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Foreword

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

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

Version x.y.z

where:

x  the first digit:

1  presented to TSG for information;

2  presented to TSG for approval;

3  or greater indicates TSG approved document under change control.

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

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

The present document specifies the Radio Resource Control protocol for the UE-eUTRAN radio interface.

The scope of the present document also includes (FFS):

- the radio related information transported in a transparent container between source eNB and target eNB upon inter eNB handover;
- the radio related information transported in a transparent container between a source or target eNB and another system upon inter RAT handover.

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".


Editor's note: Document not yet available.

[3] 3GPP TS 36.302: "Evolved Universal Terrestrial Radio Access (E-UTRA); "Services provided by the physical layer ".


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].

(For further study).

3.2 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].

AM Acknowledged Mode
ASN.1 Abstract Syntax Notation.1
ARQ Automatic Repeat Request
AS Access Stratum
BCCH Broadcast Control Channel
BCH Broadcast Channel
CCCH Common Control Channel
CCO Cell Change Order
CP Control Plane
C-RNTI Cell RNTI
DCCH Dedicated Control Channel
DRX Discontinuous Reception
DTCH Dedicated Traffic Channel
DTX Discontinuous Transmission
DL Downlink
DL-SCH Downlink Shared Channel
E-UTRA Evolved Universal Terrestrial Radio Access
E-UTRAN Evolved Universal Terrestrial Radio Access Network
ENB Evolved Node B
FDD Frequency Division Duplex
FFS For Further Study
GERAN GSM/EDGE Radio Access Network
GSM Global System for Mobile Communications
HARQ Hybrid Automatic Repeat Request
IE Information element
IMEI International Mobile Equipment Identity
IMSI International Mobile Subscriber Identity
L1 Layer 1
L2 Layer 2
L3 Layer 3
MAC Media Access Control
MBMS Multimedia Broadcast Multicast Service
MCCH MBMS point-to-multipoint Control Channel
MIB Master Information Block
MTCH MBMS point-to-multipoint Traffic Channel
N/A Not Applicable
NACC Network Assisted Cell Change
NAS Non Access Stratum
PCCH Paging Control Channel
PDU Protocol Data Unit
PDCP Packet Data Convergence Protocol
PLMN Public Land Mobile Network
PTM-MC Point-to-Multipoint, Multi-Cell
PTM-SC Point-to-Multipoint, Single-Cell
4 General

4.1 Introduction

This specification is organised as follows:

- sub-clause 4.2 describes the RRC protocol model;
- sub-clause 4.3 specifies the services provided to upper layers as well as the services expected from lower layers;
- sub-clause 4.4 lists the RRC functions;
- clause 5 specifies RRC procedures, including UE state transitions;
- clause 6 specifies the RRC message in a tabular format;
- clause 7 specifies the variables (including protocol timers and constants) and counters to be used by the UE;
- clause 8 specifies the encoding of the RRC messages.

4.2 Architecture

4.2.1 UE states and state transitions including inter RAT

A UE is in RRC_CONNECTED when an RRC connection has been established. If this is not the case i.e. no RRC connection is established, the UE is in RRC_IDLE state. The RRC states can further be characterised as follows:

- **RRC_IDLE**:
- Transfer of broadcast/multicast data to UE;
- A UE specific DRX may be configured by upper layers.
- UE controlled mobility;
- The UE:
  - Monitors a Paging channel to detect incoming calls;
  - Performs cell (re-)selection;
  - Acquires system information.

**RRC_CONNECTED:**
- Transfer of broadcast/multicast/unicast data to/from UE.
- At lower layers, the UE may be configured with a UE specific DRX/DTX.
- Network controlled mobility i.e. handover and cell change order with NACC to GERAN;
- The UE:
  - Monitors control channels associated with the shared data channel to determine if data is scheduled for it;
  - Provides channel quality and feedback information;
  - Performs neighbouring cell measurements;
  - Acquires system information.

The following figure not only provides an overview of the RRC states in E-UTRA, but also illustrates the mobility support between E-UTRAN, UTRAN and GERAN.

![E-UTRA states and inter RAT mobility procedures](image)

**Figure 4.2: E-UTRA states and inter RAT mobility procedures**

The inter-RAT handover procedure(s) supports the case of signalling, conversational services (including a “voice call continuity” procedure [FFS depending on SA2 discussions]), non-conversational services and combinations of these. The mobility between E-UTRA and non-3GPP systems is FFS.

### 4.2.2 Signalling radio bearers

"Signalling Radio Bearers" (SRBs) are defined as Radio Bearers (RB) that are used only for the transmission of RRC and NAS messages. More specifically, the following three SRBs are defined:
- SRB0 is for RRC messages using the CCCH logical channel;
- SRB1 is for NAS messages and for most RRC messages, all using DCCH logical channel;
- SRB2 is for high-priority RRC messages, using DCCH logical channel.

NAS messages may be concatenated with some of the RRC messages. NAS independently applies integrity protection and ciphering to the NAS messages. All RRC messages, including those containing a NAS message, are integrity protected and ciphered by PDCP.

4.3 Services

4.3.1 Services provided to upper layers

The RRC protocol offers the following services to upper layers:

- Broadcast of general control information;
- Notification of UEs in RRC_IDLE e.g. about a terminating call, start of an MBMS session;
- Transfer of dedicated control information i.e. information for one specific UE.

Editors note: It seems that NAS will support duplication detection for both UL & DL, in which case there is no need for AS shall to avoid the delivery of duplicates of NAS information to upper layers. A statement may be added to reflect this.

4.3.2 Services expected from lower layers

In brief, the following are the main services that RRC expects from lower layers:

- PDCP: integrity protection and ciphering
- RLC: Reliable and in-sequence transfer of information, without introducing duplicates and with support for segmentation and concatenation

Further details about the services provided by Packet Data Convergence Control layer (e.g. integrity and ciphering) are provided in [8]. The services provided by Radio Link Control layer (e.g. the RLC modes) are specified in [7]. Further details about the services provided by Medium Access Control layer (e.g. the logical channels) are provided in [6]. The services provided by physical layer (e.g. the transport channels) are specified in [3].

4.4 Functions

The RRC protocol includes the following main functions:

- Broadcast of system information:
  - AS and NAS.
- Paging;
- RRC connection control:
  - Assignment/ modification of temporary UE identity (C-RNTI);
  - Establishment/ modification/ release of SRB 1 and SRB 2.
- RRC connection mobility (handover) including:
  - Intra-frequency, inter-frequency and inter- RAT.
  - Specification of RRC context information transferred between network nodes;
- Cell (re-) selection control:
- Neighbouring cell information (carrier frequencies, identity of specific cells);
- Indication of cell (re-)selection parameters;
- Intra-frequency, inter-frequency and inter-RAT.

- Measurement configuration control and reporting:
  - Establishment/ modification/ release of measurements (e.g. Intra-frequency, inter-frequency and inter-RAT mobility, Quality, UE internal, Positioning);
  - Configuration and (de-)activation of measurement gaps;
  - Measurement reporting.

- Security management:
  - (Configuration of) AS integrity protection (CP) and AS ciphering (CP, UP).

- Radio configuration control, including
  - Establishment/ modification/ release of user plane (ptp) RBs including ARQ configuration
  - Assignment/ modification of HARQ configuration
  - Assignment/ modification of DRX configuration

- QoS control:
  - Configuration of semi-persistent allocations for the initial HARQ transmissions in DL, covering a limited set of possible resources (blindly decoded by the UE)
  - Assignment/ modification of parameters for UL rate control in the UE i.e allocation of a priority and a prioritised bit rate (PBR) for each RB

- Transfer of dedicated NAS information;

- Multicast/ broadcast:
  - Notification of service/ session start;
  - Indication of available services;
  - Establishment/ modification/ release of ptm RBs.

- Other:
  - Indication of access restrictions;
  - Recovery from out of service;
  - UE capability transfer;
  - Support for E-UTRAN sharing (multiple PLMN identities);
  - Generic protocol error handling.

- Items for further study:
  - Support of self-configuration and self-optimisation (UE involvement FFS);

NOTE Random access is specified entirely in the MAC i.e. including initial power estimation.
5 Procedures

Editors note Some further discussion regarding the structure/ organisation of the procedural and the message and information element specification is desirable.

5.1 General

5.1.1 System information

5.1.1.1 General

A SCHEDULING UNIT is an RRC message carrying a number of System Information Blocks (SIBs) that have the same scheduling requirements (i.e. periodicity). Each SIB contains a set of related system information parameters. Several SIBs have been defined including the Master Information Block (MIB), that includes a limited number of most frequently transmitted parameters, and the Scheduling Block (SB) that mainly indicates when the other system information is transmitted i.e. start times. The MIB is carried on BCH while all other SIBs (including the SB) are carried on DL-SCH.

5.1.1.2 Scheduling

Both the MIB and SU-1 use a fixed schedule with a periodicity of 40 and 80 ms respectively. SU-1 is scheduled in sub-frame #5 (frame structure Type 1) or in sub-frame #0 of the second half frame (frame structure Type 2).

The scheduling of the SUs other than SU-1 is flexible i.e. dynamic scheduling is used: the UE acquires the detailed time-domain scheduling (as well as other information e.g. frequency-domain scheduling, used transport format) of these scheduling units from the PDCCH. For these other SUs additional scheduling information (indicating starting times) is provided in the SB, which is included in SU-1. The details of the dynamic scheduling mechanism are FFS. Also, it is FFS if the other SUs are scheduled in subsequent consecutive sub-frames.

It is FFS if the mapping of SIBs on to SUs is indicated in the SB or fixed in the specification.

Editors note It seems best to specify the handling of the scheduling information by means of an ‘elementary procedure’ i.e. related to the reception of the related information elements.

Editors note In the unlikely event that serving cell paging and target cell DBCH overlap in time one of the two activities will need to be prioritised. This may lead into paging reception loss or increases in cell reselection interruption time.

5.1.1.3 Segmentation and concatenation

Segmentation is not used for SUs.

Editors note In case the physical layer is unable to support sufficiently large transport block sizes, the use of segmentation may be reconsidered. If needed, it may still be possible to avoid segmentation by redefining the largest system information blocks.

It is FFS whether or not RRC supports concatenation of SUs.

Editors note It has been agreed that a UE is able to receive more than 1 SU in one TTI provided that the SUs are multiplexed into a single TB mapped on one PDCCH/PDSCH instance.

Editors note If RRC provides the functionality, this is best described by a ‘high level procedure’ i.e. related to the reception of the SCHEDULING UNIT message.

5.1.1.4 System information validity and notification of changes

System information changes only occur at specific radio frames i.e. the concept of a modification period is used. SCHEDULING UNITS may be transmitted a number of times with the same content within a modification period, as
defined by its scheduling. The modification period boundaries are defined by SFN mod N. It is FFS whether N may be configured by system information.

When the network changes (some of the) system information, it first notifies the UEs about this change i.e. this may be done throughout a modification period. In the next modification period, the network transmits the updated system information. These general principles are illustrated in figure 5.1.1.4-1, in which different colours indicate different system information. When the UE receives a change notification, it knows that the current system information is valid until the next modification period boundary.

![Figure 5.1.1.4-1: Change of system Information](image)

The PAGING message is used to inform UEs in RRC_IDLE about a BCCH change. UEs in RRC_CONNECTED monitor the PDCCH at a periodic occasion specifically defined for this purpose i.e. a ‘Connected mode system information change notification’ occasion. If the UE detects the BCCH-Change-RNTI, it knows that the system information changes at the next modification period boundary. Although the UE may be informed about changes in system information, no further details are provided e.g. regarding which SU has changed. The change notification mechanism is not used for the system information using an expiry timer (intended for the more dynamic system information).

SU-1 includes a value tag that indicates if a change has occurred in system information other than the MIB and SU-1. UEs may use this value tag e.g. upon return from out of service, to verify if the previously acquired system information is still valid. The UE considers system information to be valid for at most [TBD] from the moment it was received.

**Editors note** The UE requirements corresponding with the above descriptive text are still to be captured elsewhere e.g. within the paging procedure which may trigger the BCCH acquisition procedure.

### 5.1.2 RRC connection control

RRC connection establishment involves contention resolution as well as the establishment of SRB 1. E-UTRAN completes connection establishment prior to completing the establishment of the S1 connection i.e. prior to receiving the UE context information from the EPC. Consequently, AS security is not activated during the initial phase of the RRC connection. During this initial phase of the RRC connection, the E-UTRAN may configure the UE to perform measurement reporting. However, the UE only accepts a handover command when security is activated.

Upon receiving the UE context from the EPC, E-UTRAN activates security (both ciphering and integrity protection) using the RRC connection reconfiguration procedure. The RRC messages to activate security (command and response) are integrity protected, while ciphering is started only after completion of the procedure. I.e. the response to the message used to activate security is not ciphered, while the subsequent messages (e.g. used to establish radio bearers) are both integrity protected and ciphered.

After having initiated the procedure to activate security, E-UTRAN may initiate the establishment of EPC bearers. In fact, E-UTRAN may initiate this bearer establishment procedure prior to receiving the confirmation of the security activation from the UE. If so, E-UTRAN will apply both ciphering and integrity protection for the RRC connection reconfiguration messages used to establish the EPC bearers. When using this ‘early’ EPC bearer establishment option, E-UTRAN should release the RRC connection if the bearer establishment fails (i.e. security activation and EPS bearer establishment are triggered by a joint S1-procedure, which does not support partial success).

For radio bearers others than SRB 1, security is always activated from the start i.e. the UE does not establish the corresponding bearers prior to activating security.

### 5.1.3 Security

AS security comprises of the integrity protection of RRC signalling as well as the encryption of RRC signalling and of user data. RRC handles the integrity protection configuration, which is common for signalling radio bearers SRB1 and
SRB 2. RRC also handles the ciphering configuration, which is common for all radio bearers i.e. the configuration is used for the radio bearers carrying signalling as well as for those carrying user data.

RRC integrity and ciphering are always activated together i.e. in one message/ procedure. RRC integrity and ciphering are never de-activated. However, it is possible to switch to a ‘dummy’ algorithm.

NOTE Security is always activated although in some cases a ‘dummy algorithm’ and/or ‘dummy keys’ may be used e.g. in case of UICC-less emergency calls

SRB 2 and the radio bearers carrying user data are always ciphered. E-UTRAN should not establish these bearers prior to activating security.

The AS applies three different security keys: one for the integrity protection of RRC signalling, one for the encryption of RRC signalling and one for the encryption of user data. It is FFS whether or not the same key can be used for the encryption of RRC signalling and of user data. All three AS keys (in the following referred to as AS derived-keys) are derived from an AS base-key, which is eNB specific \((K_{\text{eNB}})\).

Upon connection establishment new AS keys are derived. It is FFS which parameters are exchanged to facilitate the derivation of the new AS keys e.g. the network provides a counter, the UE provide a random number.

The integrity and ciphering of the RRC message used to perform handover is based on the security configuration used prior to the handover and is performed by the source eNB.

Editors note Some concerns have been expressed regarding whether it is acceptable to protect the handover message by the security configuration used prior to handover.

The integrity and ciphering algorithms can only be changed upon inter eNB handover. The AS keys (both the base-key and the derived-keys) change upon every inter eNB handover. It is FFS if there is a need for further support of AS derived-keys change in RRC_CONNECTED. If this is needed, an intra cell handover based procedure is used to change the keys.

Editors note Key change in RRC_CONNECTED may be required in order to take prepared keys into use following inter RAT handover. Since the new keys should be taken into account quite soon, the option of transiting through RRC_IDLE might be unacceptable.

A common counter (COUNT) is used as input for both the ciphering and integrity protection of RRC signalling. Except for identical re-transmissions, it is not allowed to use the same COUNT value more than once for a given security key. In order to limit the signalling overhead, individual messages/packets include a short sequence number (SN). In addition, an overflow counter mechanism is used: the hyper frame number (HFN). The HFN needs to be synchronized between the UE and the eNB. The eNB is responsible for avoiding reuse of the COUNT with the same RB identity and with the same AS base-key e.g. due to the transfer of large volumes of data, release and establishment of new RBs. The eNB may e.g. not reuse RB identities upon RB establishment, trigger an intra cell handover or an RRC_CONNECTED to RRC_IDLE to RRC_CONNECTED transition.

NOTE An example of identical retransmissions that may use the same counter as input is the case of ‘quick repeat’ of RRC messages. Details of the interaction between RRC and PDCP for this case are FFS.

5.1.4 Connected mode mobility

In RRC_CONNECTED, the network controls UE mobility i.e. the network decides when the UE shall move to which cell (which may be on another frequency or RAT). The network triggers the handover procedure e.g. based on radio conditions, load. To facilitate this, the network may configure the UE to perform measurement reporting (possibly including the configuration of measurement gaps). The network may also initiate handover blindly i.e. without having received measurement information from the UE.

For mobility within E-UTRA, handover is the only procedure that is defined. Before sending the handover command to the UE, the source eNB prepares one or more target cells. It is FFS if the target eNB generates the message used to perform the handover i.e. the message including the AS-configuration to be used in the target cell. The source eNB transparently (i.e. does not alter values/content) forwards the handover message/information received from the target to the UE. It is FFS if the source attaches other information e.g. to avoid SFN reading in the target cell for the ‘end time’ of the dedicated signature. When appropriate, the source eNB may initiate data forwarding for (a subset of) the radio bearers.
Editors note Stage 2 indicates that the source eNB generates the message. However, during the conference calls there seemed to be consensus that the target eNB generates the message.

After receiving the handover command, the UE attempts to access the target cell at the first available RACH occasion i.e. the handover is asynchronous. Consequently, when allocating dedicated preambles for the random access in the target cell, E-UTRA shall ensure they are available from the first RACH occasion the UE may use. Upon successful completion of the handover, the UE sends a handover confirmation.

After the success completion of handover, PDCP SDUs may be re-transmitted in the target cell. This only applies for radio bearers carrying user data and using RLC-AM mode. The further details are specified in [8].

After the successful completion of handover, the SN and the HFN are reset except for the radio bearers carrying user data and using RLC-AM mode (for which both SN and HFN continue). The further details are specified in [8].

Editors note W.r.t. handover there is one UE behaviour regardless of the handover procedures used within the network (e.g. whether the handover includes X2 or S1 signalling procedures).

The source eNB should, for some time, maintain a context to enable the UE to return in case of handover failure. After having detected radio link failure, the UE may attempt to resume the RRC connection either in the source or in another cell (see RL failure). This connection resumption succeeds only if handover preparation has been performed towards the concerned cell.

For inter RAT mobility from E-UTRA a single procedure is defined that supports both handover and cell change order possibly with network assistance (NACC).

### 5.1.5 Measurements

The UE reports measurement information in accordance with the measurement configuration as provided by E-UTRAN. E-UTRAN provides the measurement configuration applicable for a UE in RRC_CONNECTED state by means of dedicated signalling i.e. using the RRC CONNECTION RECONFIGURATION message. The measurement configuration includes the following parameters:

1. **Measurement identity**: A reference number that is used when configuring the measurement as well as when reporting measurement information.

2. **Measurement command**: The following measurement commands have been defined.
   - Setup: used to setup a new measurement.
   - Modify: used to modify a measurement that has been configured previously.
   - Release: used to stop a measurement and to clear a measurement that has been configured previously.

3. **Measurement type**: The following measurement types have been defined.
   - Intra-frequency measurements: measurements at the downlink carrier frequency of the serving cell.
   - Inter-frequency measurements: measurements at frequencies that differ from the downlink carrier frequency of the serving cell.
   - Inter-RAT measurements: measurements of radio access technology other than E-UTRAN, e.g. UTRAN, GSM.
   - The use of other measurement type e.g. Traffic volume, Quality, UE-internal and/ or UE positioning measurements is FFS

4. **Measurement objects**: The objects which the UE shall perform the measurement on e.g. a carrier frequency or a list of neighbouring cells. An object may include additional parameters e.g. parameters applicable for a specific cell.

Editors note It is FFS how to indicate specific (blacklisted) neighbouring cells that the UE is not allowed to report

5. **Measurement quantity**: The quantity the UE shall measure e.g. RSCP as well as the associated filtering parameters e.g. Layer 3 filter coefficient.
6. **Reporting quantities**: The quantities that the UE shall include in the measurement report. Some reporting quantities may be specified implicitly by the event triggering the measurement reporting.

7. **Measurement reporting criteria**: The criteria that trigger the UE to provide a measurement report, e.g. periodical or event-triggered reporting.

8. **Measurement gaps**: Periods that the UE may use to perform measurements i.e. no (UL, DL) transmissions are scheduled. It is FFS if the measurement gaps are common for all gap assisted measurements.

   Editors note The use of other measurement configuration parameters e.g. Measurement validity, Measurement reporting mode and/ or Additional measurement identities it is FFS.

Some of the listed parameters are applicable only in specific cases e.g. only for specific measurement types. Further details about the measurement configuration parameters are provided in clause 6.

E-UTRAN may configure multiple instances of the same event.

The term *measurement specifics* is used to refer to the measurement configuration excluding the measurement object.

The UE measures and reports the following types of cells:

1. The serving cell.
2. Listed cells i.e. cells that are indicated by the E-UTRAN as part of the list of neighbouring cells (i.e. as measurement object).
3. Detected cells i.e. cells that are not indicated by the E-UTRAN but detected by the UE. However, E-UTRAN does indicate the carrier frequency.

Besides the serving cell, the UE reports both listed and detected cells with one exception: the UE only reports listed UTRAN cells.

### 5.2 High level procedures

**Editors note** The structure of this section is an initial starting point that may further evolve during the specification process.

#### 5.2.1 BCCH acquisition

![BCCH Acquisition Diagram](image)

**Figure 8.2.2-1: BCCH acquisition, normal**

#### 5.2.1.1 General

The UE applies the BCCH acquisition procedure to acquire the AS- and NAS- system information that is broadcasted by the E-UTRAN. The procedure applies to UEs in RRC_IDLE and to UEs in RRC_CONNECTED.
5.2.1.2 Initiation

The UE shall apply the BCCH acquisition procedure upon selecting (e.g. upon power on) and upon re-selecting a cell, upon handover, upon entering E-UTRA from another RAT, upon return from loss of coverage and upon receiving a notification that the BCCH information has changed.

5.2.1.3 BCCH information to be acquired by the UE

Editors note  This procedure only covers the basic requirements e.g the acquisition of the MIB and the SB. Furthermore, this specification will specify which SIBs a UE in in RRC_IDLE as well as a UE in RRC_CONNECTED shall acquire. In addition, the Radio connection request procedure should specify which SIBs the UE shall acquire prior to initiating connection establishment (if any). In addition, performance requirements may impose requirements regarding the acquisition of certain SUs.

The UE shall acquire the MASTER INFORMATION BLOCK and the SCHEDULING UNIT 1 (FFS).

Editors note  It is presently unclear what really is the minimum system information the UE should acquire regardless of UE state. Candidates for this minimum information: BCCH R-NTI, information on which SIBs are available, information regarding their validity. Note that the acquisition of the SB could be regarded as optional i.e. the UE could read BCCH continuously.

Editors note  It seems best to specify the scheduling by means of an ‘elementary procedure’ i.e. related to the reception of the related information elements.

Editors note  It may be desirable to include a table similar to table 8.1.1 in 25.331

5.2.1.4 Actions upon reception of the MASTER INFORMATION BLOCK message

Upon receiving the MASTER INFORMATION BLOCK message the UE shall:

1> To be completed

Editors note  The aim is to specify only a minimum of specific behaviour in these sections

5.2.1.5 Actions upon reception of SCHEDULING UNIT messages

Upon receiving a SCHEDULING UNIT message the UE shall:

1> act upon all received information elements as specified in 8.6, unless specified otherwise in the following.

To be completed

5.2.2 Paging

5.2.3 RRC connection establishment
5.2.3 General

The purpose of this procedure is to establish an RRC connection. RRC connection establishment involves contention resolution and SRB establishment.

5.2.3.2 Initiation

The UE initiates the procedure when upper layers request establishment of a signalling connection while the UE is in RRC_IDLE state. Prior to initiating the connection request procedure, the UE performs the initial access procedure as specified in [TS 36.321].

Upon initiation of the procedure, the UE shall:

1> If the access barring check, as specified in 5.5.2.1, is successful:
   2> Stop acting on PAGING messages;
   2> Set counter V300 to 1; and
   2> Initiate transmission of the RRC CONNECTION REQUEST message in accordance with 5.2.3.3;
   2> Start timer T300 when the lower layers indicate success to transmit the message

NOTE Upon initiating the connection establishment procedure, the UE is not required to ensure it maintains up to date system information applicable only for UEs in RRC_IDLE state. However, the UE needs to perform BCCH acquisition upon re-selection.

1> else:
   2> FFS (To be specified)

The UE behaviour upon failure to transmit the message is FFS.

5.2.3.3 Actions related to transmission of RRC CONNECTION REQUEST message

The UE shall set the contents of RRC CONNECTION REQUEST message as follows:

1> if the UE has a valid S-TMSI:
   2> set the "Initial UE identity" to ‘S-TMSI’ (FFS);
1> else:
   2> set the "Initial UE identity" to ‘Random number’ (FFS)
1> set the "Selected PLMN identity" to (FFS);
1> Set the IE “Establishment cause” in accordance with the information received from upper layers;

The UE shall submit the RRC CONNECTION REQUEST message to lower layers for transmission on the uplink CCCH.

5.2.3.4 Reception of the RRC CONNECTION SETUP by the UE

The UE shall:

1> If the IE "Initial UE identity" is the same as the one the UE included in the RRC CONNECTION REQUEST message:
2> stop timer T300;
2> ignore information related to radio bearers other than SRB 1, should this be included in the RRC CONNECTION SETUP message;

2> If SRB 1 is established as a result of the RRC CONNECTION SETUP: (successful establishment):
   3> If stored, discard the Inter-frequency priority information and the Inter-RAT priority information;
   3> stop timer T320, if running;
   3> Enter RRC_CONNECTED state.
2> else (connection establishment failure):
   3> reject the message as specified in 5.2.5.5;
   3> Resume acting on PAGING messages;
   3> inform upper layers about the failure to establish the RRC connection.

NOTE 1: The details of how the signalling radio bearer configuration is signalled are FFS i.e. the use of default/pre-defined configurations is not precluded.

1> else (another UE is addressed):
   2> perform the RRC connection request retry procedure as specified in 5.2.3.6;

5.2.3.5  Cell re-selection or T300 timeout

The UE shall:
1> if cell re-selection occurs while timer T300 is running or
1> if timer T300 expires:
   2> perform the RRC connection request retry procedure as specified in 5.2.3.6;

5.2.3.6  RRC connection request retry

The UE shall:
1> if V300 is equal to or smaller than N300:
   2> transmit a new RRC CONNECTION REQUEST message in accordance with 5.2.3.3;
   2> increment counter V300;
   2> restart timer T300 when the MAC layer indicates success to transmit the message.
1> else:
   2> stop timer T300, if it is running;
   2> inform upper layers about the failure to establish the RRC connection.

5.2.4  RRC connection re-establishment

Editors note  The specification text is to a large extent similar to the one for the connection request. However, it is currently assumed that these procedures should not be merged.
5.2.4.1 General

The purpose of this procedure is to request a re-establishment of the RRC connection.

A UE in RRC_CONNECTED may initiate the procedure after having detected radio link failure in order to continue the RRC connection either in the source or in another cell. The connection re-establishment succeeds only if the concerned cell is prepared. In case E-UTRAN accepts the re-establishment, SRB 1 operation resumes while the operation of other radio bearers remains suspended.

5.2.4.2 Initiation

The UE initiates the procedure when one of the following conditions is met:

1> Upon re-entry of the service area after having detected radio link failure, in accordance with 5.5.4;

Prior to initiating the connection re-establishment request procedure, the UE performs the initial access procedure as specified in [TS 36.321].

Upon initiation of the procedure, the UE shall:

1> Set counter V301 to 1;

1> Initiate transmission of the RRC CONNECTION RE-ESTABLISHMENT REQUEST message in accordance with 5.2.4.3;

1> Start timer T301 when the lower layers indicate success to transmit the message

The UE behaviour upon failure to transmit the message is FFS.
5.2.4.3 Actions related to transmission of RRC CONNECTION RE-ESTABLISHMENT REQUEST message

The UE shall set the contents of RRC CONNECTION RE-ESTABLISHMENT REQUEST message as follows:

1> Include the "Initial UE identity";

Editors note Further clarification regarding the setting of the UE identity may need to be included in case there would be different options to set this IE. The UE shall include the C-RNTI used in the cell where radio link failure was detected + physical layer identity of that cell.

The UE shall submit the RRC CONNECTION RE-ESTABLISHMENT REQUEST message to lower layers for transmission on the uplink CCCH.

5.2.4.4 Reception of the RRC CONNECTION RE-ESTABLISHMENT by the UE

The UE shall:

1> If the IE "Initial UE identity" is the same as the one the UE included in the RRC CONNECTION RE-ESTABLISHMENT REQUEST message:
   2> stop timer T301;
   2> stop timer T311;
   2> ignore information related to radio bearers others than SRB 1, should this be included in the RRC CONNECTION RE-ESTABLISHMENT message;
   2> If SRB 1 is established as a result of the RRC CONNECTION RE-ESTABLISHMENT: (successful re-establishment):
      3> send the RRC CONNECTION RE-ESTABLISHMENT COMPLETE message as specified in 5.2.4.5;
      3> Resume the RRC connection with the restriction that the use of all radio bearers other than SRB 1 is suspended until a subsequent RRC CONNECTION RECONGURATION message is received;
   Editors note The details of how the RBs are resumed are FFS.
   2> else (connection re-establishment failure. The need to specify the UE behaviour for this error case is FFS):
      3> indicate the release of the signalling connection and the established EPS bearers to upper layers;
      3> move to RRC_IDLE and perform the actions related to this state changes in accordance with 5.5.1.
1> else (another UE is addressed):
   2> perform the RRC connection re-establishment request retry procedure as specified in 5.2.4.7;

5.2.4.5 Actions related to transmission of RRC CONNECTION RE-ESTABLISHMENT COMPLETE message

The UE shall set the contents of RRC CONNECTION RE-ESTABLISHMENT COMPLETE message as follows:

1> FFS (To be specified)

5.2.4.6 Cell re-selection or T301 timeout

The UE shall:

1> if cell re-selection occurs while timer T301 is running or
1> if timer T301 expires:
2> perform the RRC connection re-establishment request retry procedure as specified in 5.2.4.7;

5.2.4.7 RRC connection re-establishment request retry

The UE shall:

1> if V301 is equal to or smaller than N301:
   2> transmit a new RRC CONNECTION RE-ESTABLISHMENT REQUEST message in accordance with 5.2.4.3;
   2> increment counter V301;
   2> restart timer T301 when the MAC layer indicates success to transmit the message.
1> else:
   2> stop timer T301, if it is running;
   2> stop timer T311;
   2> indicate the release of the signalling connection and the established EPS bearers to upper layers;
   2> move to RRC_IDLE and perform the actions related to this state changes in accordance with 5.5.1.

Editors note It is up to upper layers to take further action. To facilitate this, the cause of the release may need to be indicated to upper layers.

5.2.4.8 RRC re-establishment request reject

Upon receiving the RRC CONNECTION RE-ESTABLISHMENT REJECT message, the UE shall:

1> If the IE "Initial UE identity" is the same as the one the UE included in the RRC CONNECTION RE-ESTABLISHMENT REQUEST message:
   2> stop timer T301;
   2> stop timer T311;
   2> indicate the release of the signalling connection and the established EPS bearers to upper layers;
   2> move to RRC_IDLE and perform the actions related to this state changes in accordance with 5.5.1.

Editors note It is up to upper layers to take further action. To facilitate this, the cause of the release may need to be indicated to upper layers.

5.2.5 RRC connection reconfiguration (-/ complete/ failure)

Figure 5.2.5-1: RRC connection reconfiguration, successful
5.2.5.1 General
The purpose of this procedure is to modify or release an RRC connection.

5.2.5.2 Initiation
E-UTRAN may initiate the RRC connection reconfiguration procedure to a UE in RRC_CONNECTED, possibly in response to an RRC connection re-establishment request.

Editors note This section should cover procedure specific details about procedure interaction (general aspects are covered in general section).

5.2.5.3 Reception of the RRC CONNECTION RECONFIGURATION by the UE
The UE shall:

1> If the RRC CONNECTION RECONFIGURATION message includes the IE NAS dedicated information:
   2> perform the NAS dedicated downlink information transfer procedure as specified in 5.3.5;

1> If the RRC CONNECTION RECONFIGURATION message includes the IE Radio resource configuration:
   2> perform the Radio resource configuration procedure as specified in 5.3.1;

1> If the RRC CONNECTION RECONFIGURATION message includes the IE Security configuration:
   2> perform the Security configuration procedure as specified in 5.3.2;

1> If the RRC CONNECTION RECONFIGURATION message includes the IE Measurement configuration:
   2> perform the Measurement configuration procedure as specified in 5.3.3;

1> If the RRC CONNECTION RECONFIGURATION message includes the IE Mobility control information:
   2> perform the Connected mode mobility control (Handover) procedure as specified in 5.3.4;

<Interactions between elementary procedures, if any>.

NOTE If the RRC CONNECTION RECONFIGURATION message includes the establishment of radio bearers others than SRB 1 and activates AS-security, the UE may start using these radio bearers immediately i.e. there is no need to wait for an acknowledgment of the RRC CONNECTION RECONFIGURATION COMPLETE message.

1> Consider the procedure to be unsuccessful (need to specify the UE behaviour for this error case is FFS):
   2> If the RRC CONNECTION RECONFIGURATION message includes the IE Mobility control information AND upon completion of the RRC connection reconfiguration procedure AS-security is not activated OR;
   2> If the RRC CONNECTION RECONFIGURATION message includes the establishment of radio bearers others than SRB 1 AND upon completion of the procedure AS-security is not activated;
Editors note: It is FFS how to specify the above conditions. If possible, the specification should avoid text suggesting to revert operations that have been completed successfully.

1> If the UE successfully completes all the procedures invoked by the RRC CONNECTION RECONFIGURATION message:
   2> set the contents of RRC CONNECTION RECONFIGURATION COMPLETE message as follows:
      3> Tbs
   2> transmit the RRC CONNECTION RECONFIGURATION COMPLETE message using the new configuration;
   2> submit the RRC CONNECTION RECONFIGURATION COMPLETE message to lower layers for transmission, upon which the procedure ends.

1> else:
   2> reject the entire message as specified in 5.2.5.5 i.e. the UE shall also reject the procedures invoked by the RRC CONNECTION RECONFIGURATION message that it managed to complete successfully;
   2> revert back to the configuration used prior to the reception of the RRC CONNECTION RECONFIGURATION message.

To be completed

5.2.5.4 Reception of the RRC CONNECTION RECONFIGURATION COMPLETE by the E-UTRAN’

To be completed

5.2.5.5 RRC connection reconfiguration failure

The UE shall:

1> set the contents of RRC CONNECTION RECONFIGURATION FAILURE message as follows:
   2> Tbs

Editors note: So far, the RRC CONNECTION RECONFIGURATION FAILURE is a message not including any diagnostics information i.e. not even an indication of the parts that cause the failure e.g. the type of reconfiguration, the identity of a failed RB.

1> submit the RRC CONNECTION RECONFIGURATION FAILURE message to lower layers for transmission, upon which the procedure ends.

5.2.6 Measurement reporting

The UE shall:

1> If the measurement report includes multiple cells AND a measurement quantity is not provided for each cell:
   2> include the cells in order of decreasing quantity i.e. the best cell is included first.

Editors note: It is FFS which additional cells may be included in a report e.g. cells of another type (e.g. best inter-frequency cell included in an intra-frequency report. Furthermore, it is FFS whether, if multiple cells meet the criteria, ordering is also applied irrespective of the cells carrier frequency.
5.2.7 Handover to E-UTRA

5.2.8 DL direct transfer

5.2.9 UL direct transfer

5.3 Elementary procedures

Editors note It would be desirable to apply the following general order also for this section: system information, connection control, security, mobility control, measurements, other.

5.3.1 Radio resource configuration

5.3.1.1 Introduction

To be specified

5.3.1.2 Initial setup of a radio resource configuration

To be specified

5.3.1.3 Modification of a radio resource configuration

To be specified

5.3.2 Security configuration

5.3.2.1 Introduction

To be specified

5.3.2.2 Initial setup of a security configuration

The UE shall:

1> If the UE successfully completes the initial setup of the security configuration:

2> Configure lower layers to apply the new integrity protection configuration immediately i.e. the new integrity protection configuration shall be applied to all subsequent messages received and sent by the UE including the message used to indicate the successful completion of the procedure;

2> Configure lower layers to apply the new ciphering configuration after completing the procedure i.e. the new ciphering configuration shall not be applied to message used to indicate the success completion of the procedure;

1> else (need to specify the UE behaviour for this error case is FFS):

2> indicate failure to complete the RRC reconfiguration procedure including the security configuration;

NOTE In case of a security configuration failure, the response message shall neither apply integrity nor ciphering

To be specified

5.3.2.3 Modification of a security configuration

To be specified
5.3.3 Measurement configuration

5.3.3.1 Introduction

Editors note Clarification needs to be added that what is setup, modified and released concerns a measurement identified by a measurement identity

To be specified

5.3.3.2 Setup of a measurement

To be specified

5.3.3.2 Modification of a measurement

To be specified

5.3.3.3 Release of a measurement

To be specified

5.3.4 Connected mode mobility control (Handover)

5.3.4.1 Introduction

To be specified

5.3.4.2 Reception of a handover command

NOTE The UE performs the handover as soon as possible following the reception of the RRC message triggering the handover, which could be before confirming successful reception (HARQ and ARQ) of this message

The UE shall:

1> if the radio configuration to be used in the target cell is specified as a delta to the one used in the serving cell (signalling details are FFS):

   2> act upon the received radio configuration, excluding the physical layer configuration, in accordance with 5.3.2, as specified for the case of a ‘modification’;

   2> act upon the received physical layer configuration in accordance with 5.3.2.3.

1> else:

   2> act upon the received radio configuration in accordance with 5.3.2.2.

1> reset the RLC and MAC;

1> if no dedicated preamble was provided (signalling details are FFS) OR

1> if a dedicated preamble expiry time was provided and the indicated expiry time has elapsed (signalling details are FFS):

   2> perform the initial access procedure as specified in [TS 36.321], using a randomly selected common preamble;

1> else:

   2> perform the initial access procedure as specified in [TS 36.321], using the indicated dedicated preambles;

Editors note In case the above is the only action upon expiry time, it seems preferable to specify this in 36.221. However, it is presently unclear how contention is handled after the expiry time.
The handling of the radio bearers after the success completion of handover, e.g. the re-transmission of unacknowledged messages and/or PDCP SDUs (as well as the associated status reporting), the handling of the SN and the HFN, are specified in [8].

5.3.4.3 Sending of a handover confirmation

To be specified

5.3.4.4 Handover failure

5.3.4.5 Measurement related actions

Editors note An alternative way would be to specify these actions together with other measurement related behaviour e.g. together with the elementary procedure, the actions upon presence/absence of an IE.

5.3.4.5.1 General

Editors note It is assumed there is no need for a section for Measurement related actions upon inter-RAT handover since upon handover to E-UTRAN the measurements are established in a similar manner as the normal setup.

5.3.4.5.2 Measurement related actions upon intra-frequency handover

The UE shall:

1> If the RRC CONNECTION RECONFIGURATION message triggering the handover does not include the IE measurement configuration:

2> continue the intra-frequency, inter-frequency and inter-RAT measurements without modifying the measurement specifics and the measurement objects.

Further details are to be specified

5.3.4.5.3 Measurement related actions upon inter-frequency handover

The UE shall:

1> If the RRC CONNECTION RECONFIGURATION message triggering the handover does not include the IE measurement configuration:

2> continue the intra-frequency measurements without modifying the measurement specifics but with setting the measurement object to the new serving frequency;

2> continue the inter-frequency measurements applicable for frequencies other than serving and target frequency without modifying the measurement specifics and the measurement objects;

2> stop all inter-frequency measurements while keeping the measurement specifics unmodified. In addition, keep the measurement object(s) applicable for frequencies other than serving and target frequency unmodified and clear the measurement object applicable for the source frequency;

2> continue the inter-RAT measurements without modifying the measurement specifics and the measurement objects.

NOTE 1 Setting the measurement object to the new serving frequency implies that the UE neither applies cell specified parameters e.g. offsets nor ‘blacklisted’ cells.

Editors note The handling of inter-frequency measurement configuration as specified above may need to be revisited depending on the final structure of the measurement related parameters.

NOTE 2 The UE resumes the inter-frequency measurements applicable after the E-UTRAN has configured the corresponding measurement object and activated the (corresponding) measurement gap(s).
1. deactivate the measurement gap(s), without modifying the gap configuration, unless a re-configuration is included in the message used to trigger the handover;

Further details are to be specified

5.3.4.6 Security related actions

Editors note  This section should cover the RRC signalling aspects associated with the change of the AS-key. Other aspects should be covered in 36.323.

To be specified

5.3.5 NAS dedicated downlink information transfer

5.4 Procedure interactions

The UE shall:

1. process the received messages in order of reception by RRC i.e. the processing of a message shall be completed before starting the processing of a subsequent message;

NOTE  The eNB may initiate a subsequent procedure prior to receiving the UEs response of a previously initiated procedure.

Editors note  The above is based on the following working assumptions: a) so far no need has been identified for an activation time, b) for procedure completion there is not need to wait for an L2 ACK

5.5 General procedures

5.5.1 Actions within and upon changing state (FFS)

Editors note  This section may be used to specify the UE actions within RRC IDLE and RRC CONNECTED (i.e. more normative version of 4.2.1) as well as any specific handling performed upon moving from one state to the other

Editors note  Since measurements are explicitly configured upon connection establishment and implicitly released upon connection release, it is assumed that there are no measurement related actions to be specified in this section

5.5.2 Access class barring

5.5.2.1 Access barring check

The UE shall:

1. If the Cell reserved for operator use in SIB type 1 is set AND (the value of the UEs Access class, as stored on the USIM, is not in the range 11..15 OR the cell does not belong to the H-PLMN):
   2. consider the Access barring check to be unsuccessful;

1. else if the Cell reserved for future extension in SIB type 1 is set:
   2. consider the Access barring check to be unsuccessful;

1. else if the value of the UEs Access class, as stored on the USIM, is in the range 0..9:
   2. If the Access barring for all calls in SIB type 1’ is set OR
   2. If the Access barring for mobile originating calls in SIB type 1’ is set AND the UE is establishing the RRC connection to perform a mobile originating call:
3> draw a random number, "rand", uniformly distributed in the range: 0 ≤ rand < 1
3> if 'rand' is lower than the value indicated by the IE Access probability factor included in SIB type 1:
4> consider the Access barring check to be successful;
3> else:
4> consider the Access barring check to be unsuccessful;
1> else:
2> consider the Access barring check to be successful;

5.5.2.2 Access barring failure

If the Access barring check was unsuccessful, the UE shall:
1> FFS (To be specified)

5.5.3 Speed dependant scaling of measurement related parameters

The UE shall adjust the value of the following parameters configured by the E-UTRAN depending on the UE speed:
Time to trigger. The UE shall apply 3 different levels, which are selected as follows:
FFS (To be specified, i.e. exact mechanism is FFS)

Editors note It is assumed that the speed level selection/ detection is specified in [4], both for idle and connected. Furthermore, the scaling of the idle mode parameters is assumed to be specified in [4].

5.5.4 Radio link failure related actions

5.5.4.1 Initiation

Upon detecting radio link problems, the UE shall:
1> Start a timer T310;
The criteria for detecting radio link problems are FFS.
It is FFS if a counter will be used instead of timer T310.

5.5.4.1 Radio link recovery while T310 is running

Upon detecting radio link recovery while T310 was running, the UE shall:
1> Stop timer T310;

Editors note In this case, the UE can continue the RRC connection without explicit signalling
The criteria for detecting radio link recovery are FFS.

5.5.4.2 T310 expiry

Upon T310 expiry, the UE detects radio link failure and shall:
1> If security is not activated:
2> Indicate the release of the signalling connection and the established EPS bearers to upper layers;
2> Enter idle mode;
1> else:
2> Start a timer T311;
2> Perform the cell selection process as specified in [4];

Editors note For selecting the cell, we should be able to refer to a procedure specified in 36.304.

5.5.4.3 Re-entry of service area while T311 is running

Upon re-entry of the service area while T311 was running, the UE shall:
1> Initiate the Connection re-establishment procedure as specified in 5.2.4;

NOTE This procedure applies also if the UE returns to the source cell

5.5.4.4 T311 expiry

Upon T311 expiry, the UE shall:
1> stop T301, if it is running;
1> indicate the release of the signalling connection and the established EPS bearers to upper layers;
1> enter idle mode.

Editors note It is up to upper layers to take further action. To facilitate this, the cause of the release may need to be indicated to upper layers.

5.6 Generic actions on receipt and absence of an information element

5.6.1 System information related information elements

To be specified (i.e. details regarding the UE action upon receiving specific system information IEs).

5.6.2 Connection control related information elements

To be specified (i.e. details regarding the UE action upon receiving specific connection control related IEs).

5.6.3 Security related information elements

To be specified (i.e. details regarding the UE action upon receiving specific security IEs).

5.6.4 Connected mode mobility related information elements

To be specified (i.e. details regarding the UE action upon receiving specific connected mode mobility related IEs).

5.6.5 Measurement related information elements

To be specified (i.e. details regarding the UE action upon receiving specific measurement IEs).

5.6.5.1 Measurement objects

Editors note The following statements are to be rephrased into proper specification text

It should be possible to indicate intraF, interF and interRAT cells for which specific measurement configuration parameters apply (e.g. specific offsets)

The UE is only required to report neighbouring UTRA cell that are included in the corresponding measurement object
It is FFS how to indicate specific (blacklisted) neighbouring cells that the UE is not allowed to report.

5.6.5.2 Measurement type
Intra-frequency measurements: to be specified.
Inter-frequency measurements: to be specified.
Inter-RAT measurements: to be specified.

5.6.5.3 Measurement quantity
Reference symbol received power (RSRP): to be specified
E-UTRA carrier received signal strength indicator (RSSI): to be specified
RSRQ: to be specified
The associated filtering: to be specified

5.6.5.4 Measurement reporting criteria type
Periodical reporting: to be specified
Event-triggered reporting: to be specified
Event-triggered periodic reporting: to be specified

5.6.6 Other information elements

5.6.6.1 Idle mode mobility control information
The UE shall:

1> If the Cell re-selection priority expiry timer is received:
   2> start timer T320;

1> If the Inter-frequency priority information AND/OR Inter-RAT priority information is received:
   2> when in RRC_IDLE, apply the priority information when performing cell re-selection as specified in [4];

5.7 Generic error handling

6 Protocol data units, formats and parameters
Covering all messages and information elements applicable for the UE

Editors note Some further discussion regarding the structure/organisation of the procedural and the message and information element specification is desirable

6.1 General
The contents of each RRC message is specified in subclause 6.2 using a tabular format, that lists the information elements included the message. The further content of the information elements is specified in a similar manner in subclause 6.3.

The need for information elements to be present is specified by means of abbreviations, which meaning is specified in table 10.1.
Table 10.1: Meaning of abbreviations used to specify the need for information elements to be present

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP</td>
<td>Mandatory present&lt;br&gt; An information element that always needs to be signalled. If the transfer syntax allows absence (e.g. because the information concerns an extension), the UE shall consider this to be protocol error</td>
</tr>
<tr>
<td>MD</td>
<td>Mandatory with default value&lt;br&gt; An information element that is always needed for which a default value is specified that applies in case the information element is not signalled</td>
</tr>
<tr>
<td>C</td>
<td>Conditional&lt;br&gt; An information element for which the need is specified by means of conditions included in the tabular format. For each of the conditions, the need is specified in the regular manner</td>
</tr>
<tr>
<td>OP</td>
<td>Optional&lt;br&gt; An information element that is optional to signal. The UE behaviour that applies in case the IE is absent is specified in the procedural specification</td>
</tr>
<tr>
<td>OC</td>
<td>Optional, Continue&lt;br&gt; An information element that is optional to signal. In case the information element is absent, the UE shall continue to use the existing value (and the associated functionality)</td>
</tr>
<tr>
<td>OD</td>
<td>Optional, Discontinue&lt;br&gt; An information element that is optional to signal. In case the information element is absent, the UE shall discontinue/stop to use the existing value (and the associated functionality)</td>
</tr>
</tbody>
</table>

6.2 RRC messages

NOTE: The messages included in this section reflect the current status of the discussions. Additional messages may be included at a later stage.

It is FFS whether or not the following messages should be introduced:

- The use of SUs other than SU-1 i.e. how many SUs will we have and what is the content of each SU
- SECURITY MODE CONTROL (The need to introduce a separate message to establish or modify only the security configuration is FFS)
- UE CAPABILITY INFORMATION COMPACT (The need to introduce a message including a size optimised/reduced version of the UE capabilities is FFS)
- RRC connection release related messages i.e. it is FFS if messages will be introduced specific for this purpose

It is also FFS which messages are used to request and to transfer the UE radio access capabilities

6.2.1 DL INFORMATION TRANSFER

Downlink transfer of dedicated NAS information

Signalling radio bearer: SRB 1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN -> UE

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>FFS</td>
<td>Integer [0..3]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAS dedicated information</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.2.2 HANDBOVER TO E-UTRA COMMAND

Size optimised version of RRC CONNECTION RECONFIGURATION

Signalling radio bearer: N/A

RLC-SAP: N/A (Sent through a different RAT)

Logical channel: N/A (Sent through a different RAT)

Direction: E-UTRAN -> UE

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>MP</td>
<td></td>
<td>Integer [0..3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio resource configuration</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security configuration</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobility control information</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement configuration</td>
<td>FFS</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UE related information</td>
<td>OP</td>
<td></td>
<td></td>
<td>I.e. new C-RNTI, Ue capability request</td>
<td></td>
</tr>
</tbody>
</table>

6.2.3 MEASUREMENT REPORT

Indication of measurement results

Signalling radio bearer: SRB 1 or SRB 2 (FFS)

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: UE -> E-UTRAN

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured results</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.2.4 MOBILITY FROM E-UTRA COMMAND

Message used to order handover or cell change from E-UTRA

Signalling radio bearer: SRB 1 or SRB 2 (FFS)

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: E-UTRAN -> UE

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>MP</td>
<td></td>
<td>Integer [0..3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter RAT target</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>Used to transparently carry message corresponding to specifications from another RAT e.g. a handover</td>
<td></td>
</tr>
<tr>
<td>Inter RAT message</td>
<td>OP</td>
<td></td>
<td>&lt;ref &gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 6.2.5 PAGING

Notification of one or more UEs

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: PCCH

Direction: E-UTRAN -> UE

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Paging records</td>
<td>OP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>BCCH modification info</td>
<td>OP</td>
<td></td>
<td>Enumerate True</td>
<td>Included in case of a BCCH modification</td>
</tr>
</tbody>
</table>

Editors note: The following Paging DRX values have been agreed: 320, 640, 1280, 2560. It is FFS if other values may be signalled. It is also FFS if UE specific DRX value is needed. It is assumed the DRX value NAS information, transparent to RRC (to be confirmed).

### 6.2.6 RRC CONNECTION RECONFIGURATION

Command to establish/ modify/ release an RRC connection, covering UE and network identification, radio bearer configuration, measurement configuration, security configuration,

Signalling radio bearer: SRB 1 or SRB 2 (FFS)

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: E-UTRAN -> UE

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>MP</td>
<td></td>
<td>Integer [0..3]</td>
<td></td>
</tr>
<tr>
<td>Measurement configuration</td>
<td>OP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Mobility control information</td>
<td>OP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>NAS dedicated information</td>
<td>OP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Radio resource configuration</td>
<td>OP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Security configuration</td>
<td>OP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>UE related information</td>
<td>OP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Idle mode mobility control information</td>
<td>FFS</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>Optionally present in the message used to perform connection release. It is FFS if a message is introduced specific for connection release</td>
</tr>
</tbody>
</table>
6.2.7  RRC CONNECTION RECONFIGURATION COMPLETE

Description: confirmation of the (partially) successful completion of a connection reconfiguration

Signalling radio bearer: SRB 1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE -> E-UTRAN

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>MP</td>
<td></td>
<td>Integer [0..3]</td>
<td></td>
</tr>
<tr>
<td>UE radio access capabilities E-UTRA</td>
<td>FFS</td>
<td>&lt;ref&gt;</td>
<td>It is FFS if this message is used to transfer the UE radio access capabilities</td>
<td></td>
</tr>
<tr>
<td>UE radio access capabilities GSM/GERAN</td>
<td>FFS</td>
<td>&lt;ref&gt;</td>
<td>It is FFS if this message is used to transfer the UE radio access capabilities</td>
<td></td>
</tr>
<tr>
<td>UE radio access capabilities UTRA</td>
<td>FFS</td>
<td>&lt;ref&gt;</td>
<td>It is FFS if this message is used to transfer the UE radio access capabilities</td>
<td></td>
</tr>
</tbody>
</table>

Editors note  (Temporary note, just for information i.e. nothing to be captured) Also when this message is used to confirm a successful handover, the same transfer mechanism applies i.e. SRB 1, RLC AM, DCCH. Contention is handled at the MAC (control element including C-RNTI), while PDCP includes regular MAC-I. If segmentation is needed, the eNB may provide an additional allocation e.g. in the sub-frame following Msg3 transmission.

6.2.8  RRC CONNECTION RECONFIGURATION FAILURE

Description: indication of the unsuccessful completion of a connection reconfiguration

Signalling radio bearer: SRB 1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE -> E-UTRAN

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>MP</td>
<td></td>
<td>Integer [0..3]</td>
<td></td>
</tr>
</tbody>
</table>
6.2.9 RRC CONNECTION RE-ESTABLISHMENT

Message used to resolve contention and to establish SRBs

Signalling radio bearer: SRB 0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN -> UE

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>MP</td>
<td></td>
<td>Integer [0..3]</td>
<td></td>
</tr>
<tr>
<td>Initial UE identity</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>C-RNTI used in the cell where radio link failure was detected + physical layer identity of that cell.</td>
</tr>
<tr>
<td>Integrity check info</td>
<td>FFS</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>The shared secret included in the RRC CONNECTION RE-ESTABLISHMENT REQUEST message. Included if used for contention resolution (FFS).</td>
</tr>
<tr>
<td>Radio resource configuration</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>Only SRB 1 configuration information is applicable (modification i.e. delta signalling)</td>
</tr>
</tbody>
</table>

Editors note  For this message specific HARQ operation applies i.e. only UEs for which the Initial UE identity matches provide a HARQ acknowledgment. It is FFS if integrity protection is applied for this message

6.2.10 RRC CONNECTION RE-ESTABLISHMENT COMPLETE

Description: confirmation of the successful completion of a connection re-establishment

Signalling radio bearer: SRB 1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE -> E-UTRAN

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>MP</td>
<td></td>
<td>Integer [0..3]</td>
<td></td>
</tr>
</tbody>
</table>
6.2.11  RRC CONNECTION RE-ESTABLISHMENT REJECT

Description: indication of the rejection of a connection reconfiguration request

Signalling radio bearer: SRB 0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN -> UE

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>MP</td>
<td></td>
<td>Integer [0..3]</td>
<td></td>
</tr>
<tr>
<td>Initial UE identity</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>C-RNTI used in the cell where radio link failure was detected + physical layer identity of that cell. It is FFS if the Integrity check info (Shared secret, based on keys used in the source cell) is also used for contention.</td>
</tr>
</tbody>
</table>

6.2.12  RRC CONNECTION RE-ESTABLISHMENT REQUEST

Description: confirmation of the (partially) successful completion of a connection reconfiguration

Signalling radio bearer: SRB 0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE -> E-UTRAN

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Initial UE identity</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>(C-RNTI used in the cell where radio link failure was detected + physical layer identity of that cell)</td>
</tr>
<tr>
<td>Integrity check info</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>Shared secret, based on keys used in the source cell. It is FFS if this is also used for contention. Details of the IE are FFS</td>
</tr>
</tbody>
</table>

It if FFS if additional information needs to be included e.g. if the UE identity is sufficiently unique to perform contention resolution.
6.2.13 RRC CONNECTION REQUEST

Description: Request to establish an RRC connection, aiming to trigger RRC CONNECTION RECONFIGURATION.

Signalling radio bearer: SRB 0
RLC-SAP: TM
Logical channel: CCCH
Direction: UE -> E-UTRAN

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial UE identity</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td>NOTE 2</td>
<td></td>
</tr>
<tr>
<td>Selected PLMN identity</td>
<td>C</td>
<td>&lt;ref&gt;</td>
<td></td>
<td>NOTE 2</td>
<td></td>
</tr>
<tr>
<td>Establishment cause</td>
<td>FFS</td>
<td>&lt;ref&gt;</td>
<td></td>
<td>NOTE 2</td>
<td></td>
</tr>
</tbody>
</table>

Editors note: The size of the RRC connection request message is fixed. It is FFS whether 72b is the most optimal size value.

Editors note: It has been concluded that there is no need to transfer UE capability info early (i.e. redirection may be performed after the UE context is transferred across S1)

6.2.14 RRC CONNECTION SETUP

Message used to resolve contention and to establish SRBs

Signalling radio bearer: SRB 0
RLC-SAP: TM
Logical channel: CCCH
Direction: E-UTRAN -> UE

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>FFS</td>
<td>&lt;ref&gt;</td>
<td>Integer [0..3]</td>
<td>The need may depend on the use of a response message</td>
<td></td>
</tr>
<tr>
<td>Initial UE identity</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio resource configuration</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td>Only SRB 1 establishment information is applicable</td>
<td></td>
</tr>
</tbody>
</table>

Editors note: For this message specific HARQ operation applies i.e. only UEs for which the Initial UE identity matches provide a HARQ acknowledgment.

6.2.15 RRC STATUS

Indication of a general protocol error

Signalling radio bearer: SRB 1
RLC-SAP: AM
Logical channel: DCCH
Direction: UE -> E-UTRAN

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
</table>

3GPP
<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Transaction identifier</td>
<td>FFS</td>
<td></td>
<td>Integer [0..3]</td>
<td>The need may depend on the use of a response message</td>
</tr>
</tbody>
</table>

### 6.2.16 SCHEDULING UNIT 1

**Description:** broadcast message

- Signalling radio bearer: N/A
- RLC-SAP: TM
- Logical channel: BCCH
- Direction: E-UTRAN -> UE

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIB type 1</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Scheduling block</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
</tbody>
</table>

**Editors note:** In case the physical layer is unable to support a reasonably high number of bits within a limited period, the support of segmentation functionality (either in RRC or RLC) may be revisited.

### 6.2.17 UL INFORMATION TRANSFER

**Description:** UL transfer of dedicated NAS information

- Signalling radio bearer: SRB 1
- RLC-SAP: AM
- Logical channel: DCCH
- Direction: UE -> E-UTRAN

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>NAS dedicated information</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
</tbody>
</table>

### 6.3 RRC information elements

**NOTE:** The information elements included in this section is incomplete. Additional information elements will be included at a later stage. Furthermore, the actual grouping of information is still FFS. Initially, the information elements are described by means of an informal tabular format.

**Editors note:** It would be desirable to apply the following general order also for this section: system information, connection control, security, mobility control, measurements, other.

### 6.3.1 System info related information

Covering parameters only related to the procedures for the acquisition of broadcast information e.g. scheduling but not covering the information related to other functions.
6.3.1.1 SIB mapping information (FFS)
The need to signal the mapping is FFS i.e. alternatively the mapping could be fixed in the specification

6.3.1.2 SU-1 scheduling information

6.3.1.3 SU-n scheduling info
Repetition period
Position of each segment (subsequent segments may be specified relative to first)
It is FFS how segmentation (and/ or concatenation) is performed

6.3.1.4 System frame number

6.3.1.5 System information value tag
There is a value tag common for all SUss other than SU-1 that is carried in the SB

6.3.1a SYSTEM INFORMATION BLOCKS

Editors note  This section was intended for IEs purely related to system information transmission aspects as in the previous. The SIB types may actually disappear once the further details of the SUss are agreed.

It is FFS which SU indicates which sub-frames in the serving cell are used for MBSFN transmission and which ones are only used for non-MBSFN. This information is applicable for UEs in RRC_IDLE and in RRC_CONNECTED.

It is FFS which SU includes the (primary) MCCH configuration e.g. information about when the MCCH is scheduled.

It is FFS if SYSTEM INFORMATION BLOCKS are introduced for the following:
- Dynamic common and shared channel configuration information e.g. UL interference (FFS)
- Pre-defined configuration information
- Information for UE-based or UE-assisted positioning methods

6.3.1a.1 MASTER INFORMATION BLOCK
Most essential information e.g. information required to receive further system information

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell basic physical layer parameters</td>
<td>MP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System frame number</td>
<td>MP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SU-1 scheduling information</td>
<td>FFS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.3.1a.2 SCHEDULING BLOCK
Information about the scheduling of SU messages other than SU-1.

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU-n scheduling info</td>
<td>MP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIB mapping information</td>
<td>FFS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System information value tag</td>
<td>FFS</td>
<td></td>
<td></td>
<td>Common for all Sus other than SU-1</td>
<td></td>
</tr>
</tbody>
</table>
6.3.1a.3  **SYSTEM INFORMATION BLOCK TYPE 1**

Information relevant when evaluating if a UE is allowed to access a cell.

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell access related information</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;PLMN identity list</td>
<td>MP</td>
<td>1..6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;PLMN identity</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Cell reserved for operator use</td>
<td>MP</td>
<td></td>
<td>BOOLEAN</td>
<td>Common for all the PLMNs listed</td>
<td></td>
</tr>
<tr>
<td>&gt;Tracking Area Code</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell identity</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Access barring for all calls</td>
<td>MP</td>
<td></td>
<td>BOOLEAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Access barring for mobile originating calls</td>
<td>MP</td>
<td></td>
<td>BOOLEAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Access probability factor</td>
<td>MP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell reserved for future extension</td>
<td>MP</td>
<td></td>
<td>BOOLEAN</td>
<td>If set to TRUE the UE is only allowed to access the cell if the tracking area identity matches an entry in the ‘white list’ that the UE has stored</td>
<td></td>
</tr>
<tr>
<td>Cell with restricted access</td>
<td>MP</td>
<td></td>
<td>BOOLEAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell selection information</td>
<td>FFS</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>E.g. suitability related parameters</td>
<td></td>
</tr>
<tr>
<td>Frequency band indicator</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.3.1a.4  **SYSTEM INFORMATION BLOCK TYPE 2**

Mainly covering common and shared channel information

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-static common channel configuration information</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>E.g. RACH parameters</td>
<td></td>
</tr>
<tr>
<td>Semi-static shared channel configuration information</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UE timers and constants</td>
<td>MP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency related info</td>
<td>MP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Uplink EARFCN</td>
<td>MD</td>
<td></td>
<td>Integer (0..max)</td>
<td>Default value determined from default TX-RX frequency separation defined in [36.101]</td>
<td></td>
</tr>
<tr>
<td>&gt;Additional spectrum emission requirement</td>
<td>MP</td>
<td></td>
<td>Integer (0..31)</td>
<td>Defined in [36.101]</td>
<td></td>
</tr>
</tbody>
</table>

NOTE 1: UE timers and constants related to functionality for which parameters are provided in another SIB are included in the corresponding SIB.

NOTE 2: It is FFS whether Uplink EARFCN should be moved to SIB 1. This relates to the discussion on UE capability for variable TX-RX frequency separation.

6.3.1a.5  **SYSTEM INFORMATION BLOCK TYPE 3**

Cell re-selection information, mainly related to the serving cell.

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell re-selection info of serving cell</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>(If any)</td>
<td></td>
</tr>
<tr>
<td>Cell re-selection info common for cells e.g.</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.3.1a.6 SYSTEM INFORMATION BLOCK TYPE 4

Information about neighbouring frequencies and cells relevant for cell re-selection, covering both E-UTRA and other RATs. Includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intra-frequency neighbouring cells list</td>
<td>OP</td>
<td>1..n</td>
<td></td>
<td>List of neighbouring cells with specific values for idle mode mobility parameters</td>
<td></td>
</tr>
<tr>
<td>&gt;Cell identity</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell specific re-selection parameters</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-frequency list</td>
<td>OP</td>
<td>1..n</td>
<td></td>
<td>It is FFS if other frequency specific information may be provided</td>
<td></td>
</tr>
<tr>
<td>&gt;Carrier frequency</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td>ARFCN</td>
<td></td>
</tr>
<tr>
<td>&gt;Cell re-selection priority</td>
<td>OP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-frequency neighbouring cells list</td>
<td>OP</td>
<td>1..n</td>
<td></td>
<td>List of neighbouring cells with specific values for idle mode mobility parameters. It is FFS if these cells are signalled per frequency i.e. combining this list with the IE E-UTRA carrier frequency list</td>
<td></td>
</tr>
<tr>
<td>&gt;Carrier frequency</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell identity</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell specific re-selection parameters</td>
<td>OP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSM/ GERAN carrier frequency list</td>
<td>OP</td>
<td>1..n</td>
<td></td>
<td>It is FFS if other frequency specific information may be provided e.g. &quot;NCC permitted&quot; for country borders</td>
<td></td>
</tr>
<tr>
<td>&gt;Carrier frequency</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td>ARFCN of BCCH carriers</td>
<td></td>
</tr>
<tr>
<td>&gt;Qxlevmin</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell re-selection priority</td>
<td>OP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UTRA neighbouring cells list</td>
<td>OP</td>
<td>1..n</td>
<td></td>
<td>List of neighbouring cells with specific values for idle mode mobility parameters</td>
<td></td>
</tr>
<tr>
<td>&gt;Carrier frequency</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell re-selection priority</td>
<td>OP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;UTRA cell identity</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;UTRA cell specific re-selection parameters</td>
<td>MP</td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Editors note: RAN2 has agreed not to provide cell specific re-selection parameters for GSM/GERAN neighbours. To be confirmed by GERAN/RAN4.

Editors note: RAN2 has agreed to indicate each UTRA neighbouring cell. To be confirmed by RAN4.

6.3.2 Connection control related information

Covering e.g. RRC sub-state (FFS), (ptp) RBs (low and high priority SRBs as well as UP including ARQ configuration, allocation of a priority and a prioritised bit rate (PBR) for each RB, HARQ configuration, semi-persistent allocations for the first HARQ transmissions in DL, DRX configuration (initial and intermediate values)

Editors note: A further sub-structuring is desirable i.e. RRC parameters, RLC parameters, MAC parameters, Physical layer parameters

Editors note: The following DRX parameters have been agreed: On-duration, Inactivity timer
Editors note The following Physical layer related parameters have been agreed: Allocated PUCCH resources for SR and CQI reporting.

6.3.2.1 Cell basic physical layer parameters

Physical layer parameters essential for accessing a cell i.e. downlink system bandwidth, Number of transmit antennas, Reference-Signal transmit power

6.3.2.2 Radio resource configuration

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRB list</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Parameters for each SRB</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;PDCP configuration, for SRBs</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;RLC configuration</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;RB mapping information</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAE bearer list</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Parameters for each SAE bearer</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Parameters for each DRB</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDCP configuration, for DRBs</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;RLC configuration</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;RB mapping information</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport channel configuration</td>
<td></td>
<td></td>
<td></td>
<td>Further detailed structure to be specified</td>
</tr>
<tr>
<td>Physical channel configuration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Editors note The above table provides a first overview of the Radio resource configuration parameters.

6.3.2.3 Semi-static common channel configuration information

6.3.2.4 Semi-static shared channel configuration information

6.3.2.5 Carrier frequency

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL EARFCN</td>
<td>MP</td>
<td></td>
<td>Integer(0..max)</td>
<td>Defined in [36.101]</td>
</tr>
<tr>
<td>UL EARFCN</td>
<td>MD</td>
<td></td>
<td>Integer(0..max)</td>
<td>Default value determined from TX-RX frequency specification specified in [36.101]</td>
</tr>
</tbody>
</table>

6.3.2.6 Frequency band indicator

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency band number</td>
<td>MP</td>
<td></td>
<td>Integer(0..63)</td>
<td>Defined in [36.101]</td>
</tr>
</tbody>
</table>
6.3.3 Security related information

6.3.3.1 Security configuration

Covering AS integrity protection (CP) and AS ciphering (CP, UP).

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrity Protection info</td>
<td>MP</td>
<td></td>
<td>MP</td>
<td>&lt;ref&gt;</td>
</tr>
<tr>
<td>&gt;Integrity Protection algorithm</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Ciphering info</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>&gt;Ciphering algorithm</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Key derivation info</td>
<td>FFS</td>
<td></td>
<td></td>
<td>Information used to derive the eNB specific key ($K_{eNB}$)</td>
</tr>
<tr>
<td>&gt;RRC Connection Counter</td>
<td>FFS</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
</tbody>
</table>

Editors note: The above table provides a first overview of the Security configuration parameters.

6.3.4 Connection mode mobility control related information

6.3.4.1 Cell identity

6.3.4.2 Cell re-selection info common for cells e.g. Ssearch

6.3.4.3 Cell re-selection info of serving cell

6.3.4.4 Cell selection information

6.3.4.5 Cell specific re-selection parameters

6.3.4.7 GSM/GERAN cell identity

6.3.4.8 GSM/GERAN cell specific re-selection parameters

6.3.4.9 Inter RAT message

6.3.4.10 Inter RAT target

6.3.4.11 Mobility control information

Including parameters relevant for network controlled mobility to/within E-UTRA e.g. Target cell identity

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target cell identity</td>
<td>MP</td>
<td></td>
<td>MP</td>
<td>&lt;ref&gt;</td>
</tr>
<tr>
<td>Carrier frequency</td>
<td>OC</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Additional spectrum emission requirement</td>
<td>OC</td>
<td></td>
<td>Integer (1..31)</td>
<td>Defined in [36.101]</td>
</tr>
<tr>
<td>Semi-static common channel configuration information</td>
<td>OP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>E.g. RACH parameters. May include dedicated preamble. If so, the split between dedicated and common preambles is also indicated (FFS if</td>
</tr>
<tr>
<td>Name</td>
<td>Need</td>
<td>Multi</td>
<td>Type/ reference</td>
<td>Semantics description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------</td>
<td>-------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>End time dedicated preamble</td>
<td>OP</td>
<td></td>
<td></td>
<td>always included)</td>
</tr>
</tbody>
</table>

Editors note  The UE is not aware if the handover involves a change of eNB i.e. no UE behaviour is defined specific for the intra-eNB and the inter-eNB cases

Editors note  It is FFS if other system information may be provided in the message used to trigger handover e.g. Semi-static shared channel configuration information, UE timers and constants

6.3.4.12 Paging records
Covering the list of paging records

6.3.4.13 PLMN identity
It is FFS if the PLMN identity that is broadcast is an AS or a NAS parameter. In the latter case, this should be specified by means of the IE NAS common information.

6.3.4.14 Selected PLMN identity
Used to select the NAS node when the S-TMSI is not valid in the TA of the cell. Applicable in case of an ‘Initial Direct Transfer’

6.3.4.15 Tracking Area Code
It is FFS if the TA code that is broadcast is an AS or a NAS parameter. In the latter case, this should be specified by means of the IE NAS common information.

6.3.4.16 UTRA cell identity

6.3.4.17 UTRA cell specific re-selection parameters

6.3.5 Measurement related information

6.3.5.1 Measured results
Covering measured results for Intra-frequency, inter-frequency and inter- RAT mobility, Quality, Traffic volume, UE internal and Positioning measurements

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Id</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
</tr>
<tr>
<td>Measured results</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>For the N best cells: cell identity, measured value of the measurement quantity (for the quantities, see 6.3.2)</td>
</tr>
<tr>
<td>Event results</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>Event Id, cell identity</td>
</tr>
</tbody>
</table>

Editors note  The above table provides a first overview of the Measured results reported within Connected mode.

Editors note  It has been agreed to identify intra- and inter-frequency neighbours by their physical layer identity
### 6.3.5.2 Measurement configuration

Covering Intra-frequency, inter-frequency and inter-RAT mobility, Quality, Traffic volume, UE internal and Positioning measurements as well as configuration of measurement gaps.

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intra Frequency measurement configuration</td>
<td>OP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>The configuration parameters as specified below apply for all cells</td>
<td></td>
</tr>
<tr>
<td>&gt;Measurement object</td>
<td>OP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Measurement specifics</td>
<td>OP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Measurement quantity</td>
<td>OP</td>
<td></td>
<td></td>
<td>RSRP, Carrier RSSI, RSRQ. Other quantities may be defined (FFS)</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Reporting quantity</td>
<td>OP</td>
<td></td>
<td></td>
<td>E.g. quantity as in Measurement quantity (above)</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Reporting cell status</td>
<td>OP</td>
<td></td>
<td></td>
<td>E.g. number of cells to report, may be indicated separately for used frequency, non-used frequency and inter RAT</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Reporting criteria, event based</td>
<td>OP</td>
<td></td>
<td></td>
<td>E.g. event identity, triggering condition(s), cells forbidden to trigger, W, hysteresis threshold used, (de-)activation threshold, time to trigger, reporting interval, number of reports, reporting cell status, Use cell individual offset</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Reporting criteria, periodical</td>
<td>OP</td>
<td></td>
<td></td>
<td>E.g. reporting interval, number of reports</td>
<td></td>
</tr>
<tr>
<td>Inter Frequency measurement configuration</td>
<td>OP</td>
<td></td>
<td></td>
<td>Details are similar as for the intra frequency configuration</td>
<td></td>
</tr>
<tr>
<td>&gt; Measurement object</td>
<td>OP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Measurement specifics</td>
<td>OP</td>
<td></td>
<td></td>
<td>As defined above for the intra frequency case</td>
<td></td>
</tr>
<tr>
<td>InterRAT measurement configuration</td>
<td>OP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Measurement object</td>
<td>OP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Measurement specifics</td>
<td>OP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement gap configuration</td>
<td>OP</td>
<td></td>
<td></td>
<td>Start sub-frame number, gap length (unless RAN4 agrees to use one gap length only) and inter-gap distance. Actual signalling details are FFS e.g. use of a reference to a pattern specified by RAN4 Further details regarding the use of measurement gaps and idle periods due to DRX are specified in [6]</td>
<td></td>
</tr>
<tr>
<td>Measurement gap status</td>
<td>OP</td>
<td></td>
<td></td>
<td>Used to start/ stop a measurement gap configuration</td>
<td></td>
</tr>
</tbody>
</table>

Editors note: The above table provides a first overview of the Measurement configuration only covering the measurements for the purpose of network controlled mobility. The introduction of other types of measurements is FFS. This includes Quality measurements (e.g. BLER, SIR), UE internal measurement (e.g. UE Transmitted Power, UTRA Carrier RSSI, UE Rx-Tx time difference), Traffic volume measurement (e.g. RLC buffer payload, Average RLC buffer payload, Variance of RLC buffer payload), UE positioning measurement (Type <e.g. UE assisted, UE based, UE based is preferred but UE assisted is allowed, UE assisted is preferred but UE based is allowed>, Methods <e.g. OTDOA, GPS, OTDOA or GPS, Cell ID>)

Editors note: It has been agreed to use ‘delta signalling’ for the measurement object and the measurement specifics although for the last this will be up to a limited level e.g. the Measurement Type
6.3.5.3 Intra-frequency measurement object

The UE reports all intra-frequency neighbouring cells i.e. not just the ones included in this IE. This IE specifies information applicable for specific intra-frequency neighbouring cells. The IE may also specify information applicable for all intra-frequency neighbouring cells (FFS).

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cells to remove</td>
<td>OP</td>
<td>1..n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell index</td>
<td>FFS</td>
<td></td>
<td></td>
<td>It is FFS if a short index is used to refer to a cell (as in UTRA)</td>
<td></td>
</tr>
<tr>
<td>Cells to modify</td>
<td>MP</td>
<td>1..n</td>
<td></td>
<td>It is FFS if other information may be provided</td>
<td></td>
</tr>
<tr>
<td>&gt;Cell index</td>
<td>FFS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell individual offset</td>
<td>OP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cells to add</td>
<td>MP</td>
<td>1..n</td>
<td></td>
<td>It is FFS if other information may be provided</td>
<td></td>
</tr>
<tr>
<td>&gt;Cell index</td>
<td>FFS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell individual offset</td>
<td>OP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.3.5.4 Intra-frequency measurement reporting criteria

This IE specifies criteria that affect the triggering an intra-frequency measurement event. The intra-frequency measurement are labelled aN with N equal to 1, 2, ...

Event a1: Serving becomes better than absolute threshold

Event a2: Serving becomes worse than absolute threshold

Event a3: Neighbour becomes threshold better than serving

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intra-frequency event list</td>
<td>MP</td>
<td>1..n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Event identity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Threshold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Hysteresis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Time to trigger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Maximum number of reported cells</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reporting interval</td>
<td>OP</td>
<td></td>
<td></td>
<td>If included, the event triggers the UE to perform periodical reporting with the indicated interval</td>
<td></td>
</tr>
</tbody>
</table>

6.3.5.5 Inter-frequency measurement reporting criteria

This IE specifies criteria that affect the triggering an inter-frequency measurement event. The inter-frequency measurement are labelled bN with N equal to 1, 2, ...

Event b1: Neighbour becomes better than absolute threshold

Event b2: Serving becomes worse than absolute threshold AND Neighbour becomes better than another absolute threshold

Event b3: Neighbour becomes threshold better than serving

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-frequency event list</td>
<td>MP</td>
<td>1..n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Event identity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Threshold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Hysteresis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Time to trigger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Need</td>
<td>Multi</td>
<td>Type/ reference</td>
<td>Semantics description</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------</td>
<td>-------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>&gt;Maximum number of reported cells</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reporting interval</td>
<td>OP</td>
<td></td>
<td></td>
<td>If included, the event triggers the UE to perform periodical reporting with the indicated interval</td>
<td></td>
</tr>
</tbody>
</table>

### 6.3.5.6 Inter-RAT measurement reporting criteria

This IE specifies criteria that affect the triggering of an inter-frequency measurement event. The inter-RAT measurement are labelled cN with N equal to 1, 2, ...

**Event c1:** Neighbour becomes better than absolute threshold

**Event c2:** Serving becomes worse than absolute threshold AND Neighbour becomes better than another absolute threshold

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-RAT event list</td>
<td>MP</td>
<td>1..n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Event identity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Threshold</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Hysteresis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Time to trigger</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Maximum number of reported cells</td>
<td>OP</td>
<td></td>
<td></td>
<td>If included, the event triggers the UE to perform periodical reporting with the indicated interval</td>
</tr>
</tbody>
</table>

### 6.3.6 Other information

*Editors note* A further sub-structuring seems needed e.g. NAS information, idle mode mobility control information (possibly better served by a separate group)

#### 6.3.6.1 Establishment cause

#### 6.3.6.2 Initial UE identity

Used by AS for Contention resolution and to select the NAS node

In case of initial access the IE is a choice of S-TMSI, possibly with old TA code (FFS) and a Random value.

In case of connection continuation (following radio link failure), this concerns the C-RNTI used in the cell where radio link failure was detected.

#### 6.3.6.3 Message Type

#### 6.3.6.4 Pre-configuration status information (FFS)

*Editors note* The IE is currently not used in any of the messages

#### 6.3.6.5 Reconfiguration request cause

#### 6.3.6.6 UE identity

Cell specific UE identity (C-RNTI).
6.3.6.7 UE radio access capability request
Covering a means by which E-UTRAN can request the UE to provide UE radio capability information. Applicable in case UE radio capabilities are signalled at AS level.

6.3.6.8 UE radio access capabilities E-UTRA
Covering the E-UTRA capabilities.

6.3.6.9 UE radio access capabilities GSM/GERAN
Covering the GSM/GERAN capabilities.

6.3.6.10 UE radio access capabilities UTRA
Covering UTRA capabilities.

6.3.6.11 UE timers and constants

6.3.6.12 Wait time (FFS)
Editors note  The IE is currently not used in any of the messages

6.3.6.13 NAS common information
Covering common NAS information (broadcast via system information)

NAS common information container, used for NAS broadcast information common for all PLMNs

Editors note  This IE is used e.g. for the periodic location update timer. The IE also includes the TA code if this is considered to be a NAS parameter (FFS) and if it is agreed that all NAS common information is transferred together within SIB type 1 (FFS).

6.3.6.14 NAS dedicated information
Covering UE specific NAS information (transferred transparently via dedicated signalling)

NAS dedicated information container, used in UL and DL

6.3.6.15 NAS integrity check information

6.3.6.16 Idle mode mobility control information
Including parameters relevant for network controlled mobility upon entering RRC_IDLE e.g. target frequency or RAT

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/ reference</th>
<th>Semantics description</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-frequency priority information</td>
<td>OP</td>
<td>1..n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Carrier frequency</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell re-selection priority UE specific</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-RAT priority information</td>
<td>OP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; GSM/ GERAN carrier frequency</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Cell re-selection priority UE specific</td>
<td>MP</td>
<td></td>
<td>&lt;ref&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;UTRAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 6.3.6.17 UE related information

Including parameters relevant for network controlled mobility upon entering RRC_IDLE e.g. target frequency or RAT

<table>
<thead>
<tr>
<th>Name</th>
<th>Need</th>
<th>Multi</th>
<th>Type/reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New UE identity</td>
<td>OP</td>
<td></td>
<td></td>
<td>This IE should be mandatory in case of handover i.e. in case the IE Mobility control information is included</td>
</tr>
<tr>
<td>UE radio access capability request</td>
<td>FFS</td>
<td></td>
<td>&lt;ref&gt;</td>
<td>Used to request the UE to transfer (specific) UE radio capabilities. It is FFS if this message is used to request the UE radio access capabilities</td>
</tr>
</tbody>
</table>

---

### 7 Variables and constants

#### 7.1 UE variables

#### 7.2 Counters

<table>
<thead>
<tr>
<th>Counter</th>
<th>Reset</th>
<th>Incremented</th>
<th>When reaching max value</th>
</tr>
</thead>
<tbody>
<tr>
<td>V300</td>
<td>When initiating the procedure RRC connection establishment</td>
<td>Upon expiry of T300.</td>
<td>When V300 &gt; N300, the UE enters idle mode.</td>
</tr>
<tr>
<td>V301</td>
<td>When initiating the procedure RRC connection re-establishment</td>
<td>Upon expiry of T301.</td>
<td>When V301 &gt; N301, the UE enters idle mode.</td>
</tr>
</tbody>
</table>
7.3 Timers

<table>
<thead>
<tr>
<th>Timer</th>
<th>Start</th>
<th>Stop</th>
<th>At expiry</th>
</tr>
</thead>
<tbody>
<tr>
<td>T300</td>
<td>Transmission of RRC CONNECTION REQUEST</td>
<td>Reception of RRC CONNECTION SETUP with the IE &quot;Initial UE identity&quot; equal to the IE that the UE included in the RRC CONNECTION REQUEST message</td>
<td>Retransmit RRC CONNECTION REQUEST if V300 =&lt; N300, else go to Idle mode</td>
</tr>
<tr>
<td>T301</td>
<td>Transmission of RRC CONNECTION RE-ESTABLISHMENT REQUEST</td>
<td>Reception of RRC CONNECTION RE-ESTABLISHMENT with the IE &quot;Initial UE identity&quot; equal to the IE that the UE included in the RRC CONNECTION RE-ESTABLISHMENT REQUEST message</td>
<td>Retransmit RRC CONNECTION RE-ESTABLISHMENT REQUEST if V301 =&lt; N301, else go to Idle mode</td>
</tr>
<tr>
<td>T310</td>
<td>Upon detecting radio link problems</td>
<td>Upon recovery from radio link problems</td>
<td>Start T311</td>
</tr>
<tr>
<td>T311</td>
<td>Upon T310 expiry</td>
<td>Reception of RRC CONNECTION RE-ESTABLISHMENT or RRC CONNECTION RE-ESTABLISHMENT REJECT with the IE &quot;Initial UE identity&quot; equal to the IE that the UE included in the RRC CONNECTION RE-ESTABLISHMENT REQUEST message</td>
<td>Enter RRC_IDLE</td>
</tr>
<tr>
<td>T320</td>
<td>Upon receiving IE Cell re-selection priority expiry timer</td>
<td>Upon entering RRC_CONNECTED</td>
<td>Specified in [4] i.e. discard the Inter-frequency and inter-RAT priority information</td>
</tr>
</tbody>
</table>

7.4 Constants

<table>
<thead>
<tr>
<th>Constant</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>N300</td>
<td>Maximum number of retransmissions of the RRC CONNECTION REQUEST message</td>
</tr>
<tr>
<td>N301</td>
<td>Maximum number of retransmissions of the RRC CONNECTION RE-ESTABLISHMENT REQUEST message</td>
</tr>
</tbody>
</table>

8 Protocol data unit abstract syntax (with ASN.1)

Including general aspects on the message transfer syntax (structure of encoded RRC messages, use of ECN – if any, messages encoded otherwise)

9 Pre-defined radio configurations (FFS)

May also cover pre-defined configurations of signalling radio bearers, common logical channels e.g. PCCH

Editors note The need of this section is FFS
10 Radio information related interactions between network nodes (FFS)

Covering the transparent transfer of radio information between network nodes i.e. covering both the message and information element specificaton as well as the associated procedural specification e.g. error handling

Editors note The need of this section is FFS

11 Performance requirements (FFS)

This may cover requirements regarding the duration to execute the procedures described in this specification

Editors note These requirements could be specified elsewhere e.g. in a specification dedicated to performance requirements. Hence the need of this section is FFS

UE capability related constraints

The following limitations apply regarding the number of instances of a measurement that the UE is required to support:

FFS (To be specified)

Editors note It has been agreed to define a limitation, the details are FFS
Annex A (informative):
Change history

Editors note The last digit of the version is stepped for intermediate versions not yet endorsed by RAN WG2 i.e. the changes compared to a previous version could be significant. The middle digit in the version is stepped only after RAN2 endorsement.

<table>
<thead>
<tr>
<th>Date</th>
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<tr>
<td>28 June 2007</td>
<td>CC-2</td>
<td>RAN2#58bis</td>
<td>TD-02</td>
<td>R2-072616</td>
<td>Included/changes: RRC CC-2 TD-02 TP on RRC messages and procedures-CC1upd E-UTRA RRC TP on High level parameters for some RRC functional areas (R2-072616) Consistent use of terminology (E-UTRA, RRC connection)</td>
<td>0.0.1</td>
<td>0.0.2</td>
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<tr>
<td>2 July 2007</td>
<td>RAN2#58bis</td>
<td>R2-072975</td>
<td></td>
<td></td>
<td>Same as version 0.2; that was agreed during RAN2#58bis, but now without change marks</td>
<td>0.0.2</td>
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<td>2 July 2007</td>
<td>R2-072977</td>
<td>R2-072978</td>
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<td>Included/changes: E-UTRA RRC TP on System information procedure E-UTRA RRC TP on System Information Blocks</td>
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<td>8 August 2007</td>
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<td>Included/changes: RAN2#58bis agreements on System information scheduling RAN2#58bis agreements on System information change notification RAN2#58bis agreements on Cell barring info Editorial corrections e.g. additional abbreviations</td>
<td>0.1.1</td>
<td>0.1.2</td>
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<td>13 August 2007</td>
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<td>Included/changes: RAN2#58bis agreements on RRC connection establishment according to text proposal agreed during e-mail review</td>
<td>0.1.2</td>
<td>0.1.3</td>
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<td>24 August 2007</td>
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<td>Included/changes: Note clarifying that the use of pre-configuration upon RRC connection establishment is not precluded</td>
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<td>24 August 2007</td>
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<td>Included/changes: RAN2#59 agreements to support Cell change order to GERAN including NACC RAN2#59 agreements on message parameters e.g. on handover, radio link failure, broadcast (some resulting from RAN1 liaisons), DRX Editorial corrections (references)</td>
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<td>16 October 2007</td>
<td>R-074012</td>
<td>R-074014</td>
<td>R2-074015</td>
<td>R2-074016</td>
<td>Included/changes: TP Capturing current status on measurements TP Capturing current status on mobility TP Capturing current status on security TP Progressing the PDUs TP Capturing current status on inter RAT mobility</td>
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<td>22 October 2007</td>
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<td>Included/changes: TP Capturing current status on measurements RRC concatenation of system information BCCH change notification using paging for UE’s in idle and using periodic BCCH monitoring for UE’s in connected Three intra-frequency measurement events and associated parameters Only dedicated measurement control for UE’s in connected, using the RRC connection reconfiguration message Clarification regarding the measurement configuration upon handover Security activation upon transition from idle to connected Removal of FFS on synchronous handover No individual GSM/ GERAN neighbours will be indicated. All individual UTRAN neighbours will be indicated A message for inter RAT mobility from E-UTRA NAS transfer is performed after connection establishment Clarification regarding the use of the three SRBs Introduction of UE capability transfer (removal of FFS)</td>
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<td>Main changes (based on comments e-mail review) Clarification is added that for detected cells, UTRAN indicates</td>
<td>0.3.2</td>
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the carrier frequency
- Additional clarification regarding handling of timers and indication to upper layers in a number of failure cases
- RRC connection reconfiguration request is re-named to RRC connection re-establishment request
- FFS added for the handling of the inter frequency measurements upon inter frequency handover
- Upon connection failure, upper layers are informed prior to moving to idle
- FFS added regarding which message is used to request & transfer UE radio access capabilities

Same as version 0.3.3, but now without change marks

- Main changes (agreements from RAN2#60) Access class barring (persistence value common for AC0-9, originating only option)
- Handover complete message e.g. contention resolution, security
- Radio link failure messages and their contents
- System information change notification
- Configuration and activation of measurement gaps
- Inter-frequency and inter-RAT measurement events
- Handling of inter-frequency measurements upon inter-frequency handover
- Procedure interactions, general model and initial security activation

Main changes (based on comments received during e-mail review)
- Descriptive section on RRC connection control
- Correction regarding Handling of inter-frequency measurements upon inter-frequency handover
- Retry of connection (re-)establishment upon detecting contention
- Correction regarding initial ciphering activation
- Removal of redundant security parameters

Main changes (based on comments received during e-mail review)
- An FFS was added regarding the need to specify the UE behaviour for 3 failure cases (i.e. in 5.2.4.4, 5.2.5.3 and 5.3.2.2)

Same as 0.5.0

Change history

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<td>12/2007</td>
<td>RP-38</td>
<td>RP-070920</td>
<td>-</td>
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<td>Approved at TSG-RAN #38 and placed under Change Control</td>
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