between carrier within CS)
Test conditions :
Conditions to set the TCH switching indication to ~~the same CS/different carrier/different slot~~ the communication physical slot between carrier within CS can be determined arbitrarily.
Check items:
• The CS must send a TCH switching indication containing ~~the same CS, different carrier and different slot~~ the communication physical slot between carrier within CS, when in has received a TCH switching request from PS.
• After CS has transmitted the TCH switching indication containing ~~the same CS, different carrier and different slot~~ the communication physical slot between carrier within CS, the PS must switch to the specified channel and resume communication.</td></tr>
</table>

<table>
<tr><th>Number</th><th>Page</th><th>Amendments</th></tr>
<tr><td>2.3-10</td><td>25</td><td>Test No. 2-2-1-5
Item Application operation : Channel switching during communication with CS indication (~~the same CS/different carrier/different slot~~ the communication physical slot between carrier within CS /switching back)
Test conditions :
Conditions to set the TCH switching indication to ~~the same CS/the same carrier/different slot~~ the communication physical slot between carrier within CS can be determined arbitrarily.</td></tr>
<tr><td>2.3-11</td><td>42~46</td><td>Test No. 2-2-1-22~2-2-1-26 are added.</td></tr>
<tr><td>2.3-12</td><td>56~58</td><td>Test No. 2-2-3-8~2-2-3-10 are added.</td></tr>
<tr><td>2.3-13</td><td>61~62</td><td>Test No. 2-2-4-3, 2-2-4-4 are added.</td></tr>
<tr><td>2.3-14</td><td>64~68</td><td>2.3.3.2.2.6 Additional channel establishment and disconnection during the communication tests
This item is added.
Test No. 2-2-6-1~2-2-6-5 are added.</td></tr>
<tr><td>2.3-15</td><td>71</td><td>2.3.3.4 Contents of tests for network protection and effective use of frequency
Test no. 3-4 Item Transmission power other than for communication
Check Items:
In case the CS is used for purposes other than communication,
• If the relevant CS is connected to the analog network, transmission power to the network must be at ~~(–15 + L)~~ –8 dBm or less on the average, and must not exceed 0dBm at the maximum level.
• If the relevant CS is connected to the digital network, transmission power at the time of conversion from digital to analog signals must be at ~~–15~~ –8 dBm or less on the average, and must not exceed 0dBm at the maximum level.
~~Note L means line transmission loss at 1,500Hz from the switch facility of TypeI telecommunication business operators to the connection point with the terminal facility.~~</td></tr>
<tr><td>AN1-1</td><td>87</td><td>Annex 1 : List of test items using the connection simulator
(2) Test items for communication control methods
<table>
<tr><th>Test no.</th><th>Test item</th><th>M/O</th></tr>
<tr><td>2-2</td><td>Application operation tests</td><td>-</td></tr>
<tr><td>2-2-1</td><td>Channel switching operation tests during communication</td><td>-</td></tr>
<tr><td>2-2-1-1</td><td>Channel switching during communication with CS indication : ~~the same CS, same carrier, different slot~~ the communication physical slot within carrier within CS</td><td>~~M~~ O(Note)</td></tr>
<tr><td>2-2-1-2</td><td>Channel switching during communication with CS indication : ~~the same CS, different carrier and slot~~ the communication physical slot between carrier within CS</td><td>~~M~~ O(Note)</td></tr>
<tr><td>2-2-1-3</td><td>Channel switching during communication with PS request : ~~the same CS, same carrier different slot~~ the communication physical slot within carrier within CS</td><td>~~M~~ O(Note)</td></tr>
<tr><td>2-2-1-4</td><td>Channel switching during communication with PS request : ~~the same CS, different carrier and slot~~ the communication physical slot between carrier within CS</td><td>~~M~~ O(Note)</td></tr>
<tr><td>2-2-1-5</td><td>Channel switching during communication with CS indication : ~~the same CS, different carrier and slot~~ the communication physical slot between carrier within CS (switching back)</td><td>~~M~~ O</td></tr>
</table>
(Note) In these tests, the channel switching operation scheme, i.e. switching to same carrier and different slot or to different carrier and slot, can be selected depending on the kinds of functions each CS has. Thus, either or both scheme will be tested.</td></tr>
<tr><td>AN1-2</td><td>87~89</td><td>Test no. 2-1-10, 2-1-11, 2-2-1-22~2-2-1-26, 2-2-3-8~2-2-3-10, 2-2-4-3, 2-2-4-4, 2-2-6-1~2-2-6-5 are added.</td></tr>
</table>

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AMENDMENT HISTORY

"____" Added; "~~====~~" Deleted

Number	Page	Amendments
2.3-1	7	2.3.2.1 Basic parameters (2) Common parameters for the entire test items ~~Note~~ → Note 1
2.3-2	8	Note 2 : If each test is going by selecting bearer capability as UDI, words "converse" shall be recognized as same meaning of "communicate" and check shall be done by protocol sequence but not by transmission/reception volume using handset.
3.4-1	73	3.4.1 List of test items 3-2-1 Outgoing call/communication/disconnection by the test system (Note 4)
3.4-2	73	3-3-1 Incoming call/communication/disconnection by CS (Note 4)
3.4-3	73	3-4-1 Channel switching during communication (Note 4)
3.4-4	73	Note 4: If each test is going by selecting bearer capability as UDI, words "converse" shall be recognized same meaning of "communicate" and check shall be done by protocol sequence but not by transmission/reception volume using handset.
3.4-5	74	3.4.3.2 Outgoing call/disconnection operation tests **Test no. 3-2-1 Item** Outgoing call/communication/disconnection by the test system **Test procedure :** 3. Check that the call is setup normally. (Note) (Note) If the bearer capability is selected as unrestricted digital information (UDI), test procedure 3 is replaced as "Check that the call is setup and communication starts normally by protocol sequence using the test system".
3.4-6	76	3.4.3.3 Incoming call/call ending operation tests **Test no. 3-3-1 Item** Incoming call/communication/disconnection by the test system system **Test procedure :** 3. Check that ringing tone is generated by the test system, then answer the call. (Note 1) 4. Check that the call is setup normally. (Note 2) (Note 1) If the bearer capability is selected as unrestricted digital information (UDI), the word "ringing tone" in test procedure 3 shall be recognized same meaning as "receiving call indication". If the PS has a autonomous answering function, test procedure 3 can be omitted. (Note 2) If the bearer capability is selected as unrestricted digital information (UDI), test procedure 4 is replaced as "Check that the call is setup and communication starts normally by protocol sequence using the test system".
3.4-7	77	3.4.3.4 Tests for channel switching operation during communication **Test no. 3-4-1 Item** Channel switching during communication **Test procedure :** 3. Check that the call is put through normally. (Note 1) 5. Check that the call is connected normally after channel switching during communication. (Note 2) (Note 1) If the bearer capability is selected as unrestricted digital information (UDI), test procedure 3 is replaced as "Check that the call is setup and communication starts normally by protocol sequence using the test system". (Note 2) If the bearer capability is selected as unrestricted digital information (UDI), test procedure 5 is replaced as "Check that the call is connected normally after channel switching during communication by protocol sequence using the test system".

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AMENDMENT HISTORY

"____" Added; "~~====~~" Deleted

Number	Page	Amendments
1-1	1	1.1 Overview In the 4th line, the Personal Handy Phone System ARIB Standard Version ~~2~~ 3 (RCR STD-28).
2.1-1	2	2.1 Purpose In the 2nd line, the Personal Handy Phone System ARIB Standard Version ~~2~~ 3 (RCR STD-28).
2.3-1	3~4	2.3.1.2 Test items related to the communication control methods 2-1 Basic operation tests 2-1-6 64k bit/s UDI outgoing call — PS originates a 64k bit/s UDI call and switch to the communication state (Note 3) 2-1-7 64k bit/s UDI disconnection (simulator) A call disconnected by PS during a 64k bit/s UDI communication (Note 3) 2-1-8 64k bit/s UDI incoming call — After PS receiving a 64k bit/s UDI call, PS is switched to the communication state by connecting operation (Note 3) 2-1-9 64k bit/s UDI disconnection (CS) — PS receives "Disconnect" message from CS side during a 64k bit/s UDI communication and disconnects the call (Note 3)
2.3-2	4~5	2-2 Application operation tests 2-2-1 Channel switching operation tests during communication 2-2-1-11 64k bit/s UDI channel switching during communication with CS indication : the same CS, 1st TCH (Note 3) 2-2-1-12 64k bit/s UDI channel switching during communication with CS indication : the same CS, 2nd TCH (Note 3) 2-2-1-13 64k bit/s UDI channel switching during communication with PS request : the same CS, 1st TCH (Note 3) 2-2-1-14 64k bit/s UDI channel switching during communication with PS request : the same CS, 2nd TCH (Note 3) 2-2-1-15 64k bit/s UDI channel switching during communication with CS indication : the same CS, 1st TCH (switching back) (Note 3) 2-2-1-16 64k bit/s UDI channel switching during communication with CS indication : the same CS, 2nd TCH (switching back) (Note 3) 2-2-1-17 64k bit/s UDI handover with CS indication : Recalling-type to the home CS (Note 3) 2-2-1-18 64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area) (Note 3) 2-2-1-19 64k bit/s UDI handover with simulator judgment : Recalling-type to other CS (in the same paging area), 1st TCH (Note 3) 2-2-1-20 64k bit/s UDI handover with CS indication : Recalling-type to other CS (in the same paging area), 2nd TCH (Note 3) 2-2-1-21 64k bit/s UDI handover with simulator judgment : PS recalling-type to other CS (in the same paging area) (Note 3)
2.3-3	5	2-2-3 Semi-normal outgoing call operation tests 2-2-3-4 Modifier of synchronization burst verification at link channel establishment - modifier code for 1st TCH does not match up 2-2-3-5 Modifier of synchronization burst verification at 64k bit/s communication - modifier code for 2nd TCH does not match up (Note 3) 2-2-3-6 Receiving the additional channel re-request message at 64k bit/s communication (Note 3) 2-2-3-7 Operation to transmit the additional channel assign reject message at 64k bit/s communication (Note 3)

Number	Page	Amendments
2.3-4	6	Note 3 : If CS is able to achieve a 64k bit/s communication with using 2 TCH simultaneously, these tests are required.
2.3-5	8	2.3.2.1 Basic parameters (3) Parameters specified for each test item Communication carrier number : Number selected by CS (note) Communication slot number : Number selected by CS (note) Note : If the case of tests in bearer capability of 64k bit/s UDI, the condition of additional TCH assignment function type shall settled as different slot within the arbitrary carrier present.
2.3-6	8	2.3.2.2 LCCH pattern (3) 2nd System information broadcasting In the table, RT / MM protocol version of Pattern no. A : version ~~2~~ 3
2.3-7	15~18	Test No. 2-1-6 ~ 2-1-9 are added.
2.3-8	31~41	Test No. 2-2-1-11 ~ 2-2-1-21 are added.
2.3-9	52~55	Test No. 2-2-3-4 ~ 2-2-3-7 are added.
2.3-10	69	2.3.3.3 Tests for items specified in the Attachment 2.3.3.3.1 Authentication tests Regarding authentication, tests shall be conducted to confirm the authentication for the algorithms described in the Personal Handy Phone System ARIB Standard Version ~~2~~ 3 Annex 3 "Standard Pertaining to Authentication of Personal Handy Phone System (Private)"
2.3-11	69	2.3.3.3.2 Subscriber data write-in tests Regarding subscriber data write-in, the tests specified in the Personal Handy Phone System ARIB Standard Version ~~2~~ 3 Annex 4 "Standard Pertaining to Subscriber Data Write-in of Personal Handy Phone System (Private)" shall be conducted.
3.4-1	73	3.4.1 List of test items 3-2-2 64k bit/s UDI outgoing call/communication/disconnection by the test system (Note 3) 3-3-2 64k bit/s UDI incoming call/communication/disconnection by CS (Note 3) 3-4-2 64k bit/s UDI Handover channel switching during communication (Note 3) Note 3: If CS is able to achieve a 64k bit/s communication with using 2 TCH simultaneously, these tests are required.
3.4-2	75	3.4.3 Contents of tests Test No. 3-2-2 is added.
3.4-3	76	Test No. 3-3-2 is added.
3.4-4	78	Test No. 3-4-2 is added.
3.4-5	79	3.4.3.5.2 Subscriber data write-in tests In relation to subscriber data write-in, the tests specified in the Personal Handy Phone System ARIB Standard Version ~~2~~ 3 (RCR STD-28) Annex 4 “Standard Pertaining to Subscriber Data Write-in of Personal Handy Phone System (Private)” shall be conducted.
A-1	82	**INTRODUCTION** The Personal Handy Phone System ARIB Standard Version ~~2~~ 3 (RCR STD-28).
A-2	83	**Chapter 1 General Facts** 1.1 Overview the Personal Handy Phone System ARIB Standard Version ~~2~~ 3 (RCR STD-28).
A-3	84	**Chapter 2 Connection simulator tests** 2.1 Purpose the Personal Handy Phone System ARIB Standard Version ~~2~~ 3 (RCR STD-28).
AN1-1	87~89	Annex 1 : List of test items using the connection simulator (2) Test items for communication control methods Test no. 2-1-6 ~ 2-1-9 are added. Test no. 2-2-1-11 ~ 2-2-1-21 are added. Test no. 2-2-3-4 ~ 2-2-3-7 are added.

PERSONAL HANDY PHONE SYSTEM

TEST ITEMS AND CONDITIONS FOR PRIVATE CELL STATION
COMPATIBILITY CONFIRMATION

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