Annex B: Change history
Foreword

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

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

Version x.y.z

where:

x  the first digit:

1   presented to TSG for information;

2   presented to TSG for approval;

3   or greater indicates TSG approved document under change control.

y  the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z  the third digit is incremented when editorial only changes have been incorporated in the document.
1 Scope

The present document captures the studies for [2] about the need to introduce mechanisms in UMTS to provide additional broadcast capacity, considering:

- the currently existing deployments and their future evolutions,
- the broadcast load expected from different releases, including Rel-11 and estimate for Rel-12,
- the impact on system performance and end-user experience in case of increased system information scheduling latency.

2 References

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

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

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".


[3] R4-136915, Way forward on the minimum number of carriers a UE should be able to monitor for UTRA and for E-UTRA, TeliaSonera, SoftBank Mobile, KT Corp, NTT DOCOMO, Deutsche Telekom, Qualcomm, RAN4#69.

3 Definitions, symbols and abbreviations

3.1 Definitions

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

<defined term>: <definition>.

3.2 Symbols

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

<symbol>  <Explanation>
3.3 Abbreviations

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

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACB</td>
<td>Access Class Barring</td>
</tr>
<tr>
<td>BCH</td>
<td>Broadcast Channel</td>
</tr>
<tr>
<td>DSAC</td>
<td>Domain Specific Access Control</td>
</tr>
<tr>
<td>EAB</td>
<td>Extended Access Barring</td>
</tr>
<tr>
<td>GANSS</td>
<td>Galileo and Additional Navigation Satellite Systems</td>
</tr>
<tr>
<td>MOCN</td>
<td>Multi-Operator Core Network</td>
</tr>
<tr>
<td>PPAC</td>
<td>Paging Permission with Access Control</td>
</tr>
<tr>
<td>RLF</td>
<td>Radio Link Failure</td>
</tr>
</tbody>
</table>

4 Introduction

The BCH channel has a fixed/constant throughput (12.3 kbps), i.e. broadcasts a 246 bits BCH transport block every 20 ms TTI. The BCH transport block carries a SYSTEM INFORMATION message which includes the SFN (11 bits). A SYSTEM INFORMATION message may include one or more segments. The maximum size of a segment depends on the segment type, but is in the order of 28 octets.

There are different factors determining the BCH load, but the main factors are the SIB configuration of the SIBs (e.g. repetition period, scheduling, segmentation and concatenation), the number of supported features (e.g. common E-DCH) and the amount of information broadcasted (e.g. number of neighbors relations, use of explicit configuration instead of mandatory defaults).

The aim of the study item is to investigate the need for additional BCH capacity, i.e. evaluate the scenarios where the BCH capacity limit is reached.

5 Mechanisms to handle System Information capacity

5.1 Longer SIB repetition period

When the SIB repetition period is increased more SIBs can be broadcasted. But increasing the SIB repetition period goes at the expense of a longer System Information (SI) acquisition latency which could have a negative impact on some use cases, as explained in chapter 6.

The MIB is broadcast with a fixed interval of 80 ms, i.e. every 4 BCH transport blocks. SIB7, which contains information that needs to be updated frequently (UL interference), is typically scheduled quite often (e.g. 80 - 160 ms). Scheduling block 1 and/or 2 could be also broadcast with a high frequency to decrease SI acquisition latency. MIB, scheduling blocks, and SIB7, which need to be send with a high frequency, require a comparatively high share of the BCH capacity. Thus the BCH capacity gain does not scale linearly with the repetition period of a single SIB.

5.2 Segmentation and concatenation

If the System Information Block (SIB) size is too large, i.e., greater than 226 bits, it needs to be segmented into several SYSTEM INFORMATION messages. A SIB can be segmented up to maximum 16 segments (4-bit SEG_COUNT).

The position of subsequent segments of a SIB is indicated by an offset SIB_OFF. The position of the first segment of a SIB is indicated by an offset SIB_POS. The counters and offsets associated with segmentation take some of the BCH capacity.

Furthermore concatenation can be used to transmit two or more (smaller) SIBs in a single SYSTEM INFORMATION message to optimally use the available BCH capacity. Concatenation thus enables more efficient use of the available BCH capacity. However given the sizes of the SIBs to be broadcasted, and the possible concatenation and scheduling options, a small percentage of the BCH may remain un-used.
6 Impact of BCH load on use cases

In this chapter the impact of longer SIB repetition periods is described. It is noted that the introduction of additional BCH capacity does not remove the impact of longer repetition periods, but may reduce the impact.

6.1 The impact of longer repetition periods on use cases

A longer SIB repetition period increases the SI acquisition latency. A longer SI acquisition latency has a negative effect on use cases where if the UE needs to acquire the complete system information again, e.g. CS Fallback, cell re-selection, RRC state change, cell update in case of RLC unrecoverable error or RLF, and redirection. These use cases are explained in more detail in the following paragraphs.

Reception failure of a single segment of a large SIB, broadcasted with a long repetition period (e.g. neighbor cell information), further delays the SI acquisition latency.

It is up to UE implementation to store the system information of one or more cells for later usage. In case the UE has stored system information for a cell (based on Cell Identity), the SI acquisition latency would be largely reduced, but the UE needs to read the MIB to check if any of the stored SIBs has changed. Furthermore it may need to check SIB3 for the Cell Identity of the cell. In case one or more SIBs have changed, the UE needs to re-acquire those. The UE may also have to re-acquire a timer based SIB, which timer has expired, or SIBs that were added. The UE shall delete any stored system information after 6 hours. The SI acquisition latency is impacted in the following use cases when the UE (re-)selects a cell for which it does not have up to date system information stored (i.e. expired or changed).

Impact on legacy UE

When the SIB repetition period is increased due to the introduction of a new feature, then legacy UEs are also affected, when the repetition period of a “legacy” SIB is increased. Typically a SIB type supports more than one feature.

CS fallback from LTE

When the UE is re-directed to UTRA due to CS fallback, UE needs to acquire the system information of the selected cell which would impact the CS fallback performance because of system information acquisition latency. Deferred Measurement Control Reading (DMCR) can be used to avoid the acquisition latency of SIBs that are under DMCR control. Furthermore the network may signal UTRAN system information in advance in a system information container in the connection release in LTE. Thus these two enhancements speed up CS fallback from LTE by avoiding SI acquisition. However the UE needs to acquire the SIBs that are not under deferred measurement control.

Cell Reselection

In case the UE does not have stored system information of the target cell, or the system information has expired or changed, the UE has to re-acquire the system information after cell re-selection. During SI acquisition for inter-frequency and iRAT cells, the UE cannot be reached, i.e. no DL data or paging can be conveyed to the UE. Furthermore UL access is delayed until the system information has been acquired and uplink access is configured. However, DMCR feature can be used to alleviate the access delay in RRC connection request and cell update case via allowing UE perform random access before acquiring complete SIBs.

RRC state switch from CELL_DCH to CELL_FACH or CELL_PCH/URA_PCH

This case is similar to cell re-selection, i.e. when the UE is reconfigured from CELL_DCH to CELL_FACH or CELL_PCH/URA_PCH, the UE needs to re-acquire SI as part of the reconfiguration from CELL_DCH. This delays the reconfiguration procedure. However, when a UE transits from CELL_DCH to CELL_FACH CELL_PCH/CELL_PCH/URA_PCH with no user plane data to transmit or receive, then no noticeable user plane impact is foreseen.

Call re-establishment

In case of RLF or RLC unrecoverable error in CELL_DCH state, the UE performs CELL UPDATE procedure to recover. In such case if UE has no stored SIB information, the UE needs to re-acquire system information of the new cell leading to longer voice and/or data interruption.

RRC Connection Reject/Release with redirection

In case of RRC Connection Reject/Release with re-direction, the UE may need to read the system information of the new target cell before the call can be established. This leads to longer call setup time.
7 Expected BCH load

7.1 BCH load in current networks

Networks that are currently deployed, with some features up to and including Release 8, typically do not experience BCH load issues.

In the current deployments, it is observed that a large contributor to the current load is due to the SIB11 and SIB11bis. The load in SIB11 is varying due to the amount of neighbour cell information broadcasted. In some networks SIB11bis is deployed to offload SIB11. In some networks HCS configuration is used, which may impact the BCH load.

7.2 BCH load in the different releases

In each release new features are added and the amount of system information is increased. The additional system information for each new feature is different and can vary considerably, with some features having no impact on system information. The table below gives a relative comparison of the expected BCH impact in the different releases. The features that have a relatively high impact are marked with **:

<table>
<thead>
<tr>
<th>Release</th>
<th>Features with BCH impact</th>
<th>Relative BCH load impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>R99 - REL-6</td>
<td>Neighbor relations (SIB11, 11bis)**</td>
<td>High</td>
</tr>
<tr>
<td>Rel-7</td>
<td>HSDPA in CELL_FACH</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Deferred measurement reading</td>
<td></td>
</tr>
<tr>
<td>Rel-8</td>
<td>Enhanced uplink in CELL_FACH **</td>
<td>Medium/High</td>
</tr>
<tr>
<td></td>
<td>Absolute priority based cell re-selection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PPAC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enhanced UE DRX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Support of UTRA HNB (CSG)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ETWS</td>
<td></td>
</tr>
<tr>
<td>Rel-9</td>
<td>H(e)NB enhancements</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rel-11</td>
<td>CN overload protection MTC</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Multiple Frequency Band Indicator</td>
<td></td>
</tr>
<tr>
<td>Rel-10</td>
<td>Further enhancements to CELL_FACH **</td>
<td>Low/Medium</td>
</tr>
<tr>
<td></td>
<td>RAN overload control for MTC</td>
<td></td>
</tr>
</tbody>
</table>

Additionally there are several features with a small impact on the BCH load. Examples of such features are DSAC (REL-6), PPAC (REL-8), EAB (REL-11), per PLMN access restrictions PPAC/DSAC, positioning information for GPS/OTDOA/GANSS, new frequency bands, shared networks (MOCN), and Multiple Frequency Band Indicators (MFBI). Some of these features would not be expected to be broadcasted all the time (e.g. PPAC/DSAC, EAB, and ACB). While individually these features have a small impact on the BCH load, the accumulated impact of those features could be significant if all of them are supported and deployed by the network concurrently.

7.3 Expected BCH load in REL-11

The BCH load depends on different factors, such as SIB configuration, the number of supported features, and the amount of information broadcasted. The deployment of current networks differs, and it can be expected that future network deployments will continue to differ. Therefore the expected BCH load in REL-11 for different reference scenarios is provided:

Reference scenario A

The expected BCH load for this reference scenario including the following features is listed in the table below (configuration details can be found in Annex A):

- HSDPA in CELL_FACH (REL-7)
- Enhanced uplink in CELL_FACH (REL-8)
- Absolute priority based cell re-selection (REL-8)
- Further enhancements to CELL_FACH (REL-11):
  - Concurrent 2ms and 10ms TTI
  - Fallback to R99 PRACH
  - Stand-alone HS-DPCCH
  - Per-HARQ-process grants for 2ms TTI
  - TTI alignment between CELL_FACH and CELL_DCH UEs
  - HS-DSCH DRX in CELL_FACH with second DRX cycle
- Extended Access Barring (EAB) (REL-11)

Table 7.3-1: Expected BCH load in REL-11 for reference scenario A

<table>
<thead>
<tr>
<th>IE(s)</th>
<th>Rep.-Period</th>
<th>Octets</th>
<th>Segments</th>
<th>#Seg/1.28 sec</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIB + SIB7</td>
<td>80 ms</td>
<td>20.5 + 2.5</td>
<td>1</td>
<td>16</td>
<td>24%</td>
</tr>
<tr>
<td>SIB1</td>
<td>320 ms</td>
<td>54</td>
<td>2</td>
<td>8</td>
<td>12%</td>
</tr>
<tr>
<td>SIB1 + SIB2</td>
<td>640 ms</td>
<td>16.5 + 8.5</td>
<td>1</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>SIB3 + SIB21</td>
<td>640 ms</td>
<td>23 + 3</td>
<td>1</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>SIB5 + SIB18</td>
<td>640 ms</td>
<td>124 + 14</td>
<td>5</td>
<td>10</td>
<td>15%</td>
</tr>
<tr>
<td>SIB11</td>
<td>1280 ms</td>
<td>386</td>
<td>14</td>
<td>14</td>
<td>21%</td>
</tr>
<tr>
<td>SIB11bis + SIB12</td>
<td>1280 ms</td>
<td>208 + 12</td>
<td>8</td>
<td>8</td>
<td>12%</td>
</tr>
<tr>
<td>SIB19</td>
<td>640 ms</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>6%</td>
</tr>
<tr>
<td>SIB22 + SIB4</td>
<td>640 ms</td>
<td>36</td>
<td>2</td>
<td>4</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>68</strong></td>
<td></td>
<td></td>
<td><strong>68%</strong></td>
</tr>
</tbody>
</table>

In the table above the number of octets for each SIB type is listed. Some of the SIB types are concatenated to make more efficient use of the available BCH capacity. The repetition period for the different SIB types differs, and the number of segments per 1.28 seconds is listed separately. During a 1.28 second period 64 segments can be broadcasted, and in this reference scenario the capacity of 64 segments is exceed, i.e. a total of 68 segments (106% load). The relative percentage of segments that each SIB type or SIB concatenation option generates in the BCH load is listed in the last column. From these figures it can be seen that SIB11/SIB11bis (including neighbour relations info) and SIB5 (including uplink resource info) take a relatively large part of the BCH load.

Reference scenario B

The expected BCH load for this reference scenario including the following features is listed in the table below (configuration details can be found in Annex A):
- HSDPA in CELL_FACH (REL-7)
- Enhanced uplink in CELL_FACH (REL-8)
- Absolute priority based cell re-selection (REL-8)
- Further enhancements to CELL_FACH (REL-11):
  - Concurrent 2ms and 10ms TTI
  - Fallback to R99 PRACH
  - Stand-alone HS-DPCCH
  - HS-DSCH DRX in CELL_FACH with second DRX cycle
- Extended Access Barring (EAB) (REL-11)
Table 7.3-2: Expected BCH load in REL-11 for reference scenario B

<table>
<thead>
<tr>
<th>IE(s)</th>
<th>Rep-Period</th>
<th>Octets</th>
<th>Segments</th>
<th>#Seg/1.28 sec</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIB + SIB7</td>
<td>80 ms</td>
<td>21 + 3</td>
<td>1</td>
<td>16</td>
<td>27.6%</td>
</tr>
<tr>
<td>SB1</td>
<td>320 ms</td>
<td>49</td>
<td>2</td>
<td>8</td>
<td>13.8%</td>
</tr>
<tr>
<td>SIB1 + SIB2</td>
<td>640 ms</td>
<td>18 + 3</td>
<td>1</td>
<td>2</td>
<td>3.4%</td>
</tr>
<tr>
<td>SIB3 + SIBx</td>
<td>640 ms</td>
<td>18 + 8</td>
<td>1</td>
<td>2</td>
<td>3.4%</td>
</tr>
<tr>
<td>SIB5</td>
<td>640 ms</td>
<td>135</td>
<td>5</td>
<td>10</td>
<td>17.2%</td>
</tr>
<tr>
<td>SIB11</td>
<td>1280 ms</td>
<td>436</td>
<td>16</td>
<td>16</td>
<td>27.6%</td>
</tr>
<tr>
<td>SIB4 + SIB19</td>
<td>640 ms</td>
<td>12 + 14</td>
<td>1</td>
<td>2</td>
<td>3.4%</td>
</tr>
<tr>
<td>SIB22+SIB21</td>
<td>640 ms</td>
<td>16 + 3</td>
<td>1</td>
<td>2</td>
<td>3.4%</td>
</tr>
<tr>
<td>SIBx = SIB12</td>
<td>1280 ms</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>SIBx = SIB18</td>
<td>1280 ms</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>58</strong></td>
</tr>
</tbody>
</table>

As could be seen from above that, reference scenario B is similar as A in many aspects, but differ among others, in the total number of segments broadcasted per 1.28 second period: 58 segments (90% load). Differences can be observed in terms of configuration details (see Annex A) and scheduling (concatenation and repetition periods).

### 7.4 Expected BCH load in REL-12

At the time of writing the REL-12 features are still being discussed, and in most cases stage 3 details have not been agreed yet. Furthermore some of the REL-12 features are still in the Study Item phase. Therefore no calculation of the REL-12 BCH load based on stage 3 details can be provided at this point in time.

The study items "3GPP-WiFi integration" and "Further EUL Enhancements", based on the RAN2 discussions, may have a low impact on the BCH load.

The work items "Beidou Navigation Satellite System" and "Mobility for UMTS Heterogeneous networks", based on RAN2 discussions and proposals, may also have a low impact on the BCH load. Except in case the number of inter-frequency and/or intra-frequency neighbour cells in Idle mode is increased, as discussed in the context of "Mobility for UMTS Heterogeneous networks" and the proposed RAN4 work item "Increasing the minimum number of carriers for UE monitoring in UTRA and E-UTRA" [3], a high impact on the BCH load might be expected, depending on the number of neighbour cells or carriers to be increased. The additional information is assumed to scale with the number of additional neighbour relations.

### 8 Conclusions

The broadcast channel has a fixed/constant throughput. In every release, new information is added to the system information, however this information cannot be added indefinitely without having a negative impact on the system information acquisition latency. The deployment of current networks differs, and it can be expected that future network deployments will continue to differ. Therefore BCH load in different release and the expected BCH load for a couple of reference scenarios have been analysed:

- The BCH load depends on different factors, such as SIB configuration, the number of supported features, and the amount of information broadcasted. Analysis shows that proper way of concatenation and segmentation could also improve usage of the available BCH capacity significantly.

- Typically, current networks with some features up to and including Release 8 do not experience BCH load issues.

- Some analysis shows that the BCH capacity can already be exceeded in REL-11 (106%), where other analysis estimates a 90% load for REL-11.

- At this point in time REL-12 features are still being discussed, and stage 3 details have not been agreed. In case the neighbor cell information is increased then this may have a potentially high impact on the BCH load.
Annex A:  
BCH reference scenario configuration details

A.1 Reference scenario A

Only OP/MD values are described, i.e. MP values are present.

A.1.1 MIB

- General:
  - Multiple PLMN support for shared network ('Multi Operator Core Network' (MOCN), 3 PLMNs)
  - Scheduling information, i.e. references to SB1, SIB3, SIB4, SIB7
  - 2 segments for SIB3 (1 SIB_OFF)
- 10.2.48.8.1 Master Information Block:
  - Multiple PLMN List (3):
    - Same MCC as master (i.e. no explicit MCC)
    - References to other system information blocks and scheduling blocks (SB1, SIB3, SIB4, SIB7)
    - 4 references
    - 1 SEG COUNT, 1 SIB_OFF

ASN.1:
- 80 00 20 00 30 00 60 00 00 00 00 00 00 00 00 00 00 48 00 00 00 0
- 20.5 octets (1 segment)

A.1.2 SB1

- General:
  - Scheduling information
  - Segmentation (SEG_COUNT) needed for:
    - SIB5 (5 segments, 4 SIB_OFF)
    - SIB11 (14 segments, 13 SIB_OFF)
    - SIB11bis (8 segments, 7 SIB_OFF)
    - SIB19 (2 segments, 1 SIB_OFF)
  - Total SIB references 9: SIB2, SIB5, SIB11, SIB11bis, SIB12, SIB18, SIB19, SIB21, SIB22
- 10.2.48.8.2 Scheduling Block 1:
  - 10.3.8.13 References to other system information blocks:
    - SIB-ReferenceList:
    - Total 9 references (4 SEG COUNT, 25 SIB_POS)

ASN.1:
- 40 00 30 02 00 00 00 00 00 00 00 00 00 00 03 00 38 00 00 00 00 00 00 30 00 80 00 00 00
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
- 42.5 octets (2 segments)

A.1.3 SIB1

- General:
  - Domain info
  - Timers and constants
- 10.2.48.8.4 System Information Block type 1:
  - PS + CS domain
  - Timers and constants:
- 4 timers/constants in Idle (MP)
- Including T323

ASN.1:
- e0 01 00 01 00 00 cf 07 f0 00 00 00 00 00 00 21 0
- 16.5 octets

A.1.4 SIB2
- General:
  - URA identities
- 10.2.48.8.5 System Information Block type 2:
  - URA identity list (4)

ASN.1:
- 30 00 00 00 00 00 00 00 0
- 8.5 octets

A.1.5 SIB3
- General:
  - Cell re-selection and access class barring info
- 10.2.48.8.6 System Information Block type 3:
  - Cell selection and re-selection info:
    - A-HYST-2S, s-IntraSearch, s-InterSearch, s-SearchHCS, rat-List(1), hcs-PRIO, q-HCS
  - Deferred measurement control reading support
  - CSG PSC Split Information
  - IMS Emergency Support Indicator

ASN.1:
- C0 00 00 01 00 00 00 00 00 00 00 00 00 17 87 E0 00 26 24 E0 00 00 00 00 74
- 23 octets

A.1.6 SIB4
- General:
  - Cell re-selection in connected mode
  - No access class barring info included
- 10.2.48.8.7 System Information Block type 4:
  - Similar re-selection parameters as SIB3

ASN.1:
- 00 00 00 02 3e 10 6a 04 21 80 00 0e 00 06 40 0
- 15.5 octets

A.1.7 SIB5
- General:
  - Common physical channel configuration
- 10.2.48.8.8 System Information Block type 5 and 5bis:
  - sCCPCH-SystemInformationList(2):
    - secondaryCCPCH-Info
      - timingOffset
- tfcs
- fach-PCH-InformationList
- pich-Info
- secondaryCCPCH-Info
- tfcs
- fach-PCH-InformationList
- cbs-DRX-Level1Information
- frequencyBandIndicator
- hsdpa-CellIndicator
- edch-CellIndicator
  - hs-dsch-CommonSystemInformation
  - hs-scch-SystemInfo (3 codes)
  - hs-dsch-DrxCellfach-info
  - hs-dsch-DrxCellfachInfo

ASN.1:
- 6a 58 7a 00 00 00 00 00 00 00 00 00 00 00 00 02 40 02 80 00 00 00 0f 94 00 00 00 00 00 00 00 00 00
  00 00 00 1c 40 00 00 00 30 00 20 00 00 00 00 00 00 00 00 00 00 00 00 18 86 00 00 00 00 00 00 00 00
  06 1a bf 18 00 00 00 80 00 01 40 00 00 00 04 80 00 00 00 01 40 00 00 00 00 00 00 00 00 00 00 00
  07 d0 06 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  - 74.5 octets (3 segments) (HS in CELL_FACH only)

- 10.2.48.8 System Information Block type 5 and 5bis:
  - commonEDCHSystemInfo (1 flow)
  - CommonEDCHSystemInfo:
    - Common-E-DCH-ResourceInfoList (32):
      - No explicit offsets, codes, resources, signatures added per element, except:
      - F-DPCH Code number – this item is mandatory for the first resource and for every other 10th
        resource (resource 1, resource 11, resource 21, and resource 31)
      - Channelisation Code (e-hich-Info) – the first resource should be explicitly signaled.

ASN.1:
- 6a 58 7a 00 00 00 00 00 00 00 00 00 02 40 02 80 00 00 00 0f 94 00 00 00 00 00 00 00 00 00
  00 00 00 1c 40 00 00 00 30 00 20 00 00 00 00 00 00 00 00 00 00 00 00 18 86 00 00 00 00 00 00 00 00
  06 1a bf 18 00 00 00 80 00 01 40 00 00 00 04 80 48 80 00 00 01 40 00 00 00 00 00 00 00 00 00 00
  07 d0 06 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  - 124 octets (5 segments) (HS in CELL_FACH + common E-DCH)

A.1.8 SIB7
- General:
  - Fast changing parameters UL interference
- 10.2.48.8.10 System Information Block type 7
  - >>FDD
  - >>UL interference

ASN.1:
- 00 00 0
- 2.5 octets

A.1.9 SIB11
- General:
  - Intra-frequency (20), inter-frequency cells (20) and GSM (20)
  - cpich-EcN0
  - Intra-frequency neighbors:
- cellIndividualOffset
- primaryScramblingCode
- HCS parameters including penaltyTime
- Inter-frequency neighbors:
  - primaryScramblingCode
  - q-Offset2S-N
  - HCS parameters including penaltyTime
  - q-RxLevMin
  - 2 UARFCNs
- GSM neighbors:
  - Q-Offset1S-N
  - Q-RxLevMin
  - IntraFreqMeasQuantity
  - IntraFreqReportingQuantityForFACH
  - MaxReportedCellsOnRACH
  - ReportingInfoForCellDCH

ASN.1:

Intra
- 05 9f 4d 54 40 00 42 00 2a 88 00 08 40 05 51 00 01 08 00 aa 20 00 21 00 15 44 00 04 20 02 a8 80
- 00 84 00 55 10 00 10 80 0a a2 00 02 10 01 54 40 00 02 40 00 2a 88 00 08 40 05 51 00 01 08 00 aa 20
- 00 21 00 15 44 00 04 20 02 a8 80 00 84 00 55 10 00 10 80 0a a2 00 02 10 01 54 40 00 02 40 00 2a 84
- a0 40 02 0a 88 00 08 40 05 51 00 01 08 00 00 00 00 00
- 114 octets (5.7 octets / neighbor)

Intra+Inter
- 05 df 4d 54 40 00 42 00 2a 88 00 08 40 05 51 00 01 08 00 aa 20 00 21 00 15 44 00 04 20 02 a8 80
- 00 84 00 55 10 00 10 80 0a a2 00 02 10 01 54 40 00 02 40 00 2a 88 00 08 40 05 51 00 01 08 00 aa 20
- 00 21 00 15 44 00 04 20 02 a8 80 00 84 00 55 10 00 10 80 0a a2 00 02 10 01 54 40 00 02 40 00 2a 84
- a0 40 02 0a 88 00 08 40 05 51 00 01 08 00 00 00 00 00 b3 40 00 0a 00 0a c8 20 08 08 00 01 40 01
- 59 04 01 00 20 00 2b 20 80 20 05 00 05 64 10 04 00 a0 00 ac 82 00 80 14 00 15 90 40 10 02 80 02
- b2 08 02 00 00 50 00 56 42 00 02 80 02 b2 08 02 00 50 00 56 41 00 40 0a 00 0a c8 20 08 01 40 01 59
- 04 01 00 20 00 2b 20 80 20 05 00 05 64 10 04 00 a0 00 ac 82 00 80 14 00 15 90 40 10 02 80 02 b2
- 0b 08 02 00 50 00 56 41 00 40 0a 00 0a c8 20 08 01 40 01 59 04 01 00
- 246 octets (6.15 octets / neighbor)

Intra+Inter+GSM
- 07 df 4d 54 40 00 42 00 2a 88 00 08 40 05 51 00 01 08 00 aa 20 00 21 00 15 44 00 04 20 02 a8 80
- 00 84 00 55 10 00 10 80 0a a2 00 02 10 01 54 40 00 02 40 00 2a 88 00 08 40 05 51 00 01 08 00 aa 20
- 00 21 00 15 44 00 04 20 02 a8 80 00 84 00 55 10 00 10 80 0a a2 00 02 10 01 54 40 00 02 40 00 2a 84
- a0 40 02 0a 88 00 08 40 05 51 00 01 08 00 00 00 00 00 b3 40 00 0a 00 0a c8 20 08 08 00 01 40 01
- 59 04 01 00 20 00 2b 20 80 20 05 00 05 64 10 04 00 a0 00 ac 82 00 80 14 00 15 90 40 10 02 80 02
- b2 08 02 00 00 50 00 56 42 00 02 80 02 b2 08 02 00 50 00 56 41 00 40 0a 00 0a c8 20 08 01 40 01 59
- 04 01 00 20 00 2b 20 80 20 05 00 05 64 10 04 00 a0 00 ac 82 00 80 14 00 15 90 40 10 02 80 02 b2
- 0b 08 02 00 50 00 56 41 00 40 0a 00 0a c8 20 08 01 40 01 59 04 01 00
- 320 octets = 14 segments (6.2 octets / neighbor)

A.1.10 SIB11bis

- General:
  - GSM neighbor relations
  - 10.2.48.8.14a System Information Block type 11bis:
    - Intra-frequency (12), inter-frequency cells (12) and GSM (12)
    - cpich-EcN0
  - Intra-frequency neighbors:
    - cellIndividualOffset
    - primaryScramblingCode
    - HCS parameters including penaltyTime
  - Inter-frequency neighbors:
- primaryScramblingCode
- q-Offset2S-N
- HCS parameters including penaltyTime
- q-RxLevMin
- 2 UARFCNs
- GSM neighbors:
  - Q-Offset1S-N
  - Q-RxlevMin

ANS.1:
- 8f ad 54 40 00 42 00 2a 88 00 08 40 05 51 00 01 08 00 aa 20 00 21 00 15 44 00 04 20 02 a8 80 00
- 84 00 55 10 00 10 80 0a a2 00 02 10 01 54 40 00 42 00 2a 88 00 08 40 05 51 00 01 08 00 aa 20 00
- 20 05 85 00 05 64 10 04 00 a0 00 ac 82 00 80 14 00 15 90 40 10 02 80 02 02 c5 0c 84 06 40 00 01 43 21 01 90 00 00 50 c8 40 64
- 00 00 14 32 10 19 00 00 05 0c 84 06 40 00 01 43 21 01 90 00 00 50 c8 40 64 00 00 14 32 10 19 00
- 00 00 14 32 10 19 00 00 05 0c 84 06 40 00 01 43 21 01 90 00 00 50 c8 40 64 00 00 14 32 10 19 00
- 218 octets = 8 segments

A.1.11 SIB12
- General:
  - Measurement control information in connected mode
- 10.2.48.8.15 System Information Block type 12:
  - FACH measurement occasion info:
    - Inter-RAT measurement indicators
  - Traffic volume measurement system information
  - Measurement control system information
  - Traffic volume measurement objects (2)
  - Traffic volume measurement quantity
  - Traffic volume reporting quantity
  - Measurement validity
  - Parameters sent for each transport channel (2):
    - Uplink transport channel type
    - Parameters required for each Event:
      - Pending time after trigger

ASN.1:
- b0 01 01 d0 80 00 00 42 90 01 20 00
- 12 octets

A.1.12 SIB18
- General:
  - 2 PLMN id, only IRAT idle mode, size: 12 octets
- 10.2.48.8.21 System Information Block type 18:
  - Idle mode PLMN identities
  - (Connected mode PLMN identities)
  - Idle mode PLMN identities for SIB 11bis
  - (Connected mode PLMN identities for SIB 11bis)

ASN.1:
- a4 30 00 00 40 00 00 88 60 00 00 80 00 00
- 14 octets
A.1.13 SIB19

- General:
  - Inter-RAT and priority information for measurements
- 10.2.48.8.22 System Information Block type 19:
  - UTRA priority info list (2)
  - E-UTRA frequency and priority info list (2)

ASN.1:
- 50 00 18 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 20 00 02 80 00 00 00 00 00 00 00 00 00 00 00 43 octets (2 segments)

A.1.14 SIB21

- General:
  - EAB same for all PLMN in MIB, size = 2 octets
- 10.2.48.8.24 System Information Block type 21
  - EAB Parameters
    - >CHOICE barring representation
      - >>EAB Parameters Per PLMN List
        - >>>Domain Specific EAB Parameters
          - >>EAB Parameters For All

ASN.1:
- 82 40 00
- 3 octets

A.1.15 SIB22

- General:
  - FE-FACH features
- 10.2.48.8.25 System Information Block type 22:
  - PRACH preamble control parameters extension list Type 1 (incl weight)
  - PRACH preamble control parameters extension list Type 3
  - Concurrent Deployment of 2ms and 10ms TTI:
    - TTI selection (Threshold based)
    - commonEDCHSystemInfoParamConcurrentTTI:
      - E-AGCH Info
      - E-DCH minimum set E-TFCI
    - Node B triggered HS-DPCCH Transmission:
      - HS-DPCCH transmission continuation back off
    - Fallback R99 PRACH info
    - Common E-DCH Resource Configuration Information List Extension:
      - Scheduled Transmission configuration
      - Coffset
    - HS-DSCH DRX in CELL_FACH with second DRX cycle Information:
      - 2-level DRX (incl T328, HS-DSCH first Rx burstFACH, HS-DSCH first DRX cycleFACH, HS-DSCH second Rx burstFACH, T329)

ASN.1:
- bf 00 00 00 00 00 00 00 00 02 00 02 00 00 00 00 02 0c 00 0f c0 0
- 20.5 octets
B.1 Reference scenario B

B.1.1 MIB: 21bytes

- General:
  - Multiple PLMN support for shared network
  - Scheduling information
- 10.2.48.8.1 Master Information Block:
  - Multiple PLMN List (4):
  - References to other system information blocks and scheduling blocks (SB1, SIB7)
    - 2 references

B.1.2 SB1: 49bytes

- General:
  - Scheduling information
  - Segmentation (SEG_COUNT) needed for:
    - SIB5 (5 segments, 4 SIB_OFF)
    - SIB11 (16 segments, 15 SIB_OFF)
    - SIB19 (2 segments, 1 SIB_OFF)
  - Total SIB references 9: SIB1, SIB2, SIB3, SIB4, SIB5, SIB11, SIB12, SIB18, SIB19, SIB22

B.1.3 SIB1: 18bytes

- General:
  - Domain info
  - Timers and constants
- 10.2.48.8.4 System Information Block type 1:
  - PS + CS domain
  - Timers and constants:
    - 12 timers/constants in Connected (T302, N304, T308, T310, N310, T311, T312, T313, N313, T314, T315, T317)
    - 4 timers/constants in Idle (MP)

B.1.4 SIB2: 3bytes

- General:
  - URA identities
- 10.2.48.8.5 System Information Block type 2:
  - URA identity list (1)

B.1.5 SIB3: 18bytes

- General:
  - Cell re-selection and access class barring info
- 10.2.48.8.6 System Information Block type 3:
  - Cell selection and re-selection info:
    - s-Intrasearch, s-Intersearch, s-SearchHCS, rat-List(1), hcs-PRIO, q-HCS, t-CR, n-CR

B.1.6 SIB4: 12bytes

- General:
  - Cell re-selection in connected mode
- 10.2.48.8.7 System Information Block type 4:
  - Cell re-selection parameters

B.1.7 SIB5: 135bytes

- General:
  - Common physical channel configuration
- 10.2.48.8.8 System Information Block type 5 and 5bis:
  - sCCPCH-SystemInformationList(1):
    - secondaryCCPCH-Info
      - timingOffset
      - tics
    - fach-PCH-InformationList
    - pich-Info
  - frequencyBandIndicator
  - hsdpa-CellIndicator
  - edch-CellIndicator
  - hs-dsch-CommonSystemInformation
    - hs-scch-SystemInfo (4 codes)
  - hs-dsch-DrxCellfachInfo

- 10.2.48.8.8 System Information Block type 5 and 5bis:
  - commonEDCHSystemInfo (7 flow)
  - CommonEDCHSystemInfo:
    - Common-E-DCH-ResourceInfoList (8):
      - No explicit offsets per element
      - e-RGCH info, e-HICH info, ul-DPCH info
      - e-HICH code only for the first resource
      - F-DPCH code number for the 1, 11,21,31 resource

B.1.8 SIB7: 3 octets

- General:
  - Fast changing parameters UL interference
- 10.2.48.8.10 System Information Block type 7
  - >>FDD
    - >>UL interference
    - >>Dynamic persistence level

B.1.9 SIB11: 436bytes

- General:
  - Neighbor cell info
- 10.2.48.8.14 System Information Block type 11:
  - Intra-frequency neighbors(32):
  - Inter-frequency neighbors(20):
  - Inter-RAT neighbors(32)

B.1.10 SIB12: 8bytes

- General:
  - Measurement control information in connected mode
- 10.2.48.8.15 System Information Block type 12:
- FACH measurement occasion info:
  - Inter-RAT measurement indicators
  - Measurement control system information
    - Intra-frequency measurement sys info

**B.1.11 SIB18: 8bytes**

- General:
  - 2 PLMN id
- 10.2.48.8.21 System Information Block type 18:
  - Idle mode PLMN identities
  - Connected mode PLMN identities

**B.1.12 SIB19: 14bytes**

- General:
  - Inter-RAT and priority information for measurements
- 10.2.48.8.22 System Information Block type 19:
  - UTRA priority info list (1)
  - E-UTRA frequency and priority info list (2)

**B.1.13 SIB21: 3bytes**

- General:
  - EAB
- 10.2.48.8.24 System Information Block type 21
  - EAB Parameters

**B.1.14 SIB22: 16bytes**

- General:
  - FE-FACH features
- 10.2.48.8.25 System Information Block type 22:
  - PRACH preamble control parameters extension list Type 1
  - PRACH preamble control parameters extension list Type 2
  - Concurrent Deployment of 2ms and 10ms TTI:
    - TTI selection (Threshold based)
    - commonEDCHSystemInfoParamConcurrentTTI:
      - E-AGCH Info
    - E-DCH minimum set E-TFCI
  - Node B triggered HS-DPCCH Transmission:
    - HS-DPCCH transmission continuation back off
  - Fallback R99 PRACH info
  - HS-DSCH DRX in CELL_FACH with second DRX cycle Information:
    - 2-level DRX (T328, HS-DSCH first Rx burstFACH, HS-DSCH first DRX cycleFACH, HS-DSCH second Rx burstFACH, T329)
Annex B:
Change history

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