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Technical Specification

**3rd Generation Partnership Project;
Technical Specification Group Radio Access Network;
Evolved Universal Terrestrial Radio Access (E-UTRA)
Radio Resource Control (RRC);
Protocol specification
(Release 8)**



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Foreword

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

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- 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-E-UTRAN radio interface.

The scope of the present document also includes:

- 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".

[2] 3GPP TS nn.nnn: "Radio Interface Protocol Architecture".

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 ".

[4] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); "UE Procedures in Idle Mode".

[5] 3GPP TS 36.306 "Evolved Universal Terrestrial Radio Access (E-UTRA); "UE Radio Access Capabilities".

[6] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA); "Medium Access Control (MAC) protocol specification".

[7] 3GPP TS 36.322: "Evolved Universal Terrestrial Radio Access (E-UTRA); "Radio Link Control (RLC) protocol specification".

[8] 3GPP TS 36.323: "Evolved Universal Terrestrial Radio Access (E-UTRA); "Packet Data Convergence Protocol (PDCP) Specification".

[9] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRAN); Overall description; Stage 2".

[10] 3GPP TS 22.011: " Service accessibility".

[11] 3GPP TS 23.122: "Non-Access-Stratum (NAS) functions related to Mobile Station (MS) in idle mode".

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].

1xRTT	CDMA2000 1x Radio Transmission Technology
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
CSG	Closed Subscriber Group
DCCH	Dedicated Control Channel
DRB	(user) Data Radio Bearer
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
EPC	Enhanced Packet Core
EPS	Enhanced Packet System
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
HRPD	CDMA2000 High Rate Packet Data
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
PTP	Point-to-Point
QoS	Quality of Service
RACH	Random Access CHannel
RA-RNTI	Random Access RNTI
RAT	Radio Access Technology
RB	Radio Bearer
RLC	Radio Link Control
RNTI	Radio Network Temporary Identifier
RRC	Radio Resource Control
RSCP	Received Signal Code Power
RSRP	Reference Signal Received Power
RSSI	Received Signal Strength Indicator
SAE	System Architecture Evolution
SAP	Service Access Point
SI	Scheduling Information
SIB	System Information Block
SI-RNTI	Scheduling Information Change RNTI
SI-RNTI	Scheduling Information RNTI
SRB	Signalling Radio Bearer
S-TMSI	SAE Temporary Mobile Station Identifier
TA	Tracking Area
TDD	Time Division Duplex
TM	Transparent Mode
UE	User Equipment
UICC	Universal Integrated Circuit Card
UL	Uplink
UM	Unacknowledged Mode
UL-SCH	Uplink Shared Channel
UP	User Plane
UTRAN	Universal Terrestrial Radio Access Network

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 neighbouring cell measurements and cell (re-)selection;
 - Acquires system information.
- **RRC_CONNECTED:**
 - Transfer of unicast data to/from UE, transfer of broadcast/ multicast data to 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 network assistance (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 and measurement reporting;
 - 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.

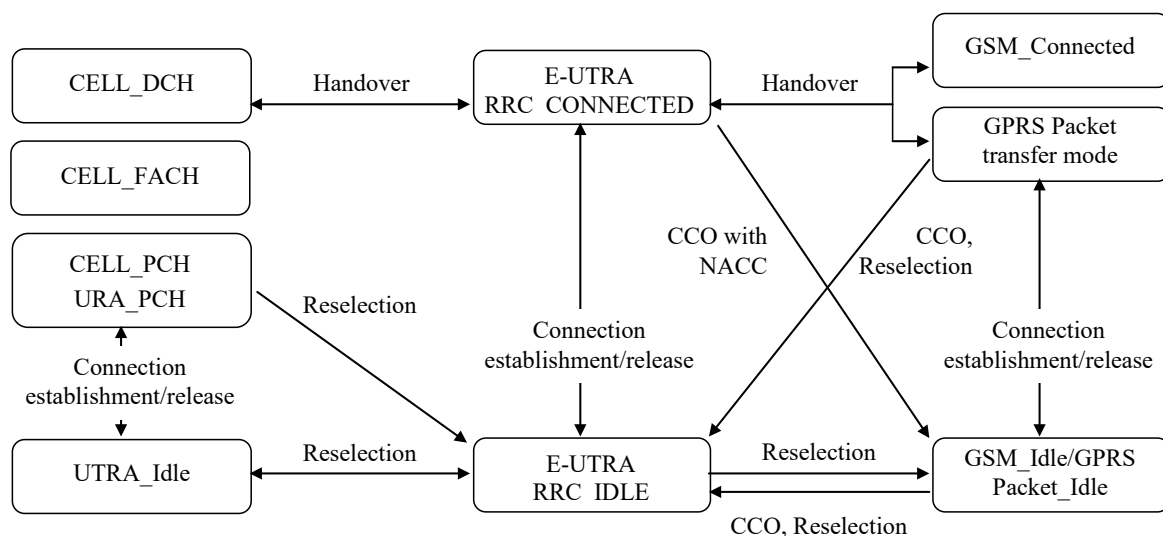


Figure 4.2.1-1: E-UTRA states and inter RAT mobility procedures, 3GPP

The following figure illustrates the mobility support between E-UTRAN, CDMA2000 1xRTT and CDMA2000 HRPD. The details of the CDMA2000 state models are out of the scope of this specification.

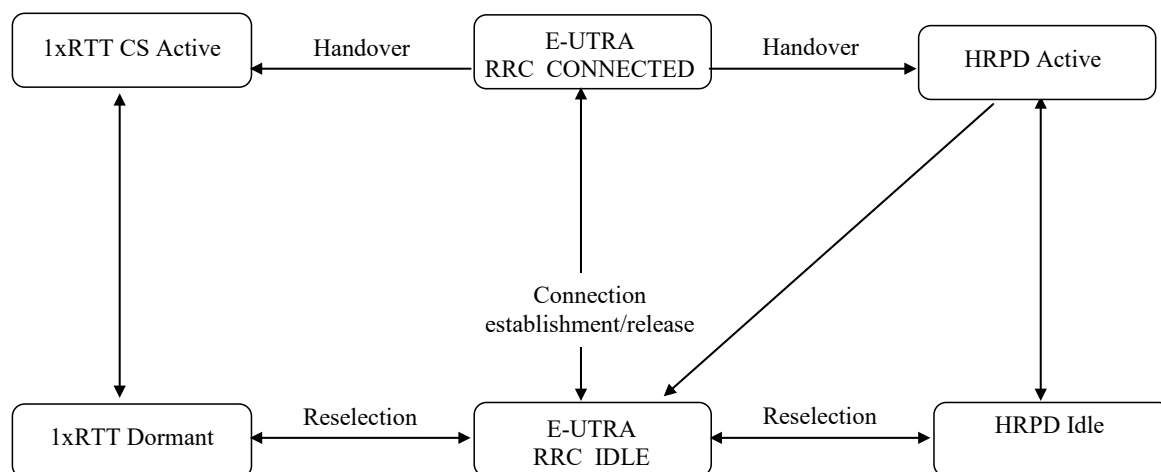


Figure 4.2.1-2: Mobility procedures between E-UTRAN and CDMA2000

Editor's note: In Fig. 4.2.1-2, the procedure name is missing for some transitions. Terminology to be added is FFS.

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-UTRAN and non-3GPP systems other than CDMA2000 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. All RRC messages, including those containing a NAS or a non-3GPP message, are integrity protected and ciphered by PDCP. NAS independently applies integrity protection and ciphering to the NAS messages.

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.

Editor's note: It seems that NAS will support duplication detection for both UL & DL, in which case there is no need for AS 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:
 - Including NAS common information;
 - Information applicable for UEs in RRC_IDLE, e.g. cell (re-)selection parameters, neighbouring cell information and information (also) applicable for UEs in RRC_CONNECTED, e.g. common channel configuration information.
- RRC connection control:
 - Paging;
 - Establishment/ modification/ release of RRC connection, including e.g. assignment/ modification of UE identity (C-RNTI), establishment/ modification/ release of SRB1 and SRB2, access class barring;
 - Initial security activation, i.e. initial configuration of AS integrity protection (CP) and AS ciphering (CP, UP);
 - RRC connection mobility including e.g. intra-frequency and inter-frequency handover, associated security handling, i.e. key and/ or algorithm change, specification of RRC context information transferred between network nodes;
 - Establishment/ modification/ release of (ptp) RBs carrying user data (DRBs);
 - Radio configuration control including e.g. assignment/ modification of ARQ configuration, HARQ configuration, DRX configuration;
 - QoS control including assignment/ modification of semi-persistent configuration information for DL and UL, 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;
 - Recovery from radio link failure;
- Inter-RAT mobility including e.g. security activation, transfer of RRC context information;
- 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.
- Other functions including e.g. transfer of dedicated NAS information and non-3GPP dedicated information, transfer of UE radio access capability information, support for E-UTRAN sharing (multiple PLMN identities);

- Multicast/ broadcast:
 - Notification of service/ session start;
 - Indication of available services;
 - Establishment/ modification/ release of ptm RBs.
- Generic protocol error handling;
- Support of self-configuration and self-optimisation;

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

5 Procedures

5.1 General

5.1.1 Introduction

The procedural requirements are structured according to the main functional areas: system information (5.2), connection management (5.3), inter-RAT mobility (5.4), measurements (5.5). In addition there is a section other (5.6) that covers e.g. NAS dedicated information transfer, UE capability transfer.

5.1.2 General requirements

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: E-UTRAN may initiate a subsequent procedure prior to receiving the UEs response of a previously initiated procedure.

Editor's 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

Editor's note: The UE can only initiate the UL information transfer procedure while in RRC_CONNECTED, i.e. this does not include the transient states while the UE is waiting for a response to connection request or a connection re-establishment request.

Editor's note: The UE continuously ongoing actions in idle and connected (i.e. normative versions of the statements in 4.2.1) are specified within the respective sections, e.g. system information, paging (36.304), measurements. Same applies for the actions upon state transitions.

To be completed

5.2 System information

5.2.1 Introduction

5.2.1.1 General

SYSTEM INFORMATION (SI) is an RRC message carrying a number of System Information Blocks (SIBs) that have the same scheduling requirements (i.e. periodicity). There may be more than one SI message transmitted with the same 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 SIB type 1 containing the scheduling information that mainly indicates when the SI messages are

transmitted, i.e. start times. SYSTEM INFORMATION MASTER (SI-M) and SYSTEM INFORMATION 1 (SI-1) are special versions of an SI message only carrying a single SIB, namely the MIB and SIB type 1 respectively. The SI-M message is carried on BCH while all other SI messages are carried on DL-SCH.

5.2.1.2 Scheduling

Both the SI-M and SI-1 use a fixed schedule with a periodicity of 40 and 80 ms respectively. The first transmission of the SI-M is scheduled in radio frames for which the $\text{SFN} \bmod 4 = 0$. SI-1 is scheduled in radio frames for which the $\text{SFN} \bmod 8 = 0$. Moreover, SI-1 is scheduled in sub-frame #5.

The scheduling of the SI messages other than SI-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 SI messages from the PDCCH. PDCCH does not indicate which SI message is scheduled i.e. a single SI-RNTI is used. For these other SI messages additional scheduling information (indicating starting times) is provided in the SI-1 message.

Each SI message is transmitted in a periodically occurring (time domain) window, having a defined semi-static starting point and length. The SI-windows are non-overlapping. The size of all SI-windows is the same. Further details of the scheduling information are FFS, e.g. whether the window size is configurable, use of a (configurable) gap between SIs.

A SIB is included in a single SI message. The mapping of SIBs on to SI messages is flexible; it is configured in the SI-1 message.

Editor's 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.

Editor's 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.

5.2.1.3 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. SYSTEM INFORMATION messages 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 $\text{SFN} \bmod N$. 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 5.2.1.4-1, in which different colours indicate different system information. Upon receiving a change notification, the UE knows that the current system information is valid until the next modification period boundary. After this boundary, the UE acquires the new system information. There is a (short) period during which the UE does not have valid system information.

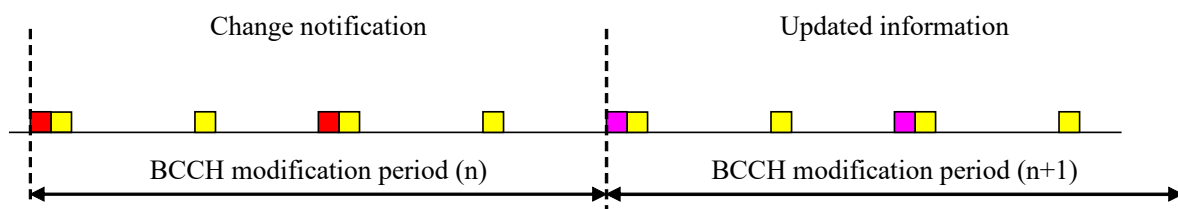


Figure 5.2.1.3-1: Change of system Information

The PAGING message is used to inform UEs in RRC_IDLE about a system information 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 SystemInformation -Change-RNTI (SC-RNTI) on PDCCH, 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 SYSTEM INFORMATION message has changed. The change notification mechanism is not used for the system information using an expiry timer (intended for the more dynamic system information).

The SI-1 message includes a value tag that indicates if a change has occurred in system information other than the SI-M and SI-1. UEs may use this value tag e.g. upon return from out of coverage, to verify if the previously acquired system information is still valid. The UE considers system information to be valid for at most 6 hours from the moment it was received.

Editor's 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.

5.2.2 System information acquisition

5.2.2.1 General

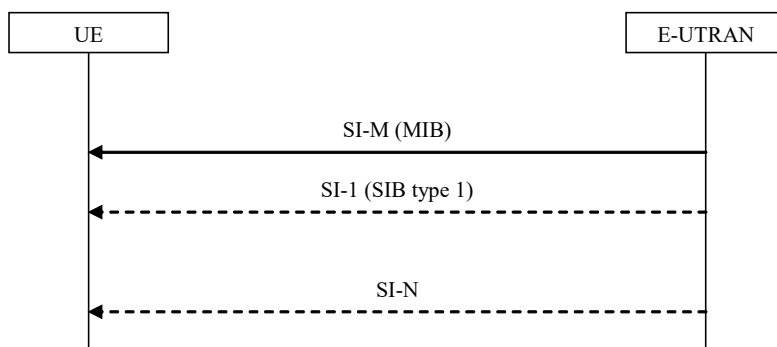


Figure 5.2.2.1-1: System information acquisition, normal

The UE applies the system information 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.

5.2.2.2 Initiation

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

Editor's note: It is assumed that upon handover and upon entering E-UTRA, the system information applicable for UEs in RRC_CONNECTED is provided via dedicated signalling (handover command). Further details are FFS.

5.2.2.3 System information to be acquired by the UE

Editor's note: This procedure only covers the basic requirements, e.g. the acquisition of the MIB and the (scheduling information within) SI-1. Furthermore, this specification will specify which SIBs a UE in RRC_IDLE as well as a UE in RRC_CONNECTED shall acquire. In addition, the RRC connection establishment 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 SIs.

The UE shall

- 1> acquire the SI-M and the SI-1 messages;
- 1> acquire all SI messages that were received more than 6 hours ago;
- 1> if the UE enters a cell for which it has no SI messages stored from a previous access, or if the UE re-enters a cell for which the stored SI messages are outdated i.e. the value tag included in SI-1 message is different from the stored value:
 - 2> acquire all applicable SI messages.

The UE may apply the received SIBs immediately i.e. the UE does not need to delay using a SIB until all SI messages have been received.

Editor's 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: SI RNTI, 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.

Editor's 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.

Editor's note: It may be desirable to include a table similar to table 8.1.1 in 25.331.

5.2.2.4 Actions upon reception of the SI-M message

Upon receiving the SI-M message the UE shall:

1>

To be completed

Editor's note: The aim is to specify only a minimum of specific behaviour in these sections

5.2.2.5 Actions upon reception of the SI-1 message

Upon receiving the SI-1 message the UE shall:

1>

To be completed

Editor's note: The aim is to specify only a minimum of specific behaviour in these sections i.e. only the behaviour related to system information reception e.g. scheduling information, value tags, etc.

5.2.2.6 Actions upon reception of SI messages other than SI-1

Upon receiving an SI message other than SI-1 the UE shall:

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

To be completed

Editor's note: The following sections aim to cover specific actions e.g. the triggering of a procedure upon receipt of an IE within a SIB. UE handling related to IEs may also be included in the procedures using the information e.g. the connection establishment includes actions related to the access class barring info. For some SIBs a section may not be needed.

5.2.2.7 Actions upon reception of SIB type 1

Upon receiving SIB type 1, the UE shall:

1> TBS

5.2.2.8 Actions upon reception of SIB type 2

Upon receiving SIB type 2, the UE shall:

1> TBS

5.2.2.9 Actions upon reception of SIB type 3

Upon receiving SIB type 3, the UE shall:

1> TBS

5.2.2.10 Actions upon reception of SIB type 4

Upon receiving SIB type 4, the UE shall:

1> TBS

5.2.2.11 Actions upon reception of SIB type 5

Upon receiving SIB type 5, the UE shall:

1> TBS

5.2.2.12 Actions upon reception of SIB type 6

Upon receiving SIB type 6, the UE shall:

1> TBS

5.2.2.13 Actions upon reception of SIB type 7

Upon receiving SIB type 7, the UE shall:

1> TBS

5.2.2.14 Actions upon reception of SIB type 8

Upon receiving SIB type 8, the UE shall:

1> if the IE “HRPD Pre-Registration Information” is included:

2> if the IE “HRPD Pre-Registration Allowed” is set to TRUE:

3> if the UE has no Pre-Registration Zone ID stored or if the stored Pre-Registration Zone ID does not match the IE “HRPD Pre-Registration Zone ID” or any entry in the IE “HRPD Secondary Pre-Registration Zone ID List”:

4> store the IE “HRPD Pre-Registration Zone ID”;

4> notify CDMA upper layers to perform pre-registration;

Editor's note The IEs mentioned in the previous still need to be added to SIB type 8

1> TBC

5.2.3 Acquisition of an SI message

When acquiring an SI message, the UE shall:

1> determine the start of the window for the concerned SI message as follows:

2> the radio frame is determined by $\text{SFN mod } N$, where N is the periodicity applicable for the concerned SI message;

2> the sub-frame is determined by adding the window size (and possibly a gap, FFS) of all SIs, transmitted prior to the concerned SI message at the concerned transmission occasion, to the starting sub-frame for SI-1;

NOTE The starting sub-frame may be in a radio frame following the one initially calculated.

1> start reception (including decoding the PDCCH) from the start of the SI-window;

To be completed

Editor's note: A more precise specification (i.e. real calculation with reference to IEs) should be added when the details of all related parameters have been concluded.

5.3 Connection control

5.3.1 Introduction

5.3.1.1 RRC connection control

RRC connection establishment involves the establishment of SRB1. E-UTRAN completes RRC 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 initial security activation procedure. The RRC messages to activate security (command and response) are integrity protected, while ciphering is started only after completion of the procedure. That is, 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 EPS bearers. In fact, E-UTRAN may initiate this bearer establishment procedure prior to receiving the confirmation of the security activation from the UE. In any case, E-UTRAN will apply both ciphering and integrity protection for the RRC connection reconfiguration messages used to establish the EPS bearers. When using this 'early' EPS 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 SRB 2 and for radio bearers carrying user data (DRBs), security is always activated from the start, i.e. the E-UTRAN does not establish these bearers prior to activating security.

5.3.1.2 Security

AS security comprises of the integrity protection of RRC signalling as well as the encryption of RRC signalling and user data. RRC handles the integrity protection configuration, which is common for signalling radio bearers SRB1 and SRB2. 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 (SRB1, SRB2) as well as for those carrying user data (DRBs).

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 1 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

NOTE 2 Lower layers discard RRC messages for which the integrity check has failed

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_{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.

The integrity and ciphering algorithms can only be changed upon handover. The AS keys (both the base-key and the derived-keys) change upon every handover. An intra cell handover *based* procedure may be used to change the keys in RRC_CONNECTED.

Editor's note: For key change, no need for any changes compared to normal handover procedure have been identified so far.

For each radio bearer an independent counter (COUNT) is used as input for ciphering. For SRBs, the same COUNT is used as input for integrity protection. 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. In order to avoid such re-use, the eNB may e.g. use different RB identities for successive RB establishments, trigger an intra cell handover or an RRC_CONNECTED to RRC_IDLE to RRC_CONNECTED transition.

NOTE 2 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.

5.3.1.3 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. 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.

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 successful 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].

Editor's 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 handover failure, the UE attempts to resume the RRC connection either in the source or in another cell using the RRC re-establishment procedure (see RL failure). This connection resumption succeeds only if the accessed cell is prepared, i.e. concerns a cell of the source eNB or of another eNB towards which handover preparation has been performed.

5.3.2 Paging

5.3.2.1 General



Figure 5.3.2.1-1: Paging

The purpose of this procedure is to transmit paging information to a UE in RRC_IDLE and/ or to inform UEs in RRC_IDLE about a system information change. The paging information is provided to upper layers, which in response may initiate RRC connection establishment, e.g. to receive an incoming call.

5.3.2.2 Initiation

E-UTRAN initiates the paging procedure by transmitting the PAGING message at the UE's paging occasion as specified in TS 36.304 [4]. E-UTRAN may identify multiple UEs within a PAGING message.

5.3.2.3 Reception of the PAGING message by the UE

Upon receiving the PAGING message, the UE shall:

- 1> For each of the Paging records included in the PAGING message:
 - 2> If the 'UE identity' included in the Paging record matches one of the UE identities allocated by upper layers:
 - 3> forward the IE "UE identity" and the IE "Paging cause" to the upper layers.
- 1> If the 'System information modification info' is included:
 - 2> re-acquire the system information using the system information acquisition procedure as specified in 5.2.2.

5.3.3 RRC connection establishment

5.3.3.1 General

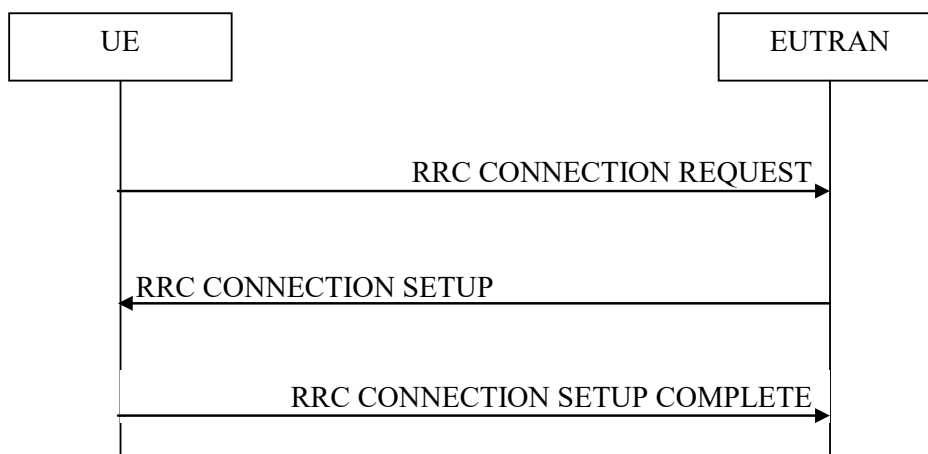


Figure 5.3.3.1-1: RRC connection establishment, successful

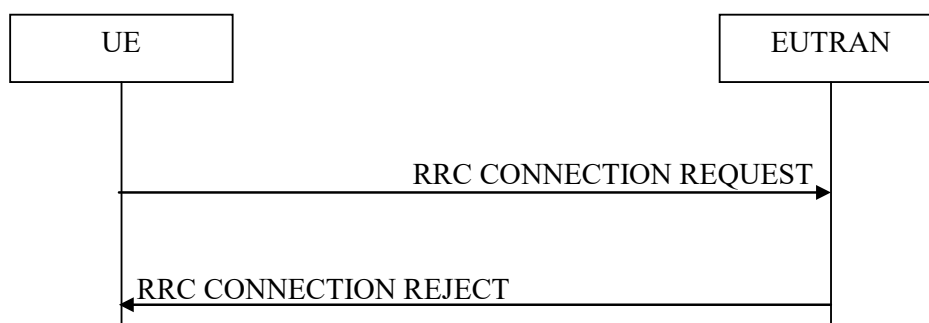


Figure 5.3.3.1-2: RRC connection establishment, network reject

The purpose of this procedure is to establish an RRC connection. RRC connection establishment involves SRB1 establishment. The procedure is also used to transfer the initial NAS dedicated information/ message from the UE to E-UTRAN.

E-UTRAN applies the procedure as follows:

- to establish SRB1 only.

5.3.3.2 Initiation

The UE initiates the procedure when upper layers request establishment of a signalling connection while the UE is in RRC_IDLE state.

Upon initiation of the procedure, the UE shall:

- 1> if System Information Block Type 2 includes the IE Access barring related information:
 - 2> if the UE is establishing the RRC connection to perform an emergency call:
 - 3> if the IE 'Access class barring' for AC 10 is set to 'not barred':
 - 4> consider the Access barring check to be successful;
 - 3> else if the UE has one or more Access Classes, as stored on the USIM, with a value in the range 11..15 and
 - 3> for at least one of these Access Classes the IE 'Access class barring' is set to 'not barred' and, according to TS 22.011[10] and TS 23.122 [11], it is valid for the UE to use this Access Class:
 - 4> consider the Access barring check to be successful;
 - 3> else:
 - 4> consider the Access barring check to be unsuccessful;
 - 2> else
 - 3> if the UE has one or more Access Classes, as stored on the USIM, with a value in the range 11..15 and
 - 3> for at least one of these Access Classes the IE 'Access class barring' is set to 'not barred' and, according to TS 22.011[10] and TS 23.122 [11], it is valid for the UE to use this Access Class:
 - 4> consider the Access barring check to be successful;
 - 3> else if the Access barring for mobile terminating calls in SIB type 2' is set to FALSE AND the UE is establishing the RRC connection to perform a mobile terminating call:
 - 4> consider the Access barring check to be successful;
 - 3> else:

NOTE: ACs 12, 13, 14 are only valid for use in the home country and ACs 11, 15 are only valid for use in the HPLMN/ EHPLMN

- 4> consider the Access barring check to be successful;
- 3> else:
 - 4> consider the Access barring check to be unsuccessful;

2> else

- 3> if the UE has one or more Access Classes, as stored on the USIM, with a value in the range 11..15 and
 - 3> for at least one of these Access Classes the IE 'Access class barring' is set to 'not barred' and, according to TS 22.011[10] and TS 23.122 [11], it is valid for the UE to use this Access Class:
 - 4> consider the Access barring check to be successful;
 - 3> else if the Access barring for mobile terminating calls in SIB type 2' is set to FALSE AND the UE is establishing the RRC connection to perform a mobile terminating call:
 - 4> consider the Access barring check to be successful;
 - 3> else:

- 4> if T303 is running:
 - 5> consider the Access barring check to be unsuccessful;
- 4> else:
 - 5> draw a random number, "rand", uniformly distributed in the range: $0 \leq \text{rand} < 1$
 - 5> if 'rand' is lower than the value indicated by the IE Access probability factor included in SIB type 2:
 - 6> consider the Access barring check to be successful;
 - 5> else:
 - 6> consider the Access barring check to be unsuccessful;
- 1> else:
 - 2> consider the Access barring check to be successful;
- 1> If the access barring check, as specified above, is successful:
 - 2> Stop acting on PAGING messages;
 - 2> Set the variable UE_CONTENTION_RESOLUTION_IDENTITY as follows:
 - 3> if upper layers provide an S-TMSI:
 - 4> set the "Identity type" to 'S-TMSI';
 - 4> set the "S-TMSI" to the value received from upper layers;
 - 3> else
 - 4> set the "Identity type" to 'Random number';
 - 4> draw a random value and set the "Random number" to the selected value;

Editor's note: Exact coding of the variable UE_CONTENTION_RESOLUTION_IDENTITY is FFS.

NOTE 1 Upper layers provide the S-TMSI if the UE is registered in the TA of the current cell.

- 2> Set counter V300 to 1; and
- 2> Initiate transmission of the RRC CONNECTION REQUEST message in accordance with 5.3.3.3;
- 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 system information acquisition upon re-selection.

- 1> else:
 - 2> if the UE is not establishing the RRC connection to perform an emergency call:
 - 3> if T303 is not running:
 - 4> draw a random number rand that is uniformly distributed in the range $0 < \text{rand} < 1$;
 - 4> Start timer T303 with a timer value calculated as follows, using the IE Access class barring time included in SIB type 2:
$$T303 = (1 - \alpha + 2\alpha * \text{rand}) * \text{Access class barring time}$$

Editor's note: In the above formula, α is constant with a value to be specified in the standard. Exact value is FFS (a value of 0.3 has been suggested).

2> inform upper layers about the failure to establish the RRC connection, upon which the procedure ends.

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

5.3.3.3 Actions related to transmission of RRC CONNECTION REQUEST message

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

1> set the IE "Initial UE identity" to the value of variable UE_CONTENTION_RESOLUTION_IDENTITY;

1> Set the IE "Establishment cause" in accordance with the information received from upper layers;

NOTE 1 Upper layers provide the S-TMSI if the UE is registered in the TA of the current cell.

The UE shall submit the RRC CONNECTION REQUEST message to lower layers for transmission with indication of variable UE_CONTENTION_RESOLUTION_IDENTITY.

The UE shall continue cell re-selection related measurements as well as cell re-selection evaluation. If the conditions for cell re-selection are fulfilled, the UE shall perform cell re-selection as specified in 5.3.3.7 at the latest upon detecting a condition for triggering a RRC connection request retry e.g. due to T300 expiry or upon losing contention.

5.3.3.4 Contention resolution

Upon receiving a response message from E-UTRAN, the UE shall:

1> stop timer T300;

1> If lower layer indicates that contention resolution is successful:

2> perform the action as specified in 5.3.3.5 or 5.3.3.9 based on received RRC message type;

1> else (contention resolution failure is informed from lower layer):

2> perform the RRC connection request retry procedure as specified in 5.3.3.8.

5.3.3.5 Reception of the RRC CONNECTION SETUP by the UE

The UE shall:

1> establish SRB1 in accordance with the received IE "Radio resource configuration" and as specified in 5.3.9;

NOTE 1: The details of how the signalling radio bearer configuration is signalled are FFS, i.e. the use of a default RLC configuration has been agreed for SRB1. Use of default configurations for other parts of the Radio resource configuration is not precluded.

1> If stored, discard the Inter-frequency priority information and the Inter-RAT priority information provided via dedicated signalling using the IE "Idle mode mobility control information";

1> stop timer T303, if running;

1> stop timer T320, if running;

1> set the C-RNTI to the value of the Temporary C-RNTI received in the Random Access Response message, see TS 36.321 [6];

1> enter RRC_CONNECTED state;

1> stop the cell re-selection procedure;

1> set the content of RRC CONNECTION SETUP COMPLETE message as follows:

2> set the IE "Selected PLMN identity" to the PLMN selected by upper layers [TS 23.122, TS 24.008] from the PLMNs included in the IE "Multiple PLMN list" broadcast in the cell where the RRC connection was established (it is FFS when the UE shall include this IE, possibly on whether the UE has a valid S-TMSI);

- 2> if upper layers provide the 'Registered MME', set the "Registered MME" to the value received from upper layers;
- 2> set the IE "NAS dedicated information" to include the information received from upper layers;
- 2> submit the RRC CONNECTION SETUP COMPLETE message to lower layers for transmission, upon which the procedure ends.

5.3.3.6 T300 or T302 timeout

The UE shall:

- 1> if timer T300 or timer T302 expires:
 - 2> perform the RRC connection request retry procedure as specified in 5.3.3.8;

5.3.3.7 Cell re-selection

If cell reselection occurs during RRC connection establishment, the UE shall:

- 1> stop timer T300, if running;
- 1> stop timer T302, if running;
- 1> stop timer T303, if running;
- 1> resume acting on PAGING messages;
- 1> inform upper layers about the failure to establish the RRC connection, upon which the procedure ends.

5.3.3.8 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 5.3.3.3;
 - 2> increment counter V300;
 - 2> restart timer T300 when lower layers indicate success to transmit the message.
- 1> else:
 - 2> resume acting on PAGING messages; 2> inform upper layers about the failure to establish the RRC connection.

Editor's note For MAC it has been agreed that a back off mechanism should be applied whenever a retry of the RACH access is initiated (see agreements on R2-080221). This also applies to retries initiated by RRC e.g. upon to losing contention or lack of response. Further details on how the back off are specified (in MAC and/ or RRC) are FFS.

5.3.3.9 Reception of the RRC CONNECTION REJECT by the UE

The UE shall:

- 1> start timer T302, with a timer value set according to the value of the IE "Wait time";

Editor's note: The need for a definite reject (i.e. no AS- retries, UE immediately enters RRC_IDLE) is FFS. Such a definite reject could either be modelled by a wait time of '0' (as in UTRA), or by absence of the IE 'Wait time'.

5.3.4 Initial security activation

5.3.4.1 General

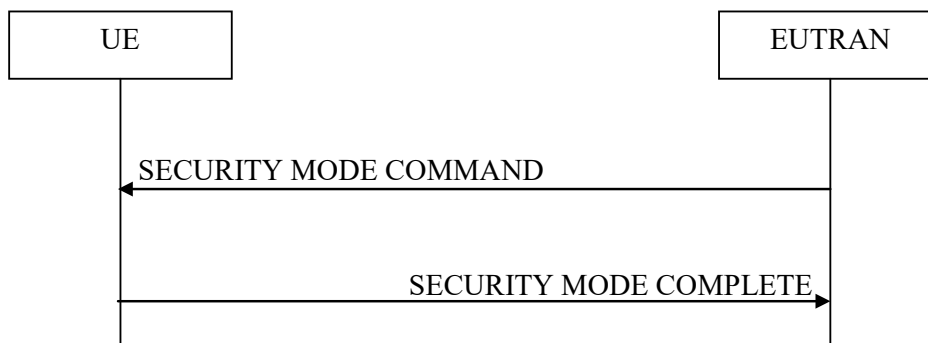


Figure 5.3.4.1-1: Security mode command, successful

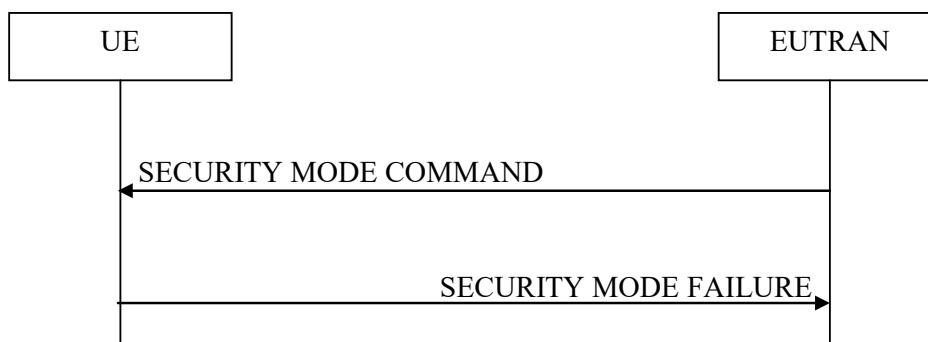


Figure 5.3.4.1-2: Security mode command, failure

The purpose of this procedure is to activate AS security upon RRC connection establishment.

5.3.4.2 Initiation

E-UTRAN initiates the security mode command procedure to a UE in RRC_CONNECTED. Moreover, E-UTRAN applies the procedure as follows:

- when only SRB1 is established, i.e. prior to establishment of SRB2 and/ or DRBs.

5.3.4.3 Reception of the SECURITY MODE COMMAND by the UE

The UE shall:

- 1> request lower layers to verify the integrity protection of the SECURITY MODE COMMAND message;
- 1> If the SECURITY MODE COMMAND message passes the integrity protection check and the UE successfully completes the initial setup of the security configuration:

Editor's note: The conditions for success/ failure need to be clarified.

- 2> set the contents of SECURITY MODE COMPLETE message as follows:

3> Tbs

- 2> configure lower layers to apply integrity protection using the indicated algorithm immediately, i.e. integrity protection shall be applied to all subsequent messages received and sent by the UE, including the SECURITY MODE COMPLETE message;

- 2> configure lower layers to apply ciphering using the indicated algorithm after completing the procedure, i.e. ciphering shall be applied to all subsequent messages received and sent by the UE, except for the SECURITY MODE COMPLETE message which is sent unciphered;
 - 2> submit the SECURITY MODE COMPLETE message to lower layers for transmission, upon which the procedure ends.
- 1> else:
- 2> set the contents of SECURITY MODE FAILURE message as follows:
 - 3> Tbs
 - 2> continue using the configuration used prior to the reception of the SECURITY MODE COMMAND message, i.e. neither apply integrity protection nor ciphering.
 - 2> submit the SECURITY MODE FAILURE message to lower layers for transmission, upon which the procedure ends.

5.3.5 RRC connection reconfiguration

5.3.5.1 General

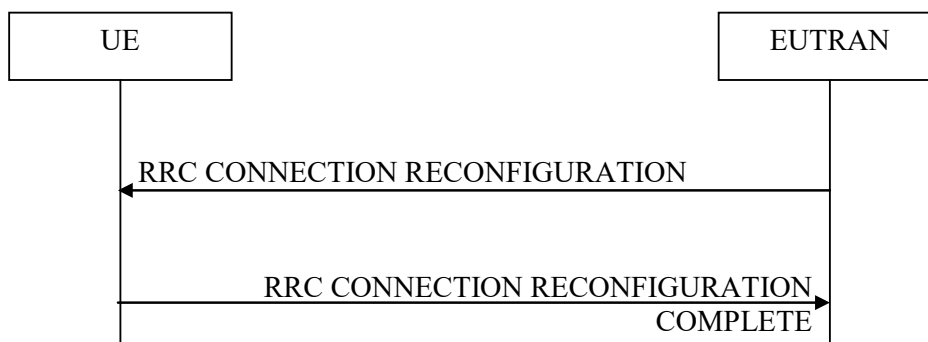


Figure 5.3.5.1-1: RRC connection reconfiguration, successful

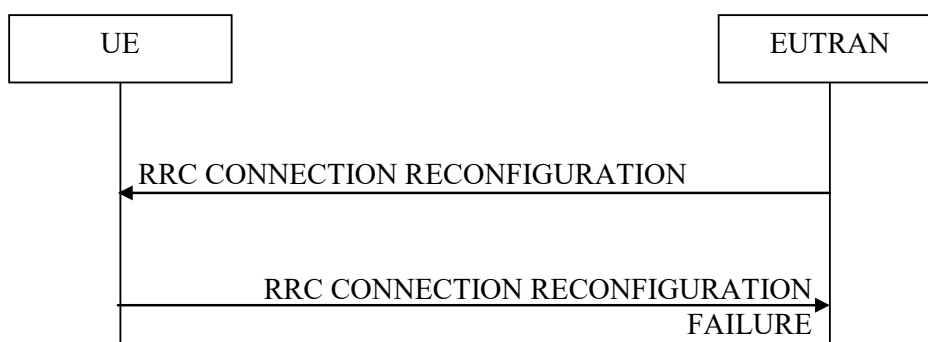


Figure 5.3.5.1-2: RRC connection reconfiguration, failure

The purpose of this procedure is to modify an RRC connection, e.g. to establish/ modify/ release RBs, to perform handover, to configure/ modify measurements. As part of the procedure, NAS dedicated information may be transferred from E-UTRAN to the UE.

5.3.5.2 Initiation

E-UTRAN may initiate the RRC connection reconfiguration procedure to a UE in RRC_CONNECTED. E-UTRAN applies the procedure as follows:

- the IE Mobility control information is included only when AS-security has been activated;

- the establishment of RBs (other than SRB1, that is established during RRC connection establishment) is included only when AS-security has been activated;

5.3.5.3 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> Forward the IE "NAS dedicated information" to upper layers;
- 1> If the RRC CONNECTION RECONFIGURATION message includes the IE Radio resource configuration:
 - 2> perform the Radio resource configuration procedure as specified in 5.3.9;
- 1> If the RRC CONNECTION RECONFIGURATION message includes the IE Measurement configuration:
 - 2> perform the Measurement configuration procedure as specified in 5.5.2;
- 1> If the RRC CONNECTION RECONFIGURATION message includes the IE Mobility control information:
 - 2> perform the handover procedure as specified in 5.3.6;

NOTE Security reconfiguration only applies in case of a handover and hence is specified in the corresponding section.

<Interactions between elementary procedures, if any>.

NOTE If the RRC CONNECTION RECONFIGURATION message includes the establishment of radio bearers others than SRB1, the UE may start using these radio bearers immediately, i.e. there is no need to wait for an outstanding acknowledgment of the SECURITY MODE COMPLETE message.

- 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> submit the RRC CONNECTION RECONFIGURATION COMPLETE message to lower layers for transmission using the new configuration, upon which the procedure ends.
- 1> else:
 - 2> revert back to the configuration used prior to the reception of the RRC CONNECTION RECONFIGURATION message;
 - 2> reject the entire message as specified in 5.3.5.5, i.e. the UE shall also reject the procedures invoked by the RRC CONNECTION RECONFIGURATION message that it managed to complete successfully;

To be completed

5.3.5.4 Reception of the RRC CONNECTION RECONFIGURATION COMPLETE by the E-UTRAN

To be completed

5.3.5.5 RRC connection reconfiguration failure

The UE shall

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

Editor's 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.

5.3.6 Handover

NOTE The UE should perform 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

5.3.6.1 Reception of the handover command

The UE shall:

- 1> start timer T304;
- 1> synchronise to the DL of the target cell, as indicated in the RRC CONNECTION RECONFIGURATION message that triggered the handover;

Editor's note: It is FFS if RL failure monitoring applies for the target cell's radio link while T304 is running

- 1> if no Dedicated preamble was provided (signalling details are FFS) OR
- 1> if a Dedicated preamble end time was provided and the indicated end 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;

Editor's note: It has been agreed that the UE is not required to determine the SFN of the target cell by acquiring system information from that cell

Editor's note: In case the above is the only action upon expiry time of the Dedicated preamble, it seems preferable to specify this in 36.221. However, it is presently unclear how contention is handled after the expiry time.

5.3.6.2 Successful handover completion

- 1> If the handover succeeds (details are FFS):

Editor's note: It has been agreed that the condition for Successful handover completion is either a or b (FFS)

- a) Same criterion when using contention and dedicated preambles: Reception of Msg2 OR
 - b) Different criteria when using contention and dedicated preambles i.e. as follows:
 - b.1: Reception of HARQ acknowledgement of the RRC RECONFIGURATION COMPLETE message when using dedicated preamble
 - b.2: Detecting UE identity on PDCCH (contention resolution) when using contention preambles.
- If option b is selected, the action upon the RRC CONNECTION RECONFIGURATION message as specified below should be moved to the previous section

- 2> stop timer T304;
- 2> If the RRC CONNECTION RECONFIGURATION message includes the IE "Security configuration":
 - 3> apply the AS-derived keys associated with the AS-base key indicated by the IE "Key indicator";
 - 3> configure lower layers to apply the indicated integrity protection algorithm immediately, i.e. the new algorithm 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;

- 3> configure lower layers to apply the indicated ciphering algorithm immediately, i.e. the new algorithm 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> 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):
 - 3> act upon the received radio configuration, excluding the physical layer configuration, in accordance with 5.3.9, as specified for the case of a ‘modification’;
 - 3> act upon the received physical layer configuration in accordance with 5.3.9.3.
 - 2> else:
 - 3> act upon the received radio configuration in accordance with 5.3.9.2.
 - 2> reset the RLC and MAC;
 - 2> indicate the occurrence of handover to PDCP;
- NOTE The handling of the radio bearers after the successful completion of handover, e.g. the re-transmission of unacknowledged PDCP SDUs (as well as the associated status reporting), the handling of the SN and the HFN, is specified in [8].
- 2> set the contents of RRC CONNECTION RECONFIGURATION COMPLETE message as follows:
 - 3> Tbs (only setting of the contents related to handover, if any)

5.3.6.3 T304 expiry (handover failure)

The UE shall:

- 1> If T304 expires (handover failure):
 - 2> start timer T311 (FFS);
 - 2> select the best available cell (details are FFS)
- Editor's note: It has been agreed that some restrictions (e.g. inter-RAT cells are not considered) may apply. FFS if this applies generally or in specific cases e.g. following handover failure.
- Editor's note: It is FFS if the UE reverts back to the configuration used in the source cell i.e. ignores the configuration received in the message triggering the handover.
- 2> initiate the connection re-establishment procedure as specified in 5.3.7, upon which initiation the procedure ends
- Editor's note: The actions the UE shall perform upon T311 expiry are assumed to be covered by 5.3.10.5 i.e. it is assumed that there is no need to specify these requirements in this section also.

5.3.7 RRC connection re-establishment

5.3.7.1 General

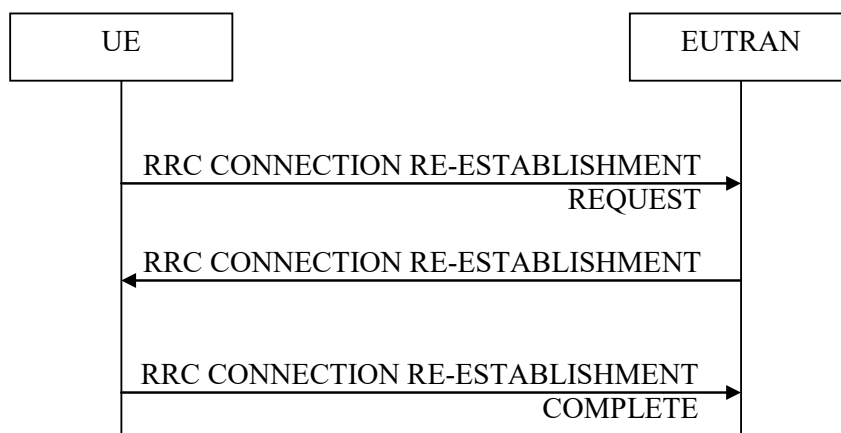


Figure 5.3.7.1-1: RRC connection e-establishment, successful

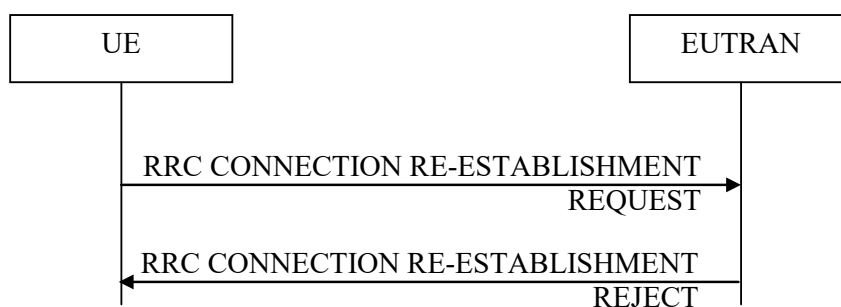


Figure 5.3.7.1-2: RRC connection re-establishment, failure

The purpose of this procedure is re-establish the RRC connection, which involved resumption of SRB1 operation and re-activation of security.

A UE in RRC_CONNECTED, for which security has been activated, may initiate the procedure in order to continue the RRC connection. The connection re-establishment succeeds only if the concerned cell is prepared i.e. has a valid UE context. In case E-UTRAN accepts the re-establishment, SRB1 operation resumes while the operation of other radio bearers remains suspended.

E-UTRAN applies the procedure as follows:

- to reconfigure SRB1 and to resume data transfer only for this RB;
- to re-activate security without changing algorithms.

5.3.7.2 Initiation

The UE shall only initiate the procedure when security has been activated. 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 5.3.10;
- 1> Upon handover failure, in accordance with 5.3.6.2;
- 1> When lower layers detect problems, as specified in TS 36.322 [7];

Upon initiation of the procedure, the UE shall:

- 1> Set counter V301 to 1;

1> Set the variable UE_CONTENTION_RESOLUTION_IDENTITY as follows:

- 2> set the "C-RNTI" to the C-RNTI used in the source cell (FFS: handover failure case) or the cell in which the re-establishment was initiated (other cases);
- 2> set the "Cell identity" to the Physical layer identity of the source cell (FFS: handover failure case) or the cell in which the re-establishment was initiated (other cases);
- 2> set the "Authentication code" to a MAC-I calculated over FFS.

Editor's note: Exact coding of the variable UE_CONTENTION_RESOLUTION_IDENTITY is FFS.

Editor's note: The details about the calculation of the MAC-I and the size are FFS. Awaiting response from SA3 to the LS in R2-081369.

1> Reset MAC and RLC for all SRBs;

Editor's note:: Whether or the corresponding reset applies for DRBs is FFS.

Editor's note:: It is FFS if, considering the different triggering conditions for this procedure, the start of T311 as well as the cell selection aspects are best specified as part of the re-establishment procedure.

1> Initiate transmission of the RRC CONNECTION RE-ESTABLISHMENT REQUEST message in accordance with 5.3.7.3;

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.

5.3.7.3 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> set the IE "Re-establishment UE identity" to the value of variable UE_CONTENTION_RESOLUTION_IDENTITY;

The UE shall submit the RRC CONNECTION RE-ESTABLISHMENT REQUEST message to lower layers for transmission with indication of variable UE_CONTENTION_RESOLUTION_IDENTITY.

5.3.7.4 Contention resolution

Upon receiving a response message from E-UTRAN, the UE shall:

- 1> stop timer T301;
- 1> If lower layer indicates that contention resolution is successful:
 - 2> stop timer T311;
 - 2> perform the actions as specified in 5.3.7.5 or 5.3.7.9 based on received RRC message type;
- 1> else (contention resolution failure is informed from lower layer):
 - 2> perform the RRC connection re-establishment request retry procedure as specified in 5.3.7.8.

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

Editor's note: It is FFS if the RRC CONNECTION RE-ESTABLISHMENT message is integrity protected.

The UE shall:

- 1> set the C-RNTI to the value of the Temporary C-RNTI received in the Random Access Response message, see TS 36.321 [6];

- 1> resume SRB1 after reconfiguring it in accordance with the received IE “Radio resource configuration” and as specified in xxx;
- 1> configure lower layers to re-activate integrity protection using the previously configured algorithm immediately, i.e. integrity protection 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;
- 1> configure lower layers to apply ciphering using the previously configured algorithm immediately, i.e. ciphering 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;
- 1> send the RRC CONNECTION RE-ESTABLISHMENT COMPLETE message as specified in 5.3.7.5;
- 1> Resume the RRC connection with the restriction that the use of all radio bearers other than SRB1 is suspended until a subsequent RRC CONNECTION RECONFIGURATION message is received;

Editor's note: The details of how the RBs are resumed are FFS. Also the handling of the measurement configuration is FFS.

5.3.7.6 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)

5.3.7.7 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 5.3.7.8;

5.3.7.8 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 5.3.7.3;
 - 2> increment counter V301;
 - 2> restart timer T301 when the lower layers indicate success to transmit the message.
- 1> else:
 - 2> stop timer T311;
 - 2> indicate the release of the signalling connection and the established EPS bearers to upper layers;
 - 2> release all radio resources and move to RRC_IDLE.

Editor's note: For MAC it has been agreed that a back off mechanism should be applied whenever a retry of the RACH access is initiated (see agreements on R2-080221). This also applies to retries initiated by RRC e.g. upon to losing contention or lack of response. Further details on how the back off are specified (in MAC and/ or RRC) are FFS.

Editor's 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.

5.3.7.9 RRC re-establishment reject

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

- 1> indicate the release of the signalling connection and the established EPS bearers to upper layers;
- 1> release all radio resources and move to RRC_IDLE.

Editor's 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.

5.3.8 RRC connection release

5.3.8.1 General



Figure 5.3.8.1-1: RRC connection release, successful

The purpose of this procedure is to release the RRC connection, which includes the release of the signalling connection, the established EPS bearers as well as all radio resources.

5.3.8.2 Initiation

E-UTRAN initiates the RRC connection release procedure to a UE in RRC_CONNECTED. It is FFS if redirection can be done from E-UTRAN before security is activated.

Editor's note: Awaiting reply from SA3 (in response to R2-080602)

5.3.8.3 Reception of the RRC CONNECTION RELEASE by the UE

The UE shall:

- 1> indicate the release of the signalling connection and the established EPS bearers to upper layers;
- 1> release all radio resources no earlier than TBD ms from the moment the UE received the RRC CONNECTION RELEASE message;

NOTE The time specified above enables lower layers to confirm successful reception of the release message

- 1> If the RRC CONNECTION RELEASE message includes the IE "Idle mode mobility control information ":
 - 2> store the "Idle mode mobility control information"
 - 2> If the Cell re-selection priority expiry timer is included:
 - 3> start timer T320;
- 1> enter RRC_IDLE.

5.3.9 Radio resource configuration

5.3.9.1 Introduction

To be specified

5.3.9.2 Initial setup of a radio resource configuration

The UE shall:

- 1> If the RRC CONNECTION RECONFIGURATION message is used to establish one or more RBs (details tbs, i.e. includes the IE'..):
- 2> To be specified;

To be completed

5.3.9.3 Modification of a radio resource configuration

The UE shall:

- 1> If the RRC CONNECTION RECONFIGURATION message includes for one or more DRBs the IE 'RLC reset request:
- 2> request RLC to reset the corresponding RLC entity/ies;

To be completed

5.3.10 Radio link failure related actions

5.3.10.1 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.

5.3.10.2 Radio link recovery while T310 is running

Upon detecting radio link recovery while T310 was running, the UE shall:

- 1> Stop timer T310;

Editor's note: In this case, the UE can continue the RRC connection without explicit signalling

The criteria for detecting radio link recovery are FFS.

5.3.10.3 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 RRC_IDLE;
- 1> else:
 - 2> Start timer T311;
 - 2> Perform the cell selection process as specified in [4];

Editor's note: For selecting the cell, we should be able to refer to a procedure specified in 36.304.

5.3.10.4 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 5.3.7;

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

The criteria for re-entry of service area, i.e. for detecting 'in service' are FFS.

5.3.10.5 T311 expiry

Upon T311 expiry, the UE shall:

1> stop T301, if running;

1> indicate the release of the signalling connection and the established EPS bearers to upper layers;

1> enter RRC_IDLE.

Editor's 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.

5.4 Inter-RAT mobility

5.4.1 Introduction

The general principles of connected mode mobility are described in 5.3.1.3. In case of mobility to CDMA2000, the eNB decides when to move to the other RAT while the target RAT determines to which cell the UE shall move.

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).

The general principles of the security handling upon connected mode mobility are described in 5.3.1.2.

5.4.2 Handover to E-UTRA

5.4.2.1 General

Editor's note: It may be desirable to avoid, to some extent, duplication of specification for parts that are common for the regular RRC connection reconfiguration procedure and the inter RAT handover case.

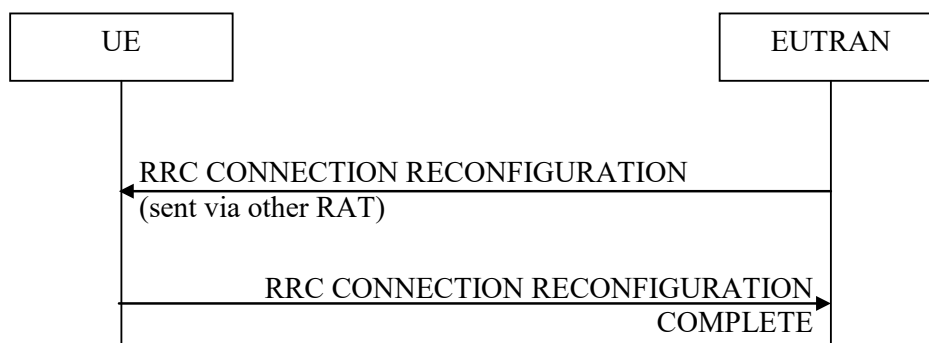


Figure 5.4.2.1-1: Handover to E-UTRA, successful

The purpose of this procedure is to, under the control of the network, transfer a connection between the UE and another Radio Access Network (e.g. GERAN or UTRAN) to E-UTRAN.

The handover to E-UTRA procedure applies when signalling radio bearers are established, possibly in combination with (EPS) bearers. In case only signalling radio bearers are established, it is FFS if the default EPS bearer is established during handover. It is FFS if handover to E-UTRAN may be initiated while security is not activated in the other RAT.

5.4.2.2 Initiation

The RAN using another RAT initiates the Handover to E-UTRA procedure, in accordance with the specifications applicable for the other RAT, by sending the RRC CONNECTION RECONFIGURATION via the radio access technology from which the inter-RAT handover is performed.

5.4.2.3 Reception of the RRC CONNECTION RECONFIGURATION by the UE

The UE shall:

- 1> act upon the received radio configuration in accordance with 5.3.9.
- 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 [6], using a randomly selected common preamble;
- 1> else:
 - 2> perform the initial access procedure as specified in TS 36.321 [6], using the indicated dedicated preamble;

Editor's note: In case the above is the only action upon expiry time, it seems preferable to specify this in 36.321.

Editor's note: The structure should be re-organised with the conditions for success/ failure specified jointly in this subclause, while the following subclauses specify the subsequent UE actions, i.e. with ..4 being actions related to setting the reconfiguration complete and ..5 the actions related to setting the failure message.

5.4.2.4 Successful completion of the handover to E-UTRA

The UE shall:

Editor's note: There may be a need to re-map information regarding e.g. EPS bearers, security context, initialisation of variables

- 1> If the UE successfully completes Handover to E-UTRA procedure (details to be specified):
 - 2> configure lower layers to apply integrity protection using the indicated algorithm immediately, i.e. integrity protection 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 ciphering using the indicated algorithm immediately, i.e. ciphering 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> set the contents of RRC CONNECTION RECONFIGURATION COMPLETE message as follows:
 - 3> Tbs
 - 2> submit the RRC CONNECTION RECONFIGURATION COMPLETE message to lower layers for transmission,
 - 2> enter E-UTRA RRC_CONNECTED, upon which the procedure ends.

To be completed

5.4.2.5 Handover to E-UTRA failure

The UE shall:

- 1> If the UE fails to connect to the target cell indicated in the RRC CONNECTION RECONFIGURATION message OR

Editor's note: Further details need to be specified regarding when the UE shall assume it succeeds to connect, e.g. receiving a response to a RACH preamble

- 1> if the RRC CONNECTION RECONFIGURATION message content is not supported by the UE (need to specify the UE behaviour for this error case is FFS);

- 2> act in accordance with the specifications applicable for the other RAT for this failure case;

5.4.3 Mobility from E-UTRA

5.4.3.1 General



Figure 5.4.3.1-1: Mobility from E-UTRA, successful

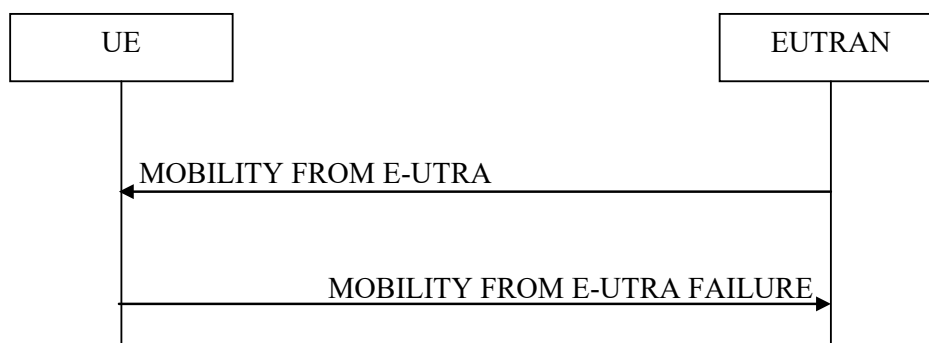


Figure 5.4.3.1-2: Mobility from E-UTRA, failure

The purpose of this procedure is to move a UE in RRC_CONNECTED to a cell using another Radio Access Technology (RAT), e.g. GERAN, UTRA or CDMA2000 systems. The mobility from E-UTRA procedure covers both:

- handover, i.e. the MOBILITY FROM E-UTRA message includes radio resources that have been allocated for the UE in the target cell and
- cell change order, i.e. the MOBILITY FROM E-UTRA message may include information facilitating access of and/ or connection establishment in the target cell, e.g. system information. Cell change order is applicable only to GERAN.

The mobility from E-UTRA procedure applies when signalling radio bearers are established, possibly in combination with EPS bearers.

5.4.3.2 Initiation

E-UTRAN initiates the mobility from E-UTRA procedure to a UE in RRC_CONNECTED, possibly in response to a MEASUREMENT REPORT message by sending a MOBILITY FROM E-UTRA message. E-UTRA initiates the procedure only when security has been activated.

5.4.3.3 Reception of the MOBILITY FROM E-UTRA by the UE

The UE shall:

- 1> If the inter RAT message included in the MOBILITY FROM E-UTRA message concerns a 'handover command':
 - 2> access the target cell indicated in the MOBILITY FROM E-UTRA message using the dedicated resources included in the inter RAT message in accordance with the specifications of the other RAT;
- 2> If the MOBILITY FROM E-UTRA message includes a subset of the established EPS bearers (FFS):
 - 3> inform upper layers about the failure to continue the EPS bearers not included in the MOBILITY FROM E-UTRA message;
- 1> else (inter RAT message does not concern a 'handover command'):
 - 2> establish the connection to the target cell indicated in the MOBILITY FROM E-UTRA message in accordance with the specifications of the other RAT and the inter RAT message(s) included in the MOBILITY FROM E-UTRA message;

5.4.3.4 Successful completion of the mobility from E-UTRA

Upon successfully completing the handover, the UE shall:

- 1> clear or set variables upon leaving E-UTRA RRC_CONNECTED as specified in subclause XX.X.

Editor's note: There may be a need to re-map information regarding, e.g. EPS bearers, security as well as clearing of variables, UE context. Also, timers monitoring the successful completion (if specified), may need to be stopped.

To be specified

5.4.3.5 Mobility from E-UTRA failure

The UE shall:

- 1> If the UE fails to connect to the target cell indicated in the MOBILITY FROM E-UTRA message:
 - 2> If the UE succeeds to revert back to the source E-UTRA cell and the configuration used prior to the reception of the MOBILITY FROM E-UTRA message (FFS):

Editor's note: Further details need to be specified regarding the (part of the) previously used configuration that the UE shall resume.

- 3> send a MOBILITY FROM E-UTRA FAILURE message;
- 2> else:
 - 3> act as specified for the case of detecting radio link failure (FFS);

The details of the handover failure handling are FFS, i.e. whether the failure handling is the same for handover and cell change order, whether RL failure operation will be re-used, whether UE shall (always) revert to source cell

5.4.4 Handover from E-UTRA preparation request (CDMA2000)

5.4.4.1 General

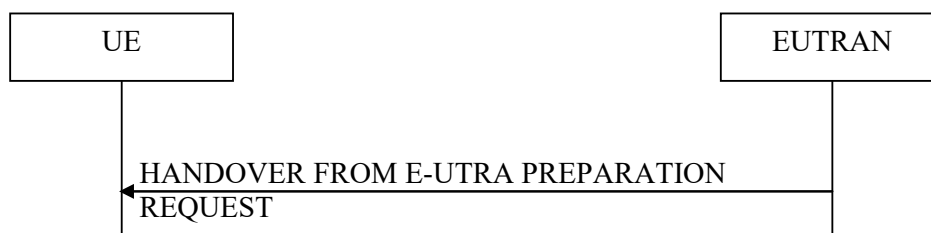


Figure 5.4.4.1-1: Handover from E-UTRA preparation request

The purpose of this procedure is to trigger the UE to prepare for handover to CDMA2000 by requesting a connection with this network. This procedure applies to CDMA2000 capable UEs only.

The Handover from E-UTRA preparation request procedure applies when signalling radio bearers are established.

5.4.4.2 Initiation

E-UTRAN initiates the Handover from E-UTRA preparation request procedure to a UE in RRC_CONNECTED, possibly in response to a MEASUREMENT REPORT message by sending a HANDOVER FROM E-UTRA PREPARATION REQUEST message. E-UTRAN initiates the procedure only when security has been activated.

5.4.4.3 Reception of the HANDOVER FROM E-UTRA PREPARATION REQUEST by the UE

Upon reception of the HANDOVER FROM E-UTRA PREPARATION REQUEST message, the UE shall:

- 1> Indicate the request to prepare handover and forward the IE 'CDMA2000 type' and the IE 'CDMA2000 dedicated information' to the CDMA upper layers.

Upon receiving the request to prepare handover, CDMA upper layers establish a connection with the CDMA network. This involves exchanging CDMA2000 dedicated information, using the UL/ DL information transfer procedure.

Editor's note: It is desirable to specify the requirements listed in the above paragraph elsewhere since it is outside the scope of this specification.

5.5 Measurements

5.5.1 Introduction

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 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 of UTRA frequencies.
 - Inter-RAT measurements of GERAN frequencies.
 - Inter-RAT measurements of CDMA2000 HRPD or 1xRTT frequencies.

- The use of other measurement types, e.g. Traffic volume, Quality, UE-internal and/ or UE positioning measurements is FFS

2. **Measurement objects:** The objects on which the UE shall perform the measurements.

- For intra-frequency and inter-frequency measurements a measurement object is a single E-UTRA carrier frequency. Associated with this carrier frequency, E-UTRAN can configure a list of cell specific offsets and a list of 'blacklisted' cells. Blacklisted cells are not considered in event evaluation or measurement reporting.
- For inter-RAT UTRA measurements a measurement object is a set of cells on a single UTRA carrier frequency.
- For inter-RAT GERAN measurements a measurement object is a set of GERAN carrier frequencies.
- For inter-RAT CDMA2000 measurements a measurement object is a set of cells on a single (HRPD or 1xRTT) carrier frequency.

It is FFS if blacklists are used for inter-RATs e.g. GERAN, UTRAN.

3. **Reporting configurations:** A list of reporting configurations where each reporting configuration consists of the following:

- Reporting criteria: The criteria that triggers the UE to send a measurement report. This can either be periodical or a single event description.
- Reporting format: The quantities that the UE includes in the measurement report and associated information (e.g. number of cells to report).

4. **Measurement identities:** A list of measurement identities where each measurement identity links one measurement object with one reporting configuration. By configuring multiple measurement identities it is possible to link more than one measurement object to the same reporting configuration, as well as to link more than one reporting configuration to the same measurement object. The measurement identity is used as a reference number in the measurement report.

5. **Quantity configurations:** One quantity configuration is configured for intra-frequency measurements, one for inter-frequency measurements and one per RAT type. The quantity configuration defines the measurement quantities and associated filtering used for all event evaluation and related reporting of that measurement type. One filter can be configured per measurement quantity.

5. **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.

E-UTRAN only configures a single Measurement object for a given frequency, i.e. it is not possible to configure two or more Measurement objects for the same frequency with different associated parameters, e.g. different offsets and/ or blacklists. E-UTRAN may configure multiple instances of the same event e.g. by configuring two reporting configurations with different thresholds.

The Measurement objects are specified per RAT type, with the E-UTRA measurement object list including both the intra-frequency object and the inter-frequency object(s). The Reporting configuration includes separate lists for E-UTRA, Inter-RAT, and for periodical reporting configurations. The E-UTRA reporting configuration list includes both intra- and inter-frequency reporting configurations (and events). There is a single Measurement identities list. Any E-UTRA measurement object can be linked to any E-UTRA reporting configuration. Some E-UTRA reporting configurations may not be linked to a measurement object (or to a 'NULL' object).

Editor's note: The use of other measurement configuration parameters, e.g. Measurement validity and/ or Additional measurement identities is FFS.

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. It is FFS whether the UE shall only report the listed UTRA cells or whether the UE is also required to report detected UTRA cells.

Editor's note: RAN2 specifications are based on the assumption that CSG cells of home deployment type are not be indicated within the neighbour list. Furthermore, the assumption is that for non-home deployments, the physical layer identity is unique within the area of a large macro cell (i.e. as for UTRAN).

5.5.2 Measurement configuration

5.5.2.1 Introduction

Editor's note: Clarification needs to be added that what is setup, modified and released concerns a measurement identified by a measurement identity.

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

5.5.2.2 Setup of a measurement

To be specified

5.5.2.2.1 Measurement objects

Editor's 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).

5.5.2.2.2 Measurement type

Intra-frequency measurements: to be specified.

Inter-frequency measurements: to be specified.

Inter-RAT measurements: to be specified.

5.5.2.2.3 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

5.5.2.2.4 Measurement reporting criteria type

Periodical reporting: to be specified

Event-triggered reporting: to be specified

Event-triggered periodic reporting: to be specified

5.5.2.3 Modification of a measurement

To be specified

5.5.2.4 Release of a measurement

The UE shall:

- 1> If the reconfiguration message includes the release of a measurement object:
 - 2> delete the indicated measurement object;
 - 2> delete the corresponding measurement identities.
- 1> If the reconfiguration message includes the release of a reporting configuration:
 - 2> delete the indicated reporting configuration;
 - 2> delete the corresponding measurement identities.
- 1> If the reconfiguration message includes the release of a measurement identity:
 - 2> delete the indicated measurement identity;

Editor's note: It has been agreed that if the reconfiguration message includes the release of a measurement identity, the UE should NOT autonomously delete any unused measurement objects or reporting configurations.

To be completed

5.5.3 Measurement report triggering

The UE shall:

- 1> If measurement gaps are active:
 - 2> If Smeasure is not configured or
 - 2> If Smeasure is configured and the serving cell quality (RSRP value) is lower than this value:
 - 3> Perform measurements of neighbouring cells and evaluation of reporting criteria;

5.5.4 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.

Editor's 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

5.5.5 Measurement related actions

5.5.5.1 Actions upon handover

Editor's 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.

5.5.5.1.1 General

After handover, the UE may re-use measurement samples obtained prior to handover.

Editor's 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.

5.5.5.1.2 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 configuration.

Further details are to be specified

5.5.5.1.3 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. The rules for continuing the intra-frequency measurements are FFS;

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

- 2> stop all inter-frequency measurements while keeping the measurement configuration unchanged;
- 2> continue the inter-RAT measurements without modifying the measurement configuration.

NOTE 2 The UE resumes the applicable inter-frequency measurements 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;

5.5.5.2 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:

The algorithm to determine the mobility state in RRC_CONNECTED is identical to the one used in RRC_IDLE. It is FFS whether the associated parameters are common for both states. Further details are TBS.

Editor's 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].

5.6 Other

5.6.1 DL information transfer

5.6.1.1 General



Figure 5.6.1.1-1: DL information transfer

The purpose of this procedure is to transfer NAS or (tunnelled) non-3GPP dedicated information from E-UTRAN to a UE in RRC_CONNECTED.

5.6.1.2 Initiation

E-UTRAN initiates the DL information transfer procedure whenever there is a need to transfer NAS or non-3GPP dedicated information. E-UTRAN initiates the DL information transfer procedure by sending the DL INFORMATION TRANSFER message.

5.6.1.3 Reception of the DL INFORMATION TRANSFER by the UE

Upon receiving DL INFORMATION TRANSFER message, the UE shall:

- 1> If CHOICE “Information Type” is set to “NAS”:
 - 2> Forward the IE ‘NAS dedicated information’ to the NAS upper layers.
- 1> If CHOICE “Information Type” is set to “CDMA2000”:
 - 2> Forward the IE ‘CDMA2000 type’ and the IE ‘CDMA2000 dedicated information’ to the CDMA upper layers.

5.6.2 UL information transfer

5.6.2.1 General

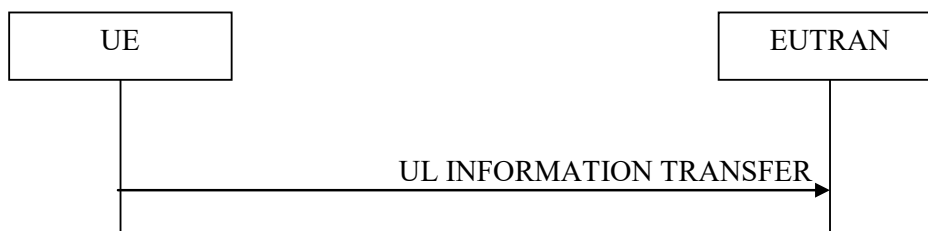


Figure 5.6.2.1-1: UL information transfer

The purpose of this procedure is to transfer NAS or (tunnelled) non-3GPP dedicated information from the UE to E-UTRAN.

5.6.2.2 Initiation

A UE in RRC_CONNECTED initiates the UL information transfer procedure whenever there is a need to transfer NAS or non-3GPP dedicated information. The UE initiates the UL information transfer procedure by sending the UL INFORMATION TRANSFER message.

5.6.2.3 Actions related to transmission of UL INFORMATION TRANSFER message

The UE shall set the contents of the UL INFORMATION TRANSFER message as follows:

- 1> If there is a need to transfer NAS information:
 - 2> Set the IE ‘Information type’ to “NAS”.
 - 2> Include the IE ‘NAS dedicated information’.
- 1> If there is a need to transfer CDMA2000 information:
 - 2> Set the IE ‘Information type’ to “CDMA2000”;
 - 2> Set the IE “CDMA2000 message type” in accordance with the information received from CDMA200 upper layers;

- 2> Include the IE 'CDMA2000 type' and the IE 'CDMA200 dedicated information';

5.6.2.4 Failure to deliver UL INFORMATION TRANSFER message

The UE shall:

- 1> If following mobility, the UE is unable to guarantee successful delivery for one or more UL INFORMATION TRANSFER messages;
- 2> Inform upper layers about the possible failure to deliver the information contained in the concerned UL INFORMATION TRANSFER messages;

Editor's note: Awaiting confirmation from CT1 (in response to R2-080604)

5.6.3 UE capability transfer

5.6.3.1 General

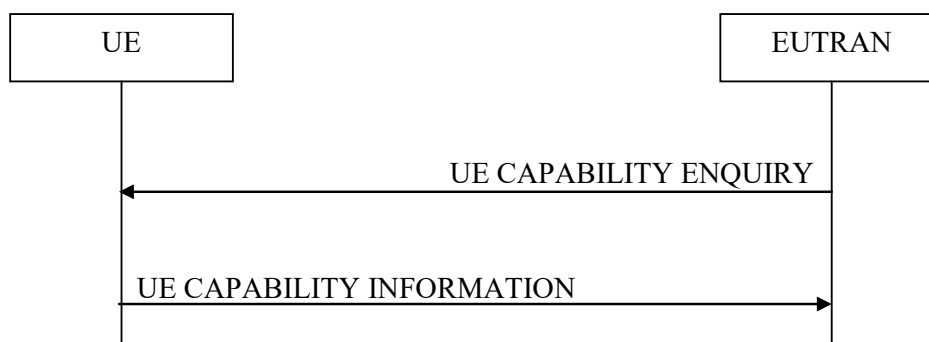


Figure 5.6.3.1-1: UE capability transfer

The purpose of this procedure is to transfer UE radio access capability information from the UE to E-UTRAN.

Editor's note: It is FFS if the security capabilities received via S1 can always be trusted. If this is not the case, there may be a need to support protection against bid down attacks. Awaiting reply from SA3 (in response to R2-080540).

5.6.3.2 Initiation

E-UTRAN initiates the procedure to a UE in RRC_CONNECTED when it needs (additional) UE radio access capability information.

5.6.3.3 Reception of the UE CAPABILITY ENQUIRY by the UE

The UE shall:

- 1> set the contents of UE CAPABILITY INFORMATION message as follows:
 - 2> If the UE radio access capability request includes E-UTRA:
 - 3> include the IE UE radio access capabilities E-UTRA;

Editor's note The UE capability transfer procedure is based on the assumption that the only mechanism for the UE to initiate a change of the UE capabilities used by the network is to perform a detach and re-attach

- 2> If the UE radio access capability request includes GSM/ GERAN:
 - 3> include the IE UE radio access capabilities GSM/ GERAN;
- 2> If the UE radio access capability request includes UTRA:

3> include the IE UE radio access capabilities UTRA;

1> submit the UE CAPABILITY INFORMATION message to lower layers for transmission, upon which the procedure ends.

Editor's note: The above text needs updating to reflect the RAT specific containers that have been agreed. Furthermore, clarification should be added that the E-UTRA container is assumed to include all the information E-UTRAN needs including the information regarding inter-RAT measurements e.g. the need for measurement gaps to perform measurements on an inter-RAT frequency/ bands.

5.7 Generic error handling

6 Protocol data units, formats and parameters

6.1 General

The contents of each RRC message is specified in subclause 6.2 using ASN.1 to specify the message syntax and using tables when needed to provide further detailed information about the information elements specified in the message syntax. The syntax of the information elements that are defined as stand-alone abstract types is further specified in a similar manner in subclause 6.3.

The need for information elements to be present in a message or an abstract type, i.e., the ASN.1 fields that are specified as OPTIONAL in the abstract notation (ASN.1), is specified by means comment text tags attached to the OPTIONAL statement in the abstract syntax, which meaning is specified in table 10.1.

Table 6.1-1: Meaning of abbreviations used to specify the need for information elements to be present

Abbreviation	Meaning
Cond <i>conditionTag</i>	<i>Conditionally present</i> An information element for which the need is specified by means of conditions. For each <i>conditionTag</i> , the need is specified in a tabular form following the ASN.1 segment.
Need OP	<i>Optionally present</i> An information element that is optional to signal. If the message is received by the UE, the UE behaviour that applies in case the information element is absent is either specified in a corresponding procedural specification or is implied by the semantics information provided in the field description table following the ASN.1 segment.
Need OC	<i>Optionally present, Continue</i> An information element that is optional to signal. If the message is received by the UE, and in case the information element is absent, the UE shall continue to use the existing value (and the associated functionality).
Need OD	<i>Optionally present, Discontinue</i> An information element that is optional to signal. If the message is received by the UE, and in case the information element is absent, the UE shall discontinue/ stop to use the existing value (and the associated functionality).

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:

- HANDOVER TO E-UTRA COMMAND (The RRC connection reconfiguration message is currently used, i.e. it is FFS if a specific message is needed)
- UE CAPABILITY INFORMATION COMPACT (The need to introduce a message including a size optimised/ reduced version of the UE capabilities is FFS)

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

6.2.1 General message structure

– *EUTRA-RRC-Definitions*

This ASN.1 segment is the start of the E-UTRA RRC PDU definitions.

```
-- ASN1START
EUTRA-RRC-Definitions DEFINITIONS AUTOMATIC TAGS ::=
BEGIN
-- ASN1STOP
```

– *BCCH-BCH-Message*

The *BCCH-BCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE via BCH on the BCCH logical channel.

```
-- ASN1START
BCCH-BCH-Message ::= SEQUENCE {
    message          BCCH-BCH-MessageType
}
BCCH-BCH-MessageType ::=
    SystemInformationMaster
-- ASN1STOP
```

– *BCCH-DL-SCH-Message*

The *BCCH-DL-SCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE via DL-SCH on the BCCH logical channel.

```
-- ASN1START
BCCH-DL-SCH-Message ::= SEQUENCE {
    message          BCCH-DL-SCH-MessageType
}
BCCH-DL-SCH-MessageType ::= CHOICE {
    c1               CHOICE {
        systemInformation          SystemInformation,
        systemInformation1         SystemInformation1
    },
    messageClassExtension SEQUENCE {}
}
-- ASN1STOP
```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

– *PCCH-Message*

The *PCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the PCCH logical channel.

```
-- ASN1START
PCCH-Message ::= SEQUENCE {
    message          PCCH-MessageType
}
PCCH-MessageType ::= CHOICE {
```

```

    c1 CHOICE {
        paging Paging
    },
    messageClassExtension SEQUENCE {}
}
-- ASN1STOP

```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

– *MCCH-Message* (FFS)

The *MCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the MCCH logical channel.

```

-- ASN1START
MCCH-Message ::= SEQUENCE {
    message MCCH-MessageType
}
MCCH-MessageType ::= CHOICE {
    c1 CHOICE {
        spare8 NULL, spare7 NULL,
        spare6 NULL, spare5 NULL, spare4 NULL,
        spare3 NULL, spare2 NULL, spare1 NULL
    },
    messageClassExtension SEQUENCE {}
}
-- ASN1STOP

```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

Editor's note: The MCCH messages are not defined (FFS). Agreed information to convey: "MBSFN-part length" (5 or 6 OFDM symbols, cf. R2-080927).

– *DL-CCCH-Message*

The *DL-CCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the downlink CCCH logical channel.

```

-- ASN1START
DL-CCCH-Message ::= SEQUENCE {
    message DL-CCCH-MessageType
}
DL-CCCH-MessageType ::= CHOICE {
    c1 CHOICE {
        rrcConnectionReestablishment RRCConnectionReestablishment,
        rrcConnectionReestablishmentReject RRCConnectionReestablishmentReject,
        rrcConnectionReject RRCConnectionReject,
        rrcConnectionSetup RRCConnectionSetup
    },
    messageClassExtension SEQUENCE {}
}
-- ASN1STOP

```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

– *DL-DCCH-Message*

The *DL-DCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the downlink DCCH logical channel.

```

-- ASN1START

```

```

DL-DCCH-Message ::= SEQUENCE {
    message          DL-DCCH-MessageType
}

DL-DCCH-MessageType ::= CHOICE {
    c1                CHOICE {
        dlInformationTransfer                DLInformationTransfer,
        handoverFromEUTRAPreparationRequest HandoverFromEUTRAPreparationRequest,
        mobilityFromEUTRACommand            MobilityFromEUTRACommand,
        rrcConnectionReconfiguration        RRCConnectionReconfiguration,
        rrcConnectionRelease                RRCConnectionRelease,
        securityModeCommand                 SecurityModeCommand,
        ueCapabilityEnquiry                  UECapabilityEnquiry,
        spare1 NULL
    },
    messageClassExtension SEQUENCE {}
}

-- ASN1STOP

```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

– *UL-CCCH-Message*

The *UL-CCCH-Message* class is the set of RRC messages that may be sent from the UE to the E-UTRAN on the uplink CCCH logical channel.

```

-- ASN1START

UL-CCCH-Message ::= SEQUENCE {
    message          UL-CCCH-MessageType
}

UL-CCCH-MessageType ::= CHOICE {
    c1                CHOICE {
        rrcConnectionReestablishmentRequest RRCConnectionReestablishmentRequest,
        rrcConnectionRequest                RRCConnectionRequest
    },
    messageClassExtension SEQUENCE {}
}

-- ASN1STOP

```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

– *UL-DCCH-Message*

The *UL-DCCH-Message* class is the set of RRC messages that may be sent from the UE to the E-UTRAN on the uplink DCCH logical channel.

```

-- ASN1START

UL-DCCH-Message ::= SEQUENCE {
    message          UL-DCCH-MessageType
}

UL-DCCH-MessageType ::= CHOICE {
    c1                CHOICE {
        measurementReport                MeasurementReport,
        rrcConnectionReconfigurationComplete RRCConnectionReconfigurationComplete,
        rrcConnectionReconfigurationFailure RRCConnectionReconfigurationFailure,
        rrcConnectionReestablishmentComplete RRCConnectionReestablishmentComplete,
        rrcConnectionSetupComplete          RRCConnectionSetupComplete,
        rrcStatus                           RRCStatus,
        securityModeComplete                 SecurityModeComplete,
        securityModeFailure                   SecurityModeFailure,
        ueCapabilityInformation               UECapabilityInformation,
        ulInformationTransfer                 ULInformationTransfer,
        spare6 NULL, spare5 NULL, spare4 NULL,
        spare3 NULL, spare2 NULL, spare1 NULL
    },

```

```

    messageClassExtension    SEQUENCE {}
}
-- ASN1STOP

```

Editor's note: One bit reserved (c1 CHOICE) for possible message class extension (FFS).

6.2.2 Message definitions

– *DLInformationTransfer*

The *DLInformationTransfer* message is used for the downlink transfer of dedicated NAS information.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

***DLInformationTransfer* message**

```

-- ASN1START
DLInformationTransfer ::=          SEQUENCE {
    rrc-TransactioIdentifier        RRC-TransactionIdentifier,          -- FFS
    criticalExtensions              CHOICE {
        dlInformationTransfer-r8    DLInformationTransfer-r8-IEs,
        criticalExtensions          SEQUENCE {}
    }
}

DLInformationTransfer-r8-IEs ::=  SEQUENCE {
    informationType                CHOICE {
        nas3GPP                   NAS-DedicatedInformation,
        cdma2000                  SEQUENCE {
            cdma2000-Type          CDMA2000-Type,
            cdma2000-DedicatedInfo OCTET STRING
        }
    },
    ...
}
-- ASN1STOP

```

Editor's note: The extension mechanisms in this message are FFS.

<i>DLInformationTransfer</i> field descriptions
<i>nas3GPP</i> Field description is FFS.
<i>cdma2000-Type</i> Field description is FFS.
<i>cdma2000-DedicatedInfo</i> Field description is FFS.

– **HandoverFromEUTRAPreparationRequest** (CDMA2000)

The *HandoverFromEUTRAPreparationRequest* message is used to trigger the handover preparation procedure with a CDMA2000 RAT.

- Signalling radio bearer: SRB1 or SRB2 (FFS)
- RLC-SAP: AM
- Logical channel: DCCH
- Direction: E-UTRAN to UE

HandoverFromEUTRAPreparationRequest message

```
-- ASN1START
HandoverFromEUTRAPreparationRequest ::= SEQUENCE {
    rrc-TransactionIdentifier      RRC-TransactionIdentifier,
    criticalExtensions              CHOICE {
        handoverFromEUTRAPreparationRequest-r8
        HandoverFromEUTRAPreparationRequest-r8-IEs,
        criticalExtensions          SEQUENCE {}
    }
}

HandoverFromEUTRAPreparationRequest-r8-IEs ::= SEQUENCE {
    cdma2000-Type                  CDMA2000-Type,
    cdma2000-DedicatedInfo         OCTET STRING                                OPTIONAL,    -- Need OP
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

HandoverFromEUTRAPreparationRequest field descriptions
cdma2000-Type Field description is FFS.
cdma2000-DedicatedInfo Field description is FFS.

– **MeasurementReport**

The *MeasurementReport* message is used for the indication of measurement results.

- Signalling radio bearer: SRB1 or SRB2 (FFS)
- RLC-SAP: AM
- Logical channel: DCCH
- Direction: UE to E-UTRAN

MeasurementReport message

```
-- ASN1START
MeasurementReport ::= SEQUENCE {
    criticalExtensions              CHOICE {
        c1 CHOICE{
            measurementReport-r8
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions          SEQUENCE {}
    }
}
-- ASN1STOP
```

```
MeasurementReport-r8-IEs ::= SEQUENCE {
    measuredResults      MeasuredResults,
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

<i>MeasurementReport</i> field descriptions
<i>measuredResults</i> Field description is FFS

– *MobilityFromEUTRACommand*

The *MobilityFromEUTRACommand* message is used to command handover or a cell change from E-UTRA to another RAT (3GPP or non-3GPP).

Signalling radio bearer: SRB1 or SRB2 (FFS)

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: E-UTRAN to UE

MobilityFromEUTRACommand message

```
-- ASN1START
MobilityFromEUTRACommand ::= SEQUENCE {
    rrc-TransactionIdentifier      RRC-TransactionIdentifier,
    criticalExtensions              CHOICE {
        c1                         CHOICE {
            mobilityFromEUTRACommand-r8      MobilityFromEUTRACommand-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions              SEQUENCE {}
    }
}

MobilityFromEUTRACommand-r8-IEs ::= SEQUENCE {
    interRAT-Target                InterRAT-Target,
    interRAT-Message                InterRAT-Message OPTIONAL, -- Need OP
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

<i>MobilityFromEUTRACommand</i> field descriptions
<i>interRAT-Target</i> Field description is FFS.
<i>interRAT-Message</i> Field description is FFS.

– *Paging*

The *Paging* message is used for the notification of one or more UEs.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: PCCH

Direction: E-UTRAN to UE

Paging message

```
-- ASN1START
Paging ::=
    criticalExtensions
        paging-r8
        criticalExtensions
    }
}

Paging-r8-IEs ::=
    pagingRecords
        ue-Identity
        pagingCause
    } OPTIONAL,
    systemInfoModification
        ENUMERATED {true}
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

<i>Paging</i> field descriptions
<i>ue-Identity</i> Field description is FFS.
<i>pagingCause</i> Field description is FFS.
<i>systemInfoModification</i> If present: indication of a BCCH modification.

Editor's 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)

Editor's note: It has been agreed to use a UE specific paging DRX. It is FFS if there is still a cell specific default e.g. for emergency call back. It is also FFS if the DRX value(s) are signalled by NAS or AS parameters.

– *RRConnectionReconfiguration*

The *RRConnectionReconfiguration* message is the command to establish or modify an RRC connection. It may convey information for UE and network identification, radio bearer configuration, measurement configuration and security configuration.

Signalling radio bearer: SRB1 or SRB2 (FFS)

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: E-UTRAN to UE

RRConnectionReconfiguration message

```
-- ASN1START

RRConnectionReconfiguration ::= SEQUENCE {
    rrc-TransactionIdentifier      RRC-TransactionIdentifier,
    criticalExtensions             CHOICE {
        c1                       CHOICE {
            rrcConnectionReconfiguration-r8      RRConnectionReconfiguration-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions             SEQUENCE {}
    }
}

RRConnectionReconfiguration-r8-IEs ::= SEQUENCE {
    measurementConfiguration      MeasurementConfiguration      OPTIONAL,  -- Need OP
    mobilityControlInformation     MobilityControlInformation    OPTIONAL,  -- Need OP
    nas-DedicatedInformation       NAS-DedicatedInformation      OPTIONAL,  -- Need OP
    radioResourceConfiguration     RadioResourceConfiguration   OPTIONAL,  -- Need OP
    securityConfiguration          SecurityConfiguration         OPTIONAL,  -- Cond Handover
    ue-RelatedInformation          UE-RelatedInformation         OPTIONAL,  -- Need OP
    ...
}

-- ASN1STOP
```

Editor's note: Need set to "OP" based on draft tabular. The *measurementConfiguration*, the *mobilityControlInformation*, the *radioResourceConfiguration* and possibly the *ue-RelatedInformation* should evidently be "OC", because it should be possible to send the message with only, for instance, the *measurementConfiguration* included, without deleting the configuration of mobility control, radio resources, etc.

Editor's note: The extension mechanisms in this message are FFS.

RRConnectionReconfiguration field descriptions

<i>measurementConfiguration</i> Field description is FFS.
<i>mobilityControlInformation</i> Field description is FFS.
<i>nas-DedicatedInformation</i> Field description is FFS.
<i>radioResourceConfiguration</i> Field description is FFS.
<i>securityConfiguration</i> Field description is FFS.
<i>ue-RelatedInformation</i> Field description is FFS.

Conditional presence	Explanation
<i>Handover</i>	The IE is mandatory present in case of inter-RAT handover to E-UTRA; it is optionally present in case of handover within E-UTRA; otherwise it is not needed.

Editor's note: The "*Handover*" condition seems to be based on procedure requirements and should possibly not be specified here; rather a need "OP".

– *RRCCConnectionReconfigurationComplete*

The *RRCCConnectionReconfigurationComplete* message is used to confirm the successful completion of an RRC connection reconfiguration.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

RRCCConnectionReconfigurationComplete message

```
-- ASN1START
RRCCConnectionReconfigurationComplete ::= SEQUENCE {
    rrc-TransactionIdentifier      RRC-TransactionIdentifier,
    criticalExtensions             CHOICE {
        rrcConnectionReconfigurationComplete-r8
        RRCConnectionReconfigurationComplete-r8-IEs,
        criticalExtensions         SEQUENCE {}
    }
}

RRCCConnectionReconfigurationComplete-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.
    ...
}
-- ASN1STOP
```

FFS

Editor's note: The extension mechanisms in this message are FFS.

<i>RRCCConnectionReconfigurationComplete</i> field descriptions
%fieldIdentifier%

Editor's 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. SRB1, 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.

— *RRConnectionReconfigurationFailure*

The *RRConnectionReconfigurationFailure* message is used to indicate the unsuccessful completion of an RRC connection reconfiguration.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***RRConnectionReconfigurationFailure* message**

```
-- ASN1START
RRConnectionReconfigurationFailure ::= SEQUENCE {
    rrc-TransactionIdentifier      RRC-TransactionIdentifier,
    criticalExtensions             CHOICE {
        rrcConnectionReconfigurationFailure-r8
        RRCConnectionReconfigurationFailure-r8-IEs,
        criticalExtensions         SEQUENCE {}
    }
}

RRConnectionReconfigurationFailure-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

<i>RRConnectionReconfigurationFailure</i> field descriptions
%fieldIdentifier%

— *RRConnectionReestablishment*

The *RRConnectionReestablishment* message is used to resolve contention and to establish SRBs.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

***RRConnectionReestablishment* message**

```
-- ASN1START
RRConnectionReestablishment ::= SEQUENCE {
    rrc-TransactionIdentifier      RRC-TransactionIdentifier,
    criticalExtensions             CHOICE {
        c1
        CHOICE{
            rrcConnectionReestablishment-r8 RRCConnectionReestablishment-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions         SEQUENCE {}
    }
}

RRConnectionReestablishment-r8-IEs ::= SEQUENCE {
```

```

    radioResourceConfiguration      RadioResourceConfiguration,
    ...
}
-- ASN1STOP

```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionReestablishment* field descriptions**

radioResourceConfiguration

Only SRB1 configuration information is applicable (modification, i.e., delta signalling)

Editor's note: A separate version of the IE *RadioResourceConfiguration* should be considered, allowing only SRB1 configuration. It could remove a number of potential error cases the UE would otherwise have to handle.

Editor's 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.

RRCConnectionReestablishmentComplete

The *RRCConnectionReestablishmentComplete* message is used to confirm the successful completion of an RRC connection reestablishment.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***RRCConnectionReestablishmentComplete* message**

```

-- ASN1START
RRCConnectionReestablishmentComplete ::= SEQUENCE {
    rrc-TransactionIdentifier      RRC-TransactionIdentifier,
    criticalExtensions              CHOICE {
        rrcConnectionReestablishmentComplete-r8
            RRCConnectionReestablishmentComplete-r8-IEs,
        criticalExtensions          SEQUENCE {}
    }
}
RRCConnectionReestablishmentComplete-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.
    ...
}
-- ASN1STOP

```

FFS

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionReestablishmentComplete* field descriptions**

%fieldIdentifier%

– *RRCCConnectionReestablishmentReject*

The *RRCCConnectionReestablishmentReject* message is used to indicate the rejection of an RRC connection reestablishment request.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRCCConnectionReestablishmentReject message

```
-- ASN1START
RRCCConnectionReestablishmentReject ::= SEQUENCE {
    rrc-TransactionIdentifier      RRC-TransactionIdentifier,
    criticalExtensions             CHOICE {
        rrcConnectionReestablishmentReject-r8
        RRCConnectionReestablishmentReject-r8-IEs,
        criticalExtensions        SEQUENCE {}
    }
}

RRCCConnectionReestablishmentReject-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

RRCCConnectionReestablishmentReject field descriptions

%fieldIdentifier%

– *RRCCConnectionReestablishmentRequest*

The *RRCCConnectionReestablishmentRequest* message is used to request the reestablishment of an RRC connection.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to E-UTRAN

RRCCConnectionReestablishmentRequest message

```
-- ASN1START
RRCCConnectionReestablishmentRequest ::= SEQUENCE {
    criticalExtensions             CHOICE {
        rrcConnectionReestablishmentRequest-r8
        RRCConnectionReestablishmentRequest-r8-IEs,
        criticalExtensions        SEQUENCE {}
    }
}

RRCCConnectionReestablishmentRequest-r8-IEs ::= SEQUENCE {
    ue-Identity                    ReestabUE-Identity,
    ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

<i>RRConnectionReestablishmentRequest</i> field descriptions
<i>ue-Identity</i> UE identity used for contention resolution at RRC connection reestablishment.

– ***RRConnectionReject***

The *RRConnectionReject* message is used to resolve contention and to reject the establishment of SRBs.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRConnectionReject message

```
-- ASN1START
RRConnectionReject ::=
    criticalExtensions
        rrcConnectionReject-r8
        criticalExtensions
    }
SEQUENCE {
    CHOICE {
        RRConnectionReject-r8-IEs,
        SEQUENCE {}
    }
}

RRConnectionReject-r8-IEs ::=
    waitTime
    ...
SEQUENCE {
    INTEGER (1..16),
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

<i>RRConnectionReject</i> field descriptions
<i>waitTime</i> Wait time value in seconds.

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

– ***RRConnectionRelease***

The *RRConnectionRelease* message is used to command the release of an RRC connection.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

RRConnectionRelease message

```
-- ASN1START
RRConnectionRelease ::=
    criticalExtensions
        rrcConnectionRelease-r8
    }
SEQUENCE {
    CHOICE {
        RRConnectionRelease-r8-IEs,
```

```

        criticalExtensions      SEQUENCE {}
    }
}

RRCConnectionRelease-r8-IEs ::= SEQUENCE {
    redirectionInformation      RedirectionInformation      OPTIONAL,    -- Need OP
    idleModeMobilityControlInfo IdleModeMobilityControlInfo OPTIONAL,    -- Need OP
    ...
}

-- ASN1STOP

```

Editor's note: The extension mechanisms in this message are FFS.

***RRCConnectionRelease* field descriptions**

idleModeMobilityControlInfo

Field description is FFS.

RRCConnectionRequest

The *RRCConnectionRequest* message is used to request the establishment of an RRC connection.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to E-UTRAN

***RRCConnectionRequest* message**

```

-- ASN1START

RRCConnectionRequest ::= SEQUENCE {
    criticalExtensions      CHOICE {
        rrcConnectionRequest-r8      RRCConnectionRequest-r8-IEs,
        criticalExtensions      SEQUENCE {}
    }
}

RRCConnectionRequest-r8-IEs ::= SEQUENCE {
    ue-Identity      InitialUE-Identity,
    establishmentCause      EstablishmentCause,
    ...
}

-- ASN1STOP

```

Editor's note: The extension mechanisms in this message are FFS.

Editor's note: Separate field types for the UE identity could be used at RRC connection request and RRC connection re-establishment, rather than having the choice in the IE *InitialUE-Identity*. It might save a bit.

***RRCConnectionRequest* field descriptions**

ue-Identity

UE identity used for contention resolution at RRC connection establishment.

establishmentCause

Field description is FFS.

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

Editor's 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)

– *RRConnectionSetup*

The *RRConnectionSetup* message is used to resolve contention and to establish SRBs.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRConnectionSetup message

```
-- ASN1START
RRConnectionSetup ::=
    rrc-TransactionIdentifier      SEQUENCE {
        criticalExtensions        RRC-TransactionIdentifier,
        rrcConnectionSetup-r8    CHOICE {
            criticalExtensions    RRCConnectionSetup-r8-IEs,
                                SEQUENCE {}
        }
    }

RRConnectionSetup-r8-IEs ::=
    radioResourceConfiguration    SEQUENCE {
        ...                       RadioResourceConfiguration,
    }
-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

RRConnectionSetup field descriptions

radioResourceConfiguration

Only SRB1 configuration information is applicable

Editor's note: A separate version of the IE *RadioResourceConfiguration* should be considered, allowing only SRB1 configuration. It could remove a number of potential error cases the UE would otherwise have to handle.

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

– *RRConnectionSetupComplete*

The *RRConnectionSetupComplete* message is used to confirm the successful completion of an RRC connection establishment.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

RRConnectionSetupComplete message

```
-- ASN1START
RRConnectionSetupComplete ::=
    rrc-TransactionIdentifier      SEQUENCE {
        criticalExtensions        RRC-TransactionIdentifier,
        rrcConnectionSetupComplete-r8 CHOICE {
            criticalExtensions    RRCConnectionSetupComplete-r8-IEs,
                                SEQUENCE {}
        }
    }
-- ASN1STOP
```

```

RRCConnectionSetupComplete-r8-IEs ::= SEQUENCE {
    selectedPLMN-Identity      SelectedPLMN-Identity,
    registeredMME              RegisteredMME,
    nas-DedicatedInformation   NAS-DedicatedInformation,
    ...
}
-- ASN1STOP

```

Editor's note: The extension mechanisms in this message are FFS.

<i>RRCConnectionSetupComplete</i> field descriptions
<i>selectedPLMN-Identity</i> Field description is FFS. Unclear if a separate IE is needed, might be just an integer index (FFS).
<i>registeredMME</i> Field description is FFS.
<i>nas-DedicatedInformation</i> Field description is FFS.

Editor's note: Is there a relation between the *selectedPLMN-Identity* and the *registeredMME*, or are they independent? – Should likely be different entities; need to confirm (FFS).

– ***RRCStatus***

The *RRCStatus* message is used to indicate an RRC protocol error.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***RRCStatus* message**

```

-- ASN1START
RRCStatus ::=
    rrc-TransactionIdentifier      RRC-TransactionIdentifier,
    criticalExtensions              CHOICE {
        rrcStatus-r8              RRCStatus-r8-IEs,
        criticalExtensions         SEQUENCE {}
    }
-- ASN1STOP

```

Editor's note: The extension mechanisms in this message are FFS.

<i>RRCStatus</i> field descriptions
%fieldIdentifier%

– SecurityModeCommand

The *SecurityModeCommand* message is used to command the activation of AS security.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

SecurityModeCommand message

```
-- ASN1START
SecurityModeCommand ::= SEQUENCE {
    rrc-TransactionIdentifier RRC-TransactionIdentifier,
    criticalExtensions CHOICE {
        c1 CHOICE{
            securityModeCommand-r8 SecurityModeCommand-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions SEQUENCE {}
    }
}

SecurityModeCommand-r8-IEs ::= SEQUENCE {
    securityConfiguration SecurityConfiguration,
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

SecurityModeCommand field descriptions

securityConfiguration

Field description is FFS.

– SecurityModeComplete

The *SecurityModeComplete* message is used to confirm the successful completion of a security mode command.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

SecurityModeComplete message

```
-- ASN1START
SecurityModeComplete ::= SEQUENCE {
    rrc-TransactionIdentifier RRC-TransactionIdentifier,
    criticalExtensions CHOICE {
        securityModeComplete-r8 SecurityModeComplete-r8-IEs,
        criticalExtensions SEQUENCE {}
    }
}

SecurityModeComplete-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.
    ...
}
```

FFS

```
}  
-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

<i>SecurityModeComplete</i> field descriptions
%fieldIdentifier%

– *SecurityModeFailure*

The *SecurityModeFailure* message is used to indicate an unsuccessful completion of a security mode command.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

SecurityModeFailure message

```
-- ASN1START  
SecurityModeFailure ::= SEQUENCE {  
    rrc-TransactionIdentifier RRC-TransactionIdentifier,  
    criticalExtensions CHOICE {  
        securityModeFailure-r8 SecurityModeFailure-r8-IEs,  
        criticalExtensions SEQUENCE {}  
    }  
}  
SecurityModeFailure-r8-IEs ::= SEQUENCE {  
    -- Enter the IEs here. FFS  
    ...  
}  
-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

<i>SecurityModeFailure</i> field descriptions
%fieldIdentifier%

– *SystemInformation*

The *SystemInformation* message is used convey one or more System Information Blocks. All the SIBs included are transmitted with the same periodicity.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E-UTRAN to UE

SystemInformation message

```
-- ASN1START  
SystemInformation ::= SEQUENCE {
```

```
criticalExtensions      CHOICE {
  systemInformation-r8  SystemInformation-r8-IEs,
  criticalExtensions    SEQUENCE {}
}

SystemInformation-r8-IEs ::= SEQUENCE (SIZE (1..maxSIB)) OF SEQUENCE {      -- Size is FFS
  sib-Type              SIB-Type,                                           -- FFS
  sib-Info              OCTET STRING,                                         -- FFS
  ...
}

-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

<i>SystemInformation</i> field descriptions
sib-Type Field description is FFS.
sib-Info Field description is FFS.

Editor's note: In order to support protocol extension, each SIB may be carried in a separate container e.g. an octet string.

– *SystemInformationMaster*

The *SystemInformationMaster* message is used to convey the IE *MasterInformationBlock*.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E-UTRAN to UE

SystemInformationMaster message

```
-- ASN1START
SystemInformationMaster ::=      MasterInformationBlock
-- ASN1STOP
```

<i>SystemInformation</i> field descriptions
Void

– *SystemInformation1*

The *SystemInformation1* message is used to convey the IE *SystemInformationBlockType1*.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E-UTRAN to UE

***SystemInformation1* message**

```
-- ASN1START
SystemInformation1 ::=                SystemInformationBlockType1
-- ASN1STOP
```

<i>SystemInformation</i> field descriptions
<i>Void</i>

– *UECapabilityEnquiry*

The *UECapabilityEnquiry* message is used to request the transfer of UE radio access capabilities for E-UTRA as well as for other RATs.

Signalling radio bearer: SRB1 or SRB2 (FFS)

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

***UECapabilityEnquiry* message**

```
-- ASN1START
UECapabilityEnquiry ::=                SEQUENCE {
    rrc-TransactionIdentifier          RRC-TransactionIdentifier,
    criticalExtensions                 CHOICE {
        ueCapabilityEnquiry-r8        UECapabilityEnquiry-r8-IEs,
        criticalExtensions             SEQUENCE {}
    }
}

UECapabilityEnquiry-r8-IEs ::=         SEQUENCE {
    ue-RadioAccessCapRequest          UE-RadioAccessCapRequest,
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

<i>UECapabilityEnquiry</i> field descriptions
<i>ue-RadioAccesCapabilityReq</i> Field description is FFS.

– *UECapabilityInformation*

The *UECapabilityInformation* message is used to transfer of UE radio access capabilities requested by the E-UTRAN.

Signalling radio bearer: SRB1 or SRB2 (FFS)

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

UECapabilityInformation message

```
-- ASN1START
UECapabilityInformation ::= SEQUENCE {
    rrc-TransactionIdentifier    RRC-TransactionIdentifier,
    criticalExtensions           CHOICE {
        c1                      CHOICE {
            ueCapabilityInformation-r8    UECapabilityInformation-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensions           SEQUENCE {}
    }
}

UECapabilityInformation-r8-IEs ::= SEQUENCE (SIZE (1..maxRAT-Capabilities)) OF SEQUENCE {
    rat-Type                    RAT-Type,
    ueCapabilitesRAT-Container  OCTET STRING,
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this message are FFS.

UECapabilityInformation field descriptions

ueCapabilitesRAT-Container

Container for the UE capabilities of the indicated RAT. The encoding is defined in the specification of each RAT:

For E-UTRA: the encoding of UE capabilities is defined in IE *UE-EUTRA-Capability*.

For UTRA: the encoding of UE capabilities is defined in IE [FFS] [25.331].

For GERAN: the encoding of UE capabilities is defined in IE [FFS] [24.008 and/or 44.018; FFS].

– *ULInformationTransfer*

The *ULInformationTransfer* message is used for the uplink transfer of dedicated NAS information.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

ULInformationTransfer message

```
-- ASN1START
ULInformationTransfer ::= SEQUENCE {
    criticalExtensions           CHOICE {
        ulInformationTransfer-r8    ULInformationTransfer-r8-IEs,
        criticalExtensions           SEQUENCE {}
    }
}
-- ASN1STOP
```

```

ULInformationTransfer-r8-IEs ::= SEQUENCE {
    informationType CHOICE {
        nas3GPP NAS-DedicatedInformation,
        cdma2000 SEQUENCE {
            cdma2000-Type CDMA2000-Type,
            cdma2000-MessageType ENUMERATED {handover, other},
            cdma2000-DedicatedInfo OCTET STRING
        }
    },
    ...
}
-- ASN1STOP

```

Editor's note: The extension mechanisms in this message are FFS.

<i>ULInformationTransfer</i> field descriptions
<i>nas3GPP</i> Field description is FFS.
<i>cdma2000-Type</i> Field description is FFS.
<i>cdma2000-MessageType</i> Field description is FFS.
<i>cdma2000-DedicatedInfo</i> Field description is FFS.

6.3 RRC information elements

6.3.1 System information blocks

Editor's note: This section was intended for IEs purely related to system information transmission aspects e.g. scheduling, SIB mapping. The SIB types may actually disappear once the further details of the SIs are agreed.

It is FFS which SI 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 SI 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

– *MasterInformationBlock*

The IE *MasterInformationBlock* defines the most essential physical layer information of the cell required to receive further system information.

MasterInformationBlock information element

```

-- ASN1START
MasterInformationBlock ::= SEQUENCE {
    dl-SystemBandwidth BIT STRING (SIZE (4)),
    numberOfTransmitAntennas BIT STRING (SIZE (4)),
    phich-Configuration PHICH-Configuration,
    systemFrameNumber BIT STRING (SIZE (8))
}
-- ASN1STOP

```

<i>MasterInformationBlock</i> field descriptions
dl-SystemBandwidth type and value range FFS
numberOfTransmitAntennas need and type and value range FFS
systemFrameNumber Defines the 8 most significant bits of the SFN

– SIB-Type

The IE *SIB-Type* is used %%

SIB-Type information element

```
-- ASN1START
SIB-Type ::=
    ENUMERATED {
        sibType1,          -- FFS if SIB1 need explicit indication
        sibType2, sibType3, sibType4, sibType5,
        sibType6, sibType7, sibType8,
        spare8, spare7, spare6, spare5,
        spare4, spare3, spare2, spare1}
-- ASN1STOP
```

<i>SIB-Type</i> field descriptions
Void

– SystemInformationBlockType1

The IE *SystemInformationBlock1* contains information relevant when evaluating if a UE is allowed to access a cell and defines the scheduling of other system information blocks.

Editor's note RAN1 has agreed (R2-080475) that DL RX Tx power should be indicated on BCCH mapped to DL-SCH. FFS in which SIB and SI this should be provided

SystemInformationBlockType1 information element

```
-- ASN1START
SystemInformationBlockType1 ::=
    SEQUENCE {
        cellAccessRelatedInformation
            SEQUENCE {
                plmn-IdentityList
                    SEQUENCE (SIZE (1..6)) OF SEQUENCE {
                        plmn-Identity
                            PLMN-Identity,
                        cellReservedForOperatorUse
                            BOOLEAN
                    },
                trackingAreaCode
                    TrackingAreaCode,
                cellIdentity
                    CellIdentity,
                cellBarred
                    BOOLEAN,
                intraFrequencyCellReselection
                    BOOLEAN OPTIONAL, -- Cond CellBarred
                cellReservationExtension
                    BOOLEAN,
                csg-Indication
                    BOOLEAN
            },
        cellSelectionInfo
            SEQUENCE {
                q-Rxlevmin
                    INTEGER (-60..-28) -- value range FFS
                    -- need FFS
            },
        frequencyBandIndicator
            INTEGER (1..64),
        schedulingInformation
            SEQUENCE (SIZE (1..maxSI-Message)) OF SEQUENCE {
                si-MessageType
                    SEQUENCE {}, -- FFS
                si-Periodicity
                    ENUMERATED {
                        ms80, ms160, ms320, ms640}, -- value range FFS
                sib-MappingInfo
                    SEQUENCE {} -- FFS
            },
        systemInformationValueTag
            INTEGER (0), -- value is 3..5 bits FFS
        ...
    }
```

-- ASN1STOP

Editor's note: The extension mechanisms in this system information block are FFS.

Editor's note: (IE *frequencyBandIndicator*) Is the range going to be 1..64 sufficient? (FFS)

SystemInformationBlockType1 field descriptions
cellReservedForOperatorUse TRUE means reserved
trackingAreaCode Common TAC for all the PLMNs listed
cellBarred TRUE means barred for all calls
intraFrequencyCellReselection FFS if needed
cellReservationExtension TRUE means reserved
csg-Indication 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
q-Rxlevmin Actual value $Q_{rxlevmin} = \text{IE value} * 2$ RSRP [dBm] FFS within <i>cellSelectionInfo</i>
frequencyBandIndicator Defined in [36.101].
schedulingInformation Exact structure and whether additional IEs are needed is FFS e.g. (common) size of and/ or gap between SI messages.
si-MessageType
si-Periodicity
sib-MappingInfo List of the SIBs mapped to this SYSTEM INFORMATION MESSAGE (FFS)
systemInformationValueTag Common for all SIs other than SI-1

Conditional presence	Explanation
<i>CellBarred</i>	The IE is mandatory present if the IE <i>cellBarred</i> is set to TRUE; otherwise the IE is not needed.

SystemInformationBlockType2

The IE *SystemInformationBlockType2* contains common and shared channel information.

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.

SystemInformationBlockType2 information element

```
-- ASN1START
SystemInformationBlockType2 ::= SEQUENCE {
    accessBarringInformation SEQUENCE {
        accessBarringForTerminatingCalls BOOLEAN,
        accessProbabilityFactor INTEGER (0), -- type and value range FFS
        accessClassBarringTime AccessClassBarringTime,
        accessClassBarringList SEQUENCE (SIZE (6)) OF SEQUENCE {
            accessClassBarring BOOLEAN
        }
    }
} OPTIONAL, -- Need OP
```

```

semiStaticCommonChConfig      SemiStaticCommonChConfigSIB,
semiStaticSharedChConfig      SemiStaticSharedChConfig,
ue-TimersAndConstants         UE-TimersAndConstants,
frequencyInformation          SEQUENCE {
    ul-EARFCN                  INTEGER (0..maxEARFCN)          OPTIONAL,    -- Need OP
    ul-Bandwidth               ENUMERATED {ffs},                -- 4-bit field FFS
    additionalSpectrumEmission INTEGER (0..31)
},
...
}

AccessClassBarringTime ::=      ENUMERATED {                    -- values to be confirmed FFS
    min2, min3, min4, min5, min7, min10, min14, min20}

-- ASN1STOP

```

Editor's note: The extension mechanisms in this system information block are FFS.

Editor's note: Shouldn't the field *accessClassBarring* as a whole be optionally present? If access class barring is not applied, none of that information is needed.

SystemInformationBlockType2 field descriptions
<i>accessBarringForTerminatingCalls</i> TRUE means barred
<i>accessProbabilityFactor</i> type and value range is FFS
<i>accessClassBarringTime</i> Timer value in minutes.
<i>accessClassBarringList</i> Access class barring for AC 10-15. First in the list is for AC 10, second in the list is for AC 11, and so on
<i>ul-EARFCN</i> Default value determined from default TX-RX frequency separation defined in [36.101]
<i>ul-Bandwidth</i> Parameter: Uplink bandwidth [36.101]
<i>additionalSpectrumEmission</i> Defined in [36.101]

– SystemInformationBlockType3

The IE *SystemInformationBlockType3* contains cell re-selection information, mainly related to the serving cell.

SystemInformationBlockType3 information element

```

-- ASN1START

SystemInformationBlockType3 ::=      SEQUENCE {
    cellReselectionInfoServingCell    CellReselectionInfoServingCell,
    cellReselectionInfoCommon         CellReselectionInfoCommon,
    q-Hyst                             INTEGER (0..8),                -- value range FFS
    t-Reselection                     INTEGER (0..7),
    s-IntraSearch                      INTEGER (-60..-28)                OPTIONAL, -- value range FFS
    speedDependentReselection          SEQUENCE {}                     OPTIONAL, -- FFS
    sameRefSignalsInNeighbour          BOOLEAN,
    mbsfn-NeighbourCellConfig          SEQUENCE {}                     OPTIONAL, -- 2-bit field FFS
    ...
}

-- ASN1STOP

```

Editor's note: The extension mechanisms in this system information block are FFS.

SystemInformationBlockType3 field descriptions
cellReselectionInfoServingCell Cell re-selection information of serving cell
cellReselectionInfoCommon Cell re-selection information common for cells, e.g. <i>Ssearch</i>
q-Hyst Actual value <i>q-Hyst</i> = IE value * 2 In dB
t-Reselection In seconds
s-IntraSearch Actual value <i>s-IntraSearch</i> = IE value * 2 In dB
sameRefSignalsInNeighbour Valid only in TDD operation [RAN1 spec; FFS]. If TRUE: the UE may assume that the same reference signals are available in neighbour cells as in serving cell.
mbsfn-NeighbourCellConfig Parameter: Neighbour-cell configuration [RAN1 spec; cf. RAN2-59: R2-073598; FFS]

– SystemInformationBlockType4

The IE *SystemInformationBlockType4* contains information about the serving neighbouring frequencies and intra-frequency neighbouring cells relevant for cell re-selection, covering both E-UTRA and other RATs. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

SystemInformationBlockType4 information element

```
-- ASN1START
SystemInformationBlockType4 ::= SEQUENCE {
    servingFreqCellReselectionInfo SEQUENCE {
        s-NonIntraSearch INTEGER (-60..-28) OPTIONAL,
        threshServingLow INTEGER (-60..-28),
        cellReselctionPriority INTEGER (0..7) OPTIONAL,
    },
    intraFreqNeighbouringCellList SEQUENCE (SIZE (1..maxCellIntra)) OF SEQUENCE {
        physicalCellIdentity PhysicalCellIdentity,
        q-OffsetCell INTEGER (-15..15) DEFAULT 0,
    } OPTIONAL,
    intraFreqBlacklistedCellList SEQUENCE (SIZE (1..maxCellBlack)) OF SEQUENCE {
        physicalCellIdentity PhysicalCellIdentity,
    } OPTIONAL,
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

SystemInformationBlockType4 field descriptions
servingFreqCellReselectionInfo
s-NonIntraSearch Actual value <i>s-NonIntraSearch</i> = IE value * 2 In dB
threshServingLow Actual value <i>threshServingLow</i> = IE value * 2 In dB
cellReselcetonPriority Absolute priority of the serving layer (0 means: highest priority)
intraFreqNeighbouringCellList List of neighbouring cells with specific cell re-selection parameters. Location of this IE is FFS, i.e. it may also be in SIB3
q-OffsetCell Actual value <i>q-OffsetCell</i> = IE value * 2. In dB
intraFreqBlacklistedCellList List of blacklisted intra-frequency neighbouring cells

– SystemInformationBlockType5

The IE *SystemInformationBlockType5* contains information about other E-UTRA frequencies and inter-frequency neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

SystemInformationBlockType5 information element

```
-- ASN1START
SystemInformationBlockType5 ::= SEQUENCE {
    interFreqCarrierFreqList SEQUENCE (SIZE (1..maxFreq)) OF SEQUENCE {
        eutra-CarrierFreq EUTRA-CarrierFreq,
        threshX-High INTEGER (-60..-28), -- value range FFS
        threshX-Low INTEGER (-60..-28), -- value range FFS
        cellReselcetonPriority INTEGER (0..7) OPTIONAL, -- value range FFS
        q-OffsetFreq INTEGER (-15..15) DEFAULT 0,
        interFreqNeighbouringCellList SEQUENCE (SIZE (1..maxCellInter)) OF SEQUENCE {
            physicalCellIdentity PhysicalCellIdentity,
            q-OffsetCell INTEGER (-15..15) DEFAULT 0
        } OPTIONAL,
        interFreqBlacklistedCellList SEQUENCE (SIZE (1..maxCellBlack)) OF SEQUENCE {
            physicalCellIdentity PhysicalCellIdentity
        } OPTIONAL
    },
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

SystemInformationBlockType5 field descriptions
threshX-High Parameter "Thres _{x,high} " [36.304]. Actual value in dBm = IE value * 2.
threshX-Low Parameter "Thres _{x,low} " [36.304]. Actual value in dBm = IE value * 2.
cellReselctionPriority Absolute priority of the serving layer (0 means: highest priority)
q-OffsetFreq Actual value $q\text{-OffsetFreq}$ = IE value * 2. In dB
interFreqNeighbouringCellList List of inter-frequency neighbouring cells with specific cell re-selection parameters.
q-OffsetCell Actual value $q\text{-OffsetCell}$ = IE value * 2. In dB
interFreqBlacklistedCellList List of blacklisted inter-frequency neighbouring cells

– SystemInformationBlockType6

The IE *SystemInformationBlockType6* contains information about UTRA frequencies and UTRA neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

Editor's note: In accordance with TS 36.300, cell specific parameters are not included in this SIB.

SystemInformationBlockType6 information element

```
-- ASN1START
SystemInformationBlockType6 ::= SEQUENCE {
    utra-CellReselectionPriority    INTEGER (0..7)                OPTIONAL,
    utra-CarrierFreqList           SEQUENCE (SIZE (1..maxUTRA-Carrier)) OF SEQUENCE {
        utra-CarrierFreq          UTRA-CarrierFreq,
        threshHigh                 INTEGER (-60..-28),             -- value range FFS
        threshLow                  INTEGER (-60..-28),             -- value range FFS
        q-OffsetFreq               INTEGER (-15..15)               DEFAULT 0
    } OPTIONAL,
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

SystemInformationBlockType6 field descriptions
utra-CellReselectionPriority Absolute priority of the RAT (0 means: highest priority). FFS if priority should be given per frequency
utra-CarrierFreqList List of carrier frequencies
threshHigh Actual value $threshHigh$ = IE value * 2 In dBm
threshLow Actual value $threshLow$ = IE value * 2 In dBm
q-OffsetFreq Actual value $q\text{-OffsetFreq}$ = IE value * 2. In dB

– **SystemInformationBlockType7**

The IE *SystemInformationBlockType7* contains information about GERAN frequencies and GERAN neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

SystemInformationBlockType7 information element

```
-- ASN1START
SystemInformationBlockType7 ::=      SEQUENCE {
    geran-CellReselectionPriority      INTEGER (0..7)                OPTIONAL,
    geran-CarrierFreqList              SEQUENCE (SIZE (1..maxGERAN-Carrier)) OF SEQUENCE {
        geran-CarrierFreq              GERAN-CarrierFreq,
        q-Rxlevmin                     INTEGER (-60..-28),           -- value range FFS
        threshHigh                     INTEGER (-60..-28),           -- value range FFS
        threshLow                      INTEGER (-60..-28),           -- value range FFS
        q-OffsetFreq                   INTEGER (-15..15)              DEFAULT 0
    } OPTIONAL,
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

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

SystemInformationBlockType7 field descriptions
geran-CellReselectionPriority Absolute priority of the RAT (0 means: highest priority). FFS if priority should be given per frequency
geran-carrierFreqList List of carrier frequencies It is FFS if other frequency specific information may be provided, e.g. "NCC permitted" for country borders
q-Rxlevmin Actual value $q\text{-Rxlevmin} = \text{IE value} * 2$ In dBm
threshHigh Actual value $\text{threshHigh} = \text{IE value} * 2$ In dBm
threshLow Actual value $\text{threshLow} = \text{IE value} * 2$ In dBm
q-OffsetFreq Actual value $q\text{-OffsetFreq} = \text{IE value} * 2$. In dB

– **SystemInformationBlockType8**

The IE *SystemInformationBlockType8* contains information about CDMA2000 frequencies and CDMA2000 neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

SystemInformationBlockType8 information element

```
-- ASN1START
SystemInformationBlockType8 ::=      SEQUENCE {
    -- Enter the IEs here.
    ...
}
-- ASN1STOP
```

Editor's note: The extension mechanisms in this system information block are FFS.

SystemInformationBlockType8 field descriptions
%fieldIdentifier%

6.3.2 Radio resource control information elements

– CQI-Reporting

The IE *CQI-ReportingSIB* and IE *CQI-Reporting* are used to specify the CQI reporting configuration in the system information and in the dedicated signalling, respectively.

CQI-Reporting information elements

```
-- ASN1START
CQI-ReportingSIB ::=
    nomPDSCH-RS-EPRE-Offset      SEQUENCE {
                                   INTEGER (0)                                -- value range FFS
    }

CQI-Reporting ::=
    pucch-Resource                SEQUENCE {
                                   SEQUENCE {},                                -- size, encoding FFS
    reportingConfigInfo          SEQUENCE {
                                   periodicity      ENUMERATED {ffs},          -- size, encoding FFS
                                   subFrameOffset   ENUMERATED {ffs},          -- size, encoding FFS
                                   cqi-BurstLength  ENUMERATED {ffs},          -- size, encoding FFS
                                   cqi-FormatIndicatorPeriodic ENUMERATED {ffs}, -- size, encoding FFS
                                   cqi-FormatIndicatorAperiodic ENUMERATED {ffs} -- size, encoding FFS
                                   } OPTIONAL,                                -- Need OC
    nomPDSCH-RS-EPRE-Offset      INTEGER (0)                                OPTIONAL -- Need OC
    }
-- ASN1STOP
```

CQI-Reporting field descriptions
pucch-Resource PUCCH resource (frequency and cyclic shift) to use for CQI reporting [RAN1 specification; FFS]
periodicity Parameter: Periodicity (N_P) [RAN1 specification; FFS]
subFrameOffset Parameter: Subframe offset (N_{OFFSET}) [RAN1 specification; FFS]
cqi-BurstLength Parameter: CQI burst length [RAN1 specification; FFS]
cqi-FormatIndicatorPeriodic Parameter: CQI format indicator(s) for periodic reporting [RAN1 specification; FFS]
cqi-FormatIndicatorAperiodic Parameter: CQI format indicator for aperiodic reporting [RAN1 specification; FFS]
nomPDSCH-RS-EPRE-Offset Parameter: Nominal PDSCH-to-RS-EPRE-offset [RAN1 specification; FFS].

– DedicatedRandomAccessParams

The IE *DedicatedRandomAccessParams* is used to specify the dedicated random access parameters.

DedicatedRandomAccessParams information element

```
-- ASN1START
DedicatedRandomAccessParams ::=
    ra-PreambleIndex      INTEGER (1..64),
    ra-PreambleExpiration  INTEGER (0)                                OPTIONAL -- need, range FFS
}
-- ASN1STOP
```

DedicatedRandomAccessParams field descriptions
ra-PreambleIndex Explicitly signalled Random Access Preamble in [36.321].
ra-PreambleExpiration Expiry time of the explicitly signalled Random Access Preamble. Value in [FFS] .

– GenericRandomAccessParams

The IE *GenericRandomAccessParams* is used to specify the generic random access parameters.

GenericRandomAccessParams information element

```
-- ASN1START
GenericRandomAccessParams ::=          SEQUENCE {
    preambleInformation                SEQUENCE {
        numberOfRA-Preambles          INTEGER (1..64) DEFAULT 1,          -- default FFS
        sizeOfRA-PreamblesGroupA      INTEGER (0)          DEFAULT 0      -- range, default FFS
    },
    powerRampingParameters            SEQUENCE {
        powerRampingSetup              INTEGER (0)          DEFAULT 0      -- range, default FFS
    }
}
-- ASN1STOP
```

GenericRandomAccessParams field descriptions
numberOfRA-Preambles Number of non-dedicated random access preambles [36.321].
sizeOfRA-PreamblesGroupA Size of the random access preambles group A [36.321]. Value in [FFS] .
powerRampingSetup Parameter: <i>POWER_RAMP_STEP</i> [36.321]. Value in dB .

– LogicalChannelConfig

The IE *LogicalChannelConfig* is used to configure the logical channel parameters.

LogicalChannelConfig information element

```
-- ASN1START
LogicalChannelConfig ::=          SEQUENCE {
    ul-SpecificParameters          SEQUENCE {
        priority                    INTEGER (0),          -- range FFS
        prioritizedBitRate          INTEGER (0),          -- need, type, range FFS
        logicalChannelGroup         INTEGER (0..3)        -- need FFS
    } OPTIONAL                                -- Cond UL
}
-- ASN1STOP
```

LogicalChannelConfig field descriptions
priority Logical channel priority in [36.321].
prioritizedBitRate Parameter: <i>Prioritized Bit Rate</i> [36.321]. Value in bytes/second.
logicalChannelGroup Mapping of logical channel to logical channel group [36.321]. (Encoding details are FFS)

Conditional presence	Explanation
UL	The IE is mandatory present for UL logical channels; otherwise it is not needed.

Editor's note: Are the logical channels unidirectional (UL/DL)? If so, should separate logical channel configuration IEs be defined for UL and DL logical channels?

– MAC-Configuration

The IE *MAC-Configuration* is used to specify the MAC layer configuration for data radio bearers.

MAC-Configuration information element

```
-- ASN1START
MAC-Configuration ::=
    SEQUENCE {
        maxNumberOfUL-Transm    INTEGER (0)          OPTIONAL,      -- Cond ConnSU, range FFS
        semiPersistSchedIntervalDL  INTEGER (0)        OPTIONAL,      -- type, range FFS
        semiPersistSchedIntervalUL  INTEGER (0)        OPTIONAL,      -- type, range FFS
        periodicBSR-Timer          INTEGER (0),         -- need, type, range FFS
        drx-Configuration          SEQUENCE {
            onDurationTimer        INTEGER (0)          DEFAULT 0,    -- type, range, default FFS
            drx-InactivityTimer     INTEGER (0)          DEFAULT 0,    -- type, range, default FFS
            drx-RetransmissionTimer INTEGER (0)          DEFAULT 0,    -- type, range, default FFS
            longDRX-Cycle           INTEGER (0)          DEFAULT 0,    -- type, range, default FFS
            shortDRX                SEQUENCE {
                shortDRX-Cycle     INTEGER (0)          DEFAULT 0,    -- type, range, default FFS
                drxShortCycleTimer  INTEGER (0)          DEFAULT 0    -- type, range, default FFS
            }
        } OPTIONAL
    }
-- ASN1STOP
```

MAC-Configuration field descriptions
maxNumberOfUL-Transm Parameter: <i>Maximum number of transmissions</i> [36.321]. If absent in the <i>RRCConnectionSetup</i> message, the default value is [FFS].
semiPersistSchedIntervalDL Semi-persistent scheduling interval in downlink. Value in number of TTI (sub-frames).
semiPersistSchedIntervalUL Semi-persistent scheduling interval in uplink. Value in number of TTI (sub-frames).
periodicBSR-Timer Parameter: <i>PERIODIC_BSR_TIMER</i> [36.321]. Value in number of TTI (sub-frames).
onDurationTimer Parameter: <i>On Duration Timer</i> [36.321]. Value in number of TTI (sub-frames). Default value is [FFS].
drx-InactivityTimer Parameter: <i>DRX Inactivity Timer</i> [36.321]. Value in number of TTI (sub-frames). Default value is [FFS].
drx-RetransmissionTimer Parameter: <i>DRX Retransmission Timer</i> [36.321]. Value in number of sub-frames. Default value is [FFS].
longDRX-Cycle Long DRX cycle in [36.321]. Value in [FFS]. Default value is [FFS].
shortDRX-Cycle Short DRX cycle in [36.321]. Value in [FFS]. Default value is [FFS].
drxShortCycleTimer Parameter: <i>DRX Short Cycle Timer</i> [36.321]. Value in [FFS]. Default value is [FFS].

Conditional presence	Explanation
<i>ConnSU</i>	The IE is mandatory default if the IE is included in <i>RRCConnectionSetup</i> ; otherwise it is optionally present, continue.

– PDCP-Configuration

The IE *PDCP-Configuration* is used to set the configurable PDCP parameters for data radio bearers.

PDCP-Configuration information element

```
-- ASN1START
PDCP-Configuration ::=
    discardTimer          INTEGER (0)                                OPTIONAL,  -- range FFS
    rlc-Mode              CHOICE {
        rlc-AM            SEQUENCE {
            statusReportRequired  BOOLEAN,
            flushTimer           ENUMERATED {ffs}
        },
        rlc-UM            SEQUENCE {
            pdcp-SN-Size        ENUMERATED {len7bits, len12bits}
        }
    },
    headerCompression     CHOICE {
        notUsed           NULL,
        rohc              SEQUENCE {
            maxCID-UL      INTEGER (1..16383)                DEFAULT 15,
            maxCID-DL      INTEGER (1..16383)                DEFAULT 15,
            profiles        SEQUENCE (SIZE (1..maxROHC-Profile)) OF SEQUENCE {
                profileInstance  INTEGER (1..10)              -- editor's note FFS
            }
        }
    }
}
-- ASN1STOP
```

Editor's note: The details with respect to the signalling of the supported ROHC profiles are FFS.

PDCP-Configuration field descriptions
pdcp-SN-Size Indicates the length of the PDCP Sequence Number as specified in [8].
maxCID-UL Highest context ID number to be used in the uplink by the UE compressor.
maxCID-DL Highest context ID number that can be used in the downlink by the eNB compressor.
profiles Profiles used by both compressor and decompressor (FFS) in both UE and UTRAN. Profile 0 shall always be supported and may always be used even if it is not listed.
profileInstance Index to a ROHC profile as specified in [8].

– PHICH-Configuration

The IE *PHICH-Configuration* is used to specify the PHICH configuration.

PHICH-Configuration information element

```
-- ASN1START
PHICH-Configuration ::=
    phich-Duration        ENUMERATED {short, long},
    phich-Resource        ENUMERATED {ffs}                        -- 2-bit field FFS
}
-- ASN1STOP
```

<i>PHICH-Configuration</i> field descriptions
<i>phich-Duration</i> Parameter: <i>Duration</i> [RAN1 specification; FFS]
<i>phich-Resource</i> Parameter: <i>Resource</i> [RAN1 specification; FFS]

– ***PhysicalChConfiguration***

The IE *PhysicalChConfiguration* is used to specify the UE specific physical channel configuration.

***PhysicalChConfiguration* information element**

```
-- ASN1START
PhysicalChConfiguration ::=          SEQUENCE {
    ul-ReferenceSignalsPUSCH          UL-ReferenceSignalsPUSCH,          -- need FFS
    uplinkPowerControl                UplinkPowerControl,                -- need FFS
    pucch-Configuration              PUCCH-Configuration,                -- need FFS
    pusch-Configuration              PUSCH-Configuration,                -- need FFS
    cqi-Reporting                    CQI-Reporting                        -- need FFS
}
-- ASN1STOP
```

<i>PhysicalChConfiguration</i> field descriptions
<i>Void</i>

– ***PRACH-Configuration***

The IE *PRACH-ConfigurationSIB* and IE *PRACH-Configuration* are used to specify the PRACH configuration in the system information and in the mobility control information, respectively.

***PRACH-Configuration* information elements**

```
-- ASN1START
PRACH-ConfigurationSIB ::=          SEQUENCE {
    rootSequenceIndex                INTEGER (0..1023),                  -- 10-bit field FFS
    prach-ConfigInfo                 PRACH-ConfigInfo
}
PRACH-Configuration ::=            SEQUENCE {
    rootSequenceIndex                INTEGER (0..1023),                  -- 10-bit field FFS
    prach-ConfigInfo                 PRACH-ConfigInfo                    OPTIONAL -- Need OC
}
PRACH-ConfigInfo ::=               SEQUENCE {
    prach-Configuration              ENUMERATED {ffs},                  -- 6-bit field FFS
    highSpeedFlag                    ENUMERATED {ffs},                  -- 1-bit field FFS
    zeroCorrelationZoneConfig        ENUMERATED {ffs},                  -- 4-bit field FFS
}
-- ASN1STOP
```

<i>PRACH-Configuration</i> field descriptions
<i>rootSequenceIndex</i> Parameter: <i>Root-sequence-index</i> [RAN1 specification; FFS]
<i>prach-Configuration</i> Parameter: <i>PRACH configuration</i> [RAN1 specification; FFS]
<i>highSpeedFlag</i> Parameter: <i>High-speed flag</i> [RAN1 specification; FFS]
<i>zeroCorrelationZoneConfig</i> Parameter: <i>Zero-correlation-zone configuration</i> [RAN1 specification; FFS]

– PUCCH-Configuration

The IE *PUCCH-ConfigurationSIB* and IE *PUCCH-Configuration* are used to specify the PUCCH configuration in the system information and in the handover case, respectively.

PUCCH-Configuration information elements

```
-- ASN1START

PUCCH-ConfigurationSIB ::=          SEQUENCE {
    pucch-ResourceSize               ENUMERATED {ffs},           -- need, size, encoding FFS
    deltaShift                       ENUMERATED {ffs},           -- 2-bit field FFS
    deltaOffset                     ENUMERATED {ffs},           -- 2-bit field FFS
}

PUCCH-Configuration ::=            SEQUENCE {
    pucch-ResourceSize               ENUMERATED {ffs}           OPTIONAL, -- need, size, encoding FFS
    simultaneousAckNackAndCQI        BOOLEAN,
    deltaShift                       ENUMERATED {ffs},           -- 2-bit field FFS
    deltaOffset                     ENUMERATED {ffs},           -- 2-bit field FFS
}

-- ASN1STOP
```

PUCCH-Configuration field descriptions

pucch-ResourceSize

Parameter: *PUCCH-resource-size* [RAN1 specification; FFS]

simultaneousAckNackAndCQI

Parameter: *Simultaneous transmission of Ack/Nack and CQI* [RAN1 specification; FFS]

deltaShift

Parameter: *Delta_shift* [RAN1 specification; cf. R1-080035; FFS]

deltaOffset

Parameter: *Delta_offset* [RAN1 specification; cf. R1-080035; FFS]

– PUSCH-Configuration

The IE *PUSCH-Configuration* is used to specify the PUSCH configuration

PUSCH-Configuration information element

```
-- ASN1START

PUSCH-Configuration ::=            SEQUENCE {
    parameterM                       ENUMERATED {ffs},           -- 2-bit field FFS
    hoppingMode                     ENUMERATED {interSubFrame, interIntraSubFrame}
}

-- ASN1STOP
```

PUSCH-Configuration field descriptions

parameterM

Parameter: *Parameter M* [RAN1 specification; cf. R1-075086; FFS]

hoppingMode

Parameter: *Hopping mode* [RAN1 specification; FFS]

– RadioResourceConfiguration

The IE *RadioResourceConfiguration* is used %

RadioResourceConfiguration information element

```
-- ASN1START

RadioResourceConfiguration ::=      SEQUENCE {
    srb-List                         SEQUENCE (SIZE (1..2)) OF SEQUENCE {
```

```

    srb-Identity          INTEGER (1..2),          -- to be confirmed FFS
    rlc-Configuration    CHOICE {
        explicit          RLC-Configuration,
        default           NULL
    } OPTIONAL,          -- Cond Setup
    rb-MappingInfo        SEQUENCE {}              OPTIONAL,          -- FFS
    logicalChannelConfig  LogicalChannelConfig     -- Need FFS
} OPTIONAL,
eps-BearerList          SEQUENCE (SIZE (1..maxDRB)) OF SEQUENCE {
    rb-Identity          INTEGER (1),              -- to be confirmed, range FFS
    pdcp-Configuration  PDCP-Configuration        OPTIONAL,          -- Cond Setup
    rlc-Configuration    RLC-Configuration        OPTIONAL,          -- Cond Setup
    rb-MappingInfo        SEQUENCE {}              OPTIONAL,          -- FFS
    logicalChannelConfig  LogicalChannelConfig     -- Need FFS
} OPTIONAL,
mac-Configuration       MAC-Configuration,       -- Need FFS
transportChannelConfig  SEQUENCE {}              OPTIONAL,          -- FFS
physicalChConfiguration PhysicalChConfiguration  OPTIONAL          -- Need OC
}
-- ASN1STOP

```

Editor's note: The RB reconfiguration and RB release cases may require further consideration (FFS).

RadioResourceConfiguration field descriptions

rlc-Configuration

SRB choice indicates whether the RLC configuration is set to the values signalled explicitly or to the values defined in the default RLC configuration table for SRB1. The default choice is only applicable for SRB1.

Conditional presence	Explanation
Setup	The IE is mandatory present if the corresponding SRB/DRB is being setup; otherwise the IE is optionally present, continue.

RLC-Configuration

The IE *RLC-Configuration* is used to specify the RLC configuration of SRBs and DRBs.

RLC-Configuration information element

```

-- ASN1START
RLC-Configuration ::=
    CHOICE {
        am          SEQUENCE {
            ul-AM-RLC  UL-AM-RLC,
            dl-AM-RLC  DL-AM-RLC
        },
        um-Bi-Directional SEQUENCE {
            ul-UM-RLC  UL-UM-RLC,
            dl-UM-RLC  DL-UM-RLC
        },
        um-Uni-Directional-UL SEQUENCE {
            ul-UM-RLC  UL-UM-RLC
        },
        um-Uni-Directional-DL SEQUENCE {
            dl-UM-RLC  DL-UM-RLC
        }
    }

UL-AM-RLC ::=
    SEQUENCE {
        t-PollRetransmit  T-PollRetransmit,
        pollPDU           PollPDU,
        pollByte          PollByte
    }

DL-AM-RLC ::=
    SEQUENCE {
        t-Reordering      T-Reordering,
        t-StatusProhibit  T-StatusProhibit
    }

UL-UM-RLC ::=
    SEQUENCE {
        sn-FieldLength    SN-FieldLength
    }
-- ASN1STOP

```

```

}

DL-UM-RLC ::=
    sn-FieldLength
    t-Reordering
}

SN-FieldLength ::=
    ENUMERATED {size5, size10}

T-PollRetransmit ::=
    ENUMERATED {ffs} -- value range FFS

PollPDU ::=
    ENUMERATED {ffs} -- value range FFS

PollByte ::=
    ENUMERATED {ffs} -- value range FFS

T-Reordering ::=
    ENUMERATED {ffs} -- value range FFS

T-StatusProhibit ::=
    ENUMERATED {ffs} -- value range FFS

-- ASN1STOP

```

RLC-Configuration field descriptions

sn-FieldLength

Indicates the UM RLC SN field size in bits.

t-PollRetransmit

Indicates the value of timer *T_{poll_retransmit}* [7] in milliseconds.

pollPDU

Indicates the value of constant *Poll_PDU* [7] in PDUs.

pollByte

Indicates the value of constant *Poll_Byte* [7] in bytes.

t-Reordering

Indicates the value of timer *T_reordering* [7] in milliseconds.

t-StatusProhibit

Indicates the value of timer *T_status_prohibit* [7] in milliseconds.

SemiStaticCommonChConfig

The IE *SemiStaticCommonChConfigSIB* and IE *SemiStaticCommonChConfig* are used to specify common channel configurations in the system information and in the mobility control information, respectively, e.g., the random access parameters and the static layer-1 parameters.

SemiStaticCommonChConfig information element

```

-- ASN1START

SemiStaticCommonChConfigSIB ::=
    genericRandomAccessParams
    referenceSignalPower
    prach-Configuration
}

SemiStaticCommonChConfig ::=
    genericRandomAccessParams
    numberOfTransmitAntennas
    phich-Configuration
    referenceSignalPower
    prach-Configuration
}

-- ASN1STOP

```

-- encoding FFS

-- Need OC, 2-bit field FFS

OPTIONAL, -- Need OC

-- need, encoding FFS

SemiStaticCommonChConfig field descriptions

numberOfTransmitAntennas

Parameter: *Number of (cell-specific) antenna-ports* [RAN1 specification; FFS]

referenceSignalPower

Parameter: *Reference-signal power* [RAN1 specification; FFS]

– *SemiStaticSharedChConfig*

The IE *SemiStaticSharedChConfig* is used %%

SemiStaticSharedChConfig information element

```
-- ASN1START

SemiStaticSharedChConfig ::=          SEQUENCE {
    ul-ReferenceSignalsPUSCH          UL-ReferenceSignalsPUSCH,
    uplinkPowerControl                UplinkPowerControlSIB,
    pucch-Configuration              PUCCH-ConfigurationSIB,
    pusch-Configuration              PUSCH-Configuration,
    cqi-Reporting                    CQI-ReportingSIB
}

-- ASN1STOP
```

SemiStaticSharedChConfig field descriptions

%fieldIdentifier%

– *UL-ReferenceSignalsPUSCH*

The IE *UL-ReferenceSignalsPUSCH* is used to specify parameters needed for the transmission on PUSCH (or PUCCH).

UL-ReferenceSignalsPUSCH information element

```
-- ASN1START

UL-ReferenceSignalsPUSCH ::=          SEQUENCE {
    groupHoppingEnabled              BOOLEAN,
    groupAssignmentPUSCH              SEQUENCE {},
    sequenceHoppingEnabled            BOOLEAN,
    dynamicCyclicShift                CHOICE {
        dynamicallyAssigned           NULL,
        semiStaticallyAssigned        CyclicShift
    }
}

CyclicShift ::=                      INTEGER (0)

-- ASN1STOP
```

UL-ReferenceSignalsPUSCH field descriptions

<i>groupHoppingEnabled</i>
Parameter: Group-hopping-enabled [RAN1 specification; FFS]
<i>groupAssignmentPUSCH</i>
Parameter: Group-assignment-PUSCH [RAN1 specification; FFS]
<i>sequenceHoppingEnabled</i>
Parameter: Sequence-hopping-enabled [RAN1 specification; FFS]
<i>dynamicCyclicShift</i>
Parameters: Dynamic-cyclic-shift [RAN1 specification; FFS]
<i>cyclicShift</i>
Parameters: Cyclic-shift [RAN1 specification; FFS]

– *UplinkPowerControl*

The IE *UplinkPowerControlSIB* and IE *UplinkPowerControl* are used to specify parameters for uplink power control in the system information and in the dedicated signalling, respectively.

UplinkPowerControl information elements

```
-- ASN1START
```

```

UplinkPowerControlSIB ::= SEQUENCE {
    p0-NominalPUSCH SEQUENCE {
        persistantScheduling INTEGER (0), -- 8-bit field FFS
        nonPersistantScheduling INTEGER (0) -- 8-bit field FFS
    },
    alpha INTEGER (0), -- 3-bit field FFS
    deltaMCS-PUSCH ENUMERATED {ffs}, -- 2-bit field FFS
    tpc-StepSizePUSCH ENUMERATED {ffs}, -- 1-bit field FFS
    p0-PUCCH INTEGER (0), -- 5-bit field FFS
    deltaMCS-PUCCH SEQUENCE (SIZE (0..maxMCS-1)) OF -- size FFS
        ENUMERATED {ffs}, -- (N-1) x 2-bit field FFS
    tpc-StepSizePUCCH ENUMERATED {ffs} -- 2-bit field FFS
}

UplinkPowerControl ::= SEQUENCE {
    -- Enter IEs here (FFS)
}

-- ASN1STOP

```

<i>UplinkPowerControl</i> field descriptions
p0-NominalPUSCH Parameter: $P_{0,NOMINAL_PUSCH}$ [RAN1 specification; FFS]
alpha Parameter: α [RAN1 specification; FFS]
deltaMCS-PUSCH Parameter: Δ_{MCS_PUSCH} [RAN1 specification; FFS]
tpc-StepSizePUSCH Parameter: <i>TPC step size (PUSCH)</i> [RAN1 specification; FFS]
p0-PUCCH Parameter: $P_{0,PUCCH}$ [RAN1 specification; FFS]
deltaMCS-PUCCH Parameter: Δ_{MCS_PUCCH} [RAN1 specification; FFS]
tpc-StepSizePUCCH Parameter: <i>TPC step size (PUCCH)</i> [RAN1 specification; FFS]

6.3.3 Security control information elements

– *CipheringAlgorithm*

The IE *CipheringAlgorithm* is used %%

CipheringAlgorithm information element

```

-- ASN1START
CipheringAlgorithm ::= SEQUENCE {
    -- Enter the IEs here. FFS
}
-- ASN1STOP

```

<i>CipheringAlgorithm</i> field descriptions
%fieldIdentifier%

– *IntegrityProtAlgorithm*

The IE *IntegrityProtAlgorithm* is used %%

IntegrityProtAlgorithm information element

```

-- ASN1START
IntegrityProtAlgorithm ::= SEQUENCE {

```

```
-- Enter the IEs here.
}
-- ASN1STOP
```

FFS

IntegrityProtAlgorithm field descriptions
%fieldIdentifier%

– **KeyIndicator**

The IE *KeyIndicator* is used %%

KeyIndicator information element

```
-- ASN1START
KeyIndicator ::= SEQUENCE {
    -- Enter the IEs here.
}
-- ASN1STOP
```

FFS

KeyIndicator field descriptions
%fieldIdentifier%

– **SecurityConfiguration**

The IE *SecurityConfiguration* is used to configure AS integrity protection (CP) and AS ciphering (CP and UP).

SecurityConfiguration information element

```
-- ASN1START
SecurityConfiguration ::= SEQUENCE {
    integrityProtAlgorithm IntegrityProtAlgorithm,
    cipheringAlgorithm CipheringAlgorithm,
    keyIndicator KeyIndicator OPTIONAL -- Cond Handover
}
-- ASN1STOP
```

SecurityConfiguration field descriptions
integrityProtAlgorithm Field description is FFS.
cipheringAlgorithm The same ciphering algorithm is assumed to be used for SRBs and DRBs
keyIndicator Indicates whether the UE should use the keys associated with latest available Kasme (details FFS).

Conditional presence	Explanation
Handover	The IE is mandatory present if the IE <i>MobilityControlInfo</i> is present in the message; otherwise the IE is not needed.

6.3.4 Mobility control information elements

– *CDMA2000-SystemTimeInfo*

The IE *CDMA2000-SystemTimeInfo* is %%

NOTE: The UE needs the CDMA system time with a certain level of accuracy for performing measurements as well as for communicating with the CDMA network (HRPD or 1xRTT).

Editor's note: Changes of CDMA system time should neither result in system information change notifications nor in a modification of the value tag in SI-1.

***CDMA2000-SystemTimeInfo* information element**

```
-- ASN1START
CDMA2000-SystemTimeInfo ::=          SEQUENCE {
    cdma-EUTRA-Synchronisation        BOOLEAN                OPTIONAL,
    cdma-SystemTime                    SEQUENCE {}            OPTIONAL      -- FFS
}
-- ASN1STOP
```

***CDMA2000-SystemTimeInfo* field descriptions**

cdma-EUTRA-Synchronisation

TRUE indicates that the networks are synchronised i.e. there is no drift in the timing between E-UTRA and CDMA.

cdma-SystemTime

CDMA system time corresponding to the starting boundary of the radio frame with SFN = 0 in the current SFN period

– *CDMA2000-Type*

The IE *CDMA2000-Type* is used to describe the type of CDMA2000 network.

***CDMA2000-Type* information element**

```
-- ASN1START
CDMA2000-Type ::=                      ENUMERATED {type1xRTT, typeHRPD}
-- ASN1STOP
```

***CDMA2000-Type* field descriptions**

cdma2000-Type

Type of CDMA2000 network: 1xRTT or HRPD.

– *CellIdentity*

The IE *CellIdentity* is used %%

***CellIdentity* information element**

```
-- ASN1START
CellIdentity ::=                      SEQUENCE {
    -- Enter the IEs here.
}
-- ASN1STOP
```

<i>CellIdentity</i> field descriptions
%fieldIdentifier%

– *CellReselectionInfoCommon*

The IE *CellReselectionInfoCommon* is used %%

CellReselectionInfoCommon information element

```
-- ASN1START
CellReselectionInfoCommon ::=      SEQUENCE {
    -- Enter the IEs here.
}
-- ASN1STOP
```

FFS

<i>CellReselectionInfoCommon</i> field descriptions
%fieldIdentifier%

– *CellReselectionInfoServingCell*

The IE *CellReselectionInfoServingCell* is used %%

CellReselectionInfoServingCell information element

```
-- ASN1START
CellReselectionInfoServingCell ::= SEQUENCE {
    -- Enter the IEs here.
}
-- ASN1STOP
```

FFS

<i>CellReselectionInfoServingCell</i> field descriptions
%fieldIdentifier%

– *EUTRA-CarrierFreq*

The IE *EUTRA-CarrierFreq* is used %%

EUTRA-CarrierFreq information element

```
-- ASN1START
EUTRA-CarrierFreq ::=      SEQUENCE {
    earfcn-DL          INTEGER (0..maxEARFCN),
    earfcn-UL          INTEGER (0..maxEARFCN)          OPTIONAL    -- Cond FDD
}
-- ASN1STOP
```

<i>EUTRA-CarrierFreq</i> field descriptions
earfcn-DL Defined in [36.101]
earfcn-UL Default value determined from TX-RX frequency specification specified in [36.101]

Conditional presence	Explanation
<i>FDD</i>	The IE is mandatory with default value (default duplex distance defined for the concerned band) in case of "FDD"; otherwise the IE is not needed.

– GERAN-CarrierFreq

The IE *GERAN-CarrierFreq* is used %%

GERAN-CarrierFreq information element

```
-- ASN1START
GERAN-CarrierFreq ::=          SEQUENCE {
    bcch-ARFCN                INTEGER (0..1023),
    bandIndicator              ENUMERATED {dcs1800, pcs1900}
}
-- ASN1STOP
```

GERAN-CarrierFreq field descriptions
bcch-ARFCN GERAN ARFCN of BCCH carrier
bandIndicator Indicates how to interpret the ARFCN of BCCH carrier

– GERAN-CellIdentity

The IE *GERAN-CellIdentity* is used %%

GERAN-CellIdentity information element

```
-- ASN1START
GERAN-CellIdentity ::=          SEQUENCE {
    -- Enter other IEs here.
}
-- ASN1STOP
```

FFS

GERAN-CellIdentity field descriptions
%fieldIdentifier%

– IdleModeMobilityControlInfo

The IE *IdleModeMobilityControlInfo* is used %%

IdleModeMobilityControlInfo information element

```
-- ASN1START
IdleModeMobilityControlInfo ::= SEQUENCE {
    interFreqPriorityInfoList    SEQUENCE (SIZE (1..maxFreq)) OF SEQUENCE {
        eutra-CarrierFreq        EUTRA-CarrierFreq,
        cellReselectionPriority    INTEGER (0..7)
    }
    OPTIONAL,
    geran-CarrierFreqList        SEQUENCE (SIZE (1..maxGERAN-Carrier)) OF SEQUENCE {
        geran-CarrierFreq        GERAN-CarrierFreq,
        geran-CellReselectionPriority    INTEGER (0..7)
    }
    OPTIONAL,
    utra-CarrierFreqList        SEQUENCE (SIZE (1..maxUTRA-Carrier)) OF SEQUENCE {
        utra-CarrierFreq        UTRA-CarrierFreq,
        utra-CellReselectionPriority    INTEGER (0..7)
    }
    OPTIONAL,
}
```

-- value range FFS

-- value range FFS

-- value range FFS

```
cellReselectionPriorityExpiryTimer SEQUENCE {
} OPTIONAL
-- ASN1STOP
```

IdleModeMobilityControllInfo field descriptions
carrierFrequency Field description is FFS. (Could generic descriptions be used to cover multiple cases, i.e.: E-UTRA inter-frequency, GERAN and UTRA?)
cellReselectionPriority Field description is FFS.
cellReselectionPriorityExpiryTimer Upon expiry, the UE discards the inter-frequency and inter-RAT priority information

– *InterRAT-Message*

The IE *InterRAT-Message* is used to transparently carry message corresponding to specifications from another RAT, e.g., handover command, (Packet) System Information as used in case of GERAN network assisted cell change, HRPD "TCA" for mobility to HRPD.

InterRAT-Message information element

```
-- ASN1START
InterRAT-Message ::=
    -- Enter the IEs here.
SEQUENCE {
}
-- ASN1STOP
```

InterRAT-Message field descriptions
%fieldIdentifier%

– *InterRAT-Target*

The IE *InterRAT-Target* is used %%

InterRAT-Target information element

```
-- ASN1START
InterRAT-Target ::=
    -- Enter the IEs here.
SEQUENCE {
}
-- ASN1STOP
```

InterRAT-Target field descriptions
%fieldIdentifier%

– *MobilityControlInformation*

The IE *MobilityControlInformation* includes parameters relevant for network controlled mobility to/within E-UTRA.

Editor's 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

Editor's 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

MobilityControlInformation information element

```
-- ASN1START
MobilityControlInformation ::=
    targetCellIdentity          PhysicalCellIdentity,
    eutra-CarrierFreq           EUTRA-CarrierFreq           OPTIONAL,    -- Need OC
    eutra-CarrierBandwidth     EUTRA-CarrierBandwidth     OPTIONAL,    -- Need OC
    additionalSpectrumEmission INTEGER (0..31)             OPTIONAL,    -- Need OC
    semiStaticCommonChConfig   SemiStaticCommonChConfig   OPTIONAL,
    dedicatedRandomAccessParams DedicatedRandomAccessParams OPTIONAL    -- Need FFS
}

EUTRA-CarrierBandwidth ::=
    dl-Bandwidth               ENUMERATED {ffs},           -- 4-bit field FFS
    ul-Bandwidth               ENUMERATED {ffs},           -- 4-bit field FFS
}

-- ASN1STOP
```

MobilityControlInformation field descriptions
additionalSpectrumEmission Defined in [36.101]
dl-Bandwidth Parameter: <i>Downlink bandwidth</i> [36.101]
ul-Bandwidth Parameter: <i>Uplink bandwidth</i> [36.101]

PhysicalCellIdentity

The IE *PhysicalCellIdentity* is used %%

PhysicalCellIdentity information element

```
-- ASN1START
PhysicalCellIdentity ::=
    INTEGER (1..504)           -- range to be confirmed FFS
-- ASN1STOP
```

PhysicalCellIdentity field descriptions
Void

PLMN-Identity

The IE *PLMN-Identity* covers %%.

PLMN-Identity information element

```
-- ASN1START
PLMN-Identity ::=
    -- Enter other IEs here.
    SEQUENCE {
    }
-- ASN1STOP
```

<i>PLMN-Identity</i> field descriptions
%fieldIdentifier%

– *RedirectionInformation*

The IE *RedirectionInformation* is used to redirect the UE to another E-UTRA or an inter-RAT carrier frequency.

RedirectionInformation information element

```
-- ASN1START

RedirectionInformation ::=          CHOICE {
    eutra-CarrierFreq              EUTRA-CarrierFreq,           -- anything more needed FFS
    interRAT-target                CHOICE {
        geran                      GERAN-CarrierFreq,
        utra                       UTRA-CarrierFreq
    }
}

-- ASN1STOP
```

<i>RedirectionInformation</i> field descriptions
%fieldIdentifier%

– *RegisteredMME*

The IE *RegisteredMME* is used to identify the MME where the UE is registered.

RegisteredMME information element

```
-- ASN1START

RegisteredMME ::=                SEQUENCE {
    mcc                          SEQUENCE {},                  -- need, encoding (sep. IE) FFS
    mnc                          SEQUENCE {},                  -- need, encoding (sep. IE) FFS
    mmegi                        SEQUENCE {},                  -- need, encoding (sep. IE) FFS
    mmec                         SEQUENCE {}                   -- need, encoding (sep. IE) FFS
}

-- ASN1STOP
```

<i>RegisteredMME</i> field descriptions
mcc Field description is FFS.
mnc Field description is FFS.
mmegi Field description is FFS.
mmec Field description is FFS.

Editor's note: The MCC + MNC define a PLMN. The MMEI + MMEC define an MME within the PLMN. PLMN + MMEI + MMEC are the "GUMMEI". How does this relate to the *selectedPLMN-Identity*?

– *SelectedPLMN-Identity*

The IE *SelectedPLMN-Identity* is used to select the NAS node when the S-TMSI is not valid in the TA of the cell. It is applicable in case of an "Initial Direct Transfer".

SelectedPLMN-Identity information element

```
-- ASN1START
```

```
SelectedPLMN-Identity ::=          SEQUENCE {
    -- Enter other IEs here.
}
-- ASN1STOP
```

FFS

SelectedPLMN-Identity field descriptions
%fieldIdentifier%

– TrackingAreaCode

The IE TrackingAreaCode is %%

TrackingAreaCode information element

```
-- ASN1START
TrackingAreaCode ::=          SEQUENCE {
    -- Enter other IEs here.
}
-- ASN1STOP
```

FFS

TrackingAreaCode field descriptions
%fieldIdentifier%

– UTRA-CarrierFreq

The IE UTRA-CarrierFreq is used %%

UTRA-CarrierFreq information element

```
-- ASN1START
UTRA-CarrierFreq ::=          SEQUENCE {
    uarfcn-DL          INTEGER (0..16383),
    uarfcn-UL          INTEGER (0..16383)          OPTIONAL    -- Cond FDD
}
-- ASN1STOP
```

UTRA-CarrierFreq field descriptions
uarfcn-DL If FDD: the IE contains the downlink frequency (Nd) If TDD: the IE contains the (Nt)
uarfcn-UL Contains the uplink frequency (Nu)

Conditional presence	Explanation
FDD	The IE is mandatory with default value (default duplex distance defined for the concerned band) in case of “FDD”; otherwise the IE is not needed.

– UTRA-CellIdentity

The IE *UTRA-CellIdentity* is %%

UTRA-CellIdentity information element

```
-- ASN1START
UTRA-CellIdentity ::=                SEQUENCE {
    -- Enter other IEs here.
}
-- ASN1STOP
```

FFS

UTRA-CellIdentity field descriptions

%fieldIdentifier%

6.3.5 Measurement information elements

– CDMA2000-CarrierInfo

The IE *CDMA2000-CarrierInfo* used to provide the CDMA2000 carrier information.

CDMA2000-CarrierInfo information element

```
-- ASN1START
CDMA2000-CarrierInfo ::=            SEQUENCE {
    bandClass                        INTEGER,
    frequency                        INTEGER
}
-- ASN1STOP
```

-- FFS
-- FFS

CDMA2000-CarrierInfo field descriptions

bandClass

Identifies the CDMA2000 Frequency Band in which the CDMA2000 Carrier can be found.

frequency

Identifies the carrier frequency within a CDMA2000 Band.

– CDMA2000-CellIdentity

The IE *CDMA2000-CellIdentity* identifies the PNOffset that represents the "Physical cell identity" in CDMA2000.

CDMA2000-CellIdentity information element

```
-- ASN1START
CDMA2000-CellIdentity ::=            INTEGER (1..maxPNOffset)
-- ASN1STOP
```

-- FFS

CDMA2000-CellIdentity field descriptions

Void

– *MeasGapConfig*

The IE *MeasGapConfig* specifies the measurement gap configuration and controls activation/ deactivation of measurement gaps.

***MeasGapConfig* information element**

```
-- ASN1START
MeasGapConfig ::=
    gapPattern                SEQUENCE {
                                INTEGER (0)                                OPTIONAL, -- Need OC
                                -- value range FFS
    gapActivation              CHOICE {
        activate                SEQUENCE {
            startSFN             INTEGER,
            startSubframeNumber  INTEGER                                -- FFS
        },
        deactivate              NULL                                -- FFS
    }
}
-- ASN1STOP
```

<i>MeasGapConfig</i> field descriptions
gapPattern Reference to a measurement gap pattern defined in [25.133].
gapActivation Used to activate/ deactivate the measurement gap pattern.
startSFN Specifies the SFN when the measurement gap pattern starts. Need and details are FFS.
startSubframeNumber Specifies the subframe number when the measurement gap pattern starts. Need and details are FFS.

– *MeasId*

The IE *MeasId* is used to identify a measurement configuration, i.e., linking of a measurement object and a reporting configuration.

***MeasId* information element**

```
-- ASN1START
MeasId ::=
    INTEGER (1..maxMeasId)
-- ASN1STOP
```

<i>MeasId</i> field descriptions
Void

– *MeasObjectCDMA2000*

The IE *MeasObjectCDMA2000* specifies information applicable for inter-RAT CDMA2000 neighbouring cells.

Editor’s note: Use of cell individual offset is FFS.

***MeasObjectCDMA2000* information element**

```
-- ASN1START
MeasObjectCDMA2000 ::=
    cdma2000-Type              CDMA2000-Type,
    cdma2000-CarrierInfo        CDMA2000-CarrierInfo                OPTIONAL, -- Need OP
    cdma2000-SearchWindowSize    INTEGER (1..16)                    OPTIONAL, -- Need OC; FFS
    cellsToRemoveList            SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
```

```

        cellIndex                INTEGER (1..maxCellMeas)                -- FFS
    } OPTIONAL,
    cellsToAddModifyList          SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
        cellIndex                INTEGER (1..maxCellMeas),                -- FFS
        cdma2000-CellIdentity     CDMA2000-CellIdentity
    } OPTIONAL
}
-- ASN1STOP

```

MeasObjectCDMA2000 field descriptions

cdma2000-Type
The type of CDMA2000 network.
cdma2000-CarrierInfo
Identifies CDMA2000 carrier frequency for which this configuration is valid.
cdma2000-SearchWindowSize
Provides the search window size to be used by the UE for the neighbouring pilot.
cellsToRemoveList
List of cells to remove from the neighbouring cell list.
cellsToAddModifyList
List of cells to add/ modify in the neighbouring cell list.
cellIndex
Entry index in the neighbouring cell list.
cdma2000-CellIdentity
CDMA2000 Physical cell identity of a cell in neighbouring cell list expressed as PNOffset.

MeasObjectEUTRA

The IE *MeasObjectEUTRA* specifies information applicable for intra-frequency or inter-frequency E-UTRA neighbouring cells. The UE reports all intra-frequency or inter-frequency neighbouring cells, i.e., not just the ones included in this IE, except for the cells included in the black list.

MeasObjectEUTRA information element

```

-- ASN1START
MeasObjectEUTRA ::=
    eutra-CarrierInfo          SEQUENCE {
        offsetFreq             SEQUENCE {},                -- FFS
        -- Neighbour cell list
        cellsToRemoveList      NeighCellsToRemoveList      OPTIONAL,  -- Need OP
        cellsToAddModifyList   NeighCellsToAddModifyList    OPTIONAL,  -- Need OP
        -- Black list
        blackListedCellsToRemoveList BlackListedCellsToRemoveList OPTIONAL,  -- Need OP
        blackListedCellsToAddModifyList BlackListedCellsToAddModifyList OPTIONAL  -- Need OP
    }
NeighCellsToRemoveList ::= SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
    cellIndex                INTEGER (1..maxCellMeas)
}
NeighCellsToAddModifyList ::= SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
    cellIndex                INTEGER (1..maxCellMeas),
    physicalCellIdentity      PhysicalCellIdentity,
    cellIndividualOffset      INTEGER (-15..15)            -- value range FFS
}
BlackListedCellsToRemoveList ::= SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
    blackListedCellIndex      INTEGER (1..maxCellMeas)      -- value range FFS
}
BlackListedCellsToAddModifyList ::= SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
    blackListedCellIndex      INTEGER (1..maxCellMeas),
    blackListedPhysicalCellIdentity PhysicalCellIdentity      -- value range FFS
}
-- ASN1STOP

```

<i>MeasObjectEUTRA</i> field descriptions
<i>eutra-CarrierInfo</i> Identifies E-UTRA carrier frequency for which this configuration is valid.
<i>offsetFreq</i> Offset value applicable to the carrier frequency. Value in dB.
<i>cellsToRemoveList</i> List of cells to remove from the neighbouring cell list.
<i>cellsToAddModifyList</i> List of cells to add/ modify in the neighbouring cell list.
<i>cellIndex</i> Entry index in the neighbouring cell list.
<i>physicalCellIdentity</i> Physical cell identity of a cell in neighbouring cell list.
<i>cellIndividualOffset</i> Cell individual offset applicable to a specific neighbouring cell.
<i>blackListedCellsToRemoveList</i> List of cells to remove from the black list of cells.
<i>blackListedCellsToAddModifyList</i> List of cells to add/ modify in the black list of cells.
<i>blackListedCellIndex</i> Entry index in the black list of cells.
<i>blackListedPhysicalCellIdentity</i> Physical cell identity of a cell in the black list.

— *MeasObjectGERAN*

The IE *MeasObjectGERAN* specifies information applicable for inter-RAT GERAN neighbouring cells. The UE reports all GERAN neighbouring cells, i.e., not just the ones included in this IE.

Editor's note: Use of explicit neighbour cell list and cell individual offset is FFS.

MeasObjectGERAN information element

```
-- ASN1START
MeasObjectGERAN ::=
    geran-CarrierInfoList
    geran-CarrierInfo
    }
    }
-- ASN1STOP
```

-- FFS

<i>MeasObjectGERAN</i> field descriptions
<i>geran-CarrierInfoList</i> List of GERAN carrier frequencies on which GERAN cell BCCH can be found.
<i>geran-CarrierInfo</i> Identifies a GERAN carrier frequency on which GERAN cell BCCH can be found.

— *MeasObjectId*

The IE *MeasObjectId* used to identify a measurement object configuration.

MeasObjectId information element

```
-- ASN1START
MeasObjectId ::=
    INTEGER (1..maxObjectId)
-- ASN1STOP
```

<i>MeasObjectId</i> field descriptions
Void

– *MeasObjectUTRA*

The IE *MeasObjectUTRA* specifies information applicable for inter-RAT UTRA neighbouring cells.

Editor's note: Use of cell individual offset and how FDD/ TDD and the UTRAN cell identity (primary scrambling code) are specified are FFS.

***MeasObjectUTRA* information element**

```
-- ASN1START
MeasObjectUTRA ::=
    SEQUENCE {
        utra-CarrierInfo          SEQUENCE {},
        cellsToRemoveList         SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
            cellIndex              INTEGER (1..maxCellMeas)
        },
        cellsToAddModifyList      SEQUENCE (SIZE (1..maxCellMeas)) OF SEQUENCE {
            cellIndex              INTEGER (1..maxCellMeas),
            utra-CellIdentity      UTRA-CellIdentity
        },
        OPTIONAL
    }
-- ASN1STOP
```

<i>MeasObjectUTRA</i> field descriptions
<i>utra-CarrierInfo</i> Identifies UTRA carrier frequency for which this configuration is valid.
<i>cellsToRemoveList</i> List of cells to remove from the neighbouring cell list.
<i>cellsToAddModifyList</i> List of cells to add/ modify in the neighbouring cell list.
<i>cellIndex</i> Entry index in the neighbouring cell list.
<i>utra-CellIdentity</i> UTRA cell identity of a cell in neighbouring cell list.

– *MeasuredResults*

The IE *MeasuredResults* covers measured results for intra-frequency, inter-frequency and inter- RAT mobility, and for quality, traffic volume, UE internal and positioning measurements.

Editor's note: It has been agreed to identify intra- and inter-frequency neighbours by their physical layer identity

***MeasuredResults* information element**

```
-- ASN1START
MeasuredResults ::=
    SEQUENCE {
        measId                      MeasId,
        measResultServing           SEQUENCE {} OPTIONAL,
        mobilityMeasResults         CHOICE {
            measResultListEUTRA    MeasResultListEUTRA,
            measResultListUTRA     MeasResultListUTRA,
            measResultListGERAN    MeasResultListGERAN,
            measResultListCDMA2000 MeasResultListCDMA2000
        }
    }
MeasResultListEUTRA ::=
    SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {
        physicalCellIdentity      PhysicalCellIdentity,
        measResultEUTRA           SEQUENCE {}
    }
-- FFS
```

```

MeasResultListUTRA ::=          SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {
    utra-CellIdentity            UTRA-CellIdentity,
    measResultUTRA              SEQUENCE {}                                -- FFS
}

MeasResultListGERAN ::=          SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {
    geran-CarrierInfo            SEQUENCE {},                            -- FFS
    geran-CellIdentity           GERAN-CellIdentity,
    measResultGERAN             SEQUENCE {}                                -- FFS
}

MeasResultListCDMA2000 ::=       SEQUENCE (SIZE (1..maxCellReport)) OF SEQUENCE {
    cdma2000-CellIdentity        CDMA2000-CellIdentity,
    measResultCDMA2000          SEQUENCE {}                                -- FFS
}

-- ASN1STOP

```

MeasuredResults field descriptions	
measId	Identifies the measurement identity for which the reporting is being performed.
measResultServing	Measured result of the serving cell. FFS if mandatory or optional.
measResultListEUTRA	List of measured results for the maximum number of reported best cells for an E-UTRA measurement identity.
measResultEUTRA	Measured result of an E-UTRA cell.
measResultListUTRA	List of measured results for the maximum number of reported best cells for a UTRA measurement identity.
measResultUTRA	Measured result of a UTRA cell.
measResultListGERAN	List of measured results for the maximum number of reported best cells or frequencies for a GERAN measurement identity.
measResultGERAN	Measured result of a GERAN cell or frequency.
measResultListCDMA2000	List of measured results for the maximum number of reported best cells for a CDMA2000 measurement identity.
measResultCDMA2000	Measured result of a CDMA2000 cell.

– **MeasurementConfiguration**

The IE *MeasurementConfiguration* specifies measurements to be performed by the UE, and covers intra-frequency, inter-frequency and inter-RAT mobility, quality, traffic volume, UE internal and positioning measurements as well as configuration of measurement gaps.

Editor's note: It has been agreed that the signalling shall support the addition, modification and removal (i.e. delta configuration) of individual measurement objects, reporting configurations and measurement identities.

Editor's note: It has been agreed to introduce a mechanism by which E-UTRAN can request the UE to report the CGI corresponding to an E-UTRA L1 identity (FFS for inter RAT) reported by the UE. The UE is only required to report the GCI if it is provided with sufficient “inactive time”. Further details are FFS.

MeasurementConfiguration information element

```

-- ASN1START
MeasurementConfiguration ::=      SEQUENCE {
    -- Measurement identities
    measIdToRemoveList            MeasIdToRemoveList                    OPTIONAL,  -- Need OP
    measIdToAddModifyList         MeasIdToAddModifyList                 OPTIONAL,  -- Need OP
    -- Measurement objects
    measObjectToRemoveList        MeasObjectToRemoveList                OPTIONAL,  -- Need OP
    measObjectToAddModifyList     MeasObjectToAddModifyList             OPTIONAL,  -- Need OP

```

```

-- Reporting configurations
  reportConfigToRemoveList      ReportConfigToRemoveList      OPTIONAL, -- Need OP
  reportConfigToAddModifyList   ReportConfigToAddModifyList   OPTIONAL, -- Need OP
-- Other parameters
  quantityConfig                QuantityConfig                OPTIONAL, -- Need OC
  measGapConfig                 MeasGapConfig                 OPTIONAL, -- Need OC
  s-Measure                     INTEGER (0)                  OPTIONAL, -- Need OC;FFS
  cdma2000-SystemTimeInfo       CDMA2000-SystemTimeInfo       OPTIONAL, -- Need OC
  mbsfn-NeighbourCellConfig     SEQUENCE {}                  OPTIONAL -- 2-bit field FFS
}

MeasIdToRemoveList ::=
  measId                      SEQUENCE (SIZE (1..maxMeasId)) OF SEQUENCE {
                                MeasId
  }

MeasIdToAddModifyList ::=
  measId                      SEQUENCE (SIZE (1..maxMeasId)) OF SEQUENCE {
  measObjectId                MeasId,
  reportConfigId              MeasObjectId,
                                ReportConfigId
  }

MeasObjectToRemoveList ::=
  measObjectId                SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {
                                MeasObjectId
  }

MeasObjectToAddModifyList ::=
  measObjectId                SEQUENCE (SIZE (1..maxObjectId)) OF SEQUENCE {
  measObject                  MeasObjectId,
                                CHOICE {
  measObjectEUTRA              MeasObjectEUTRA,
  measObjectUTRA              MeasObjectUTRA,
  measObjectGERAN              MeasObjectGERAN,
  measObjectCDMA2000          MeasObjectCDMA2000
                                }
  }

ReportConfigToRemoveList ::=
  reportConfigId              SEQUENCE (SIZE (1..maxReportConfigId)) OF SEQUENCE {
                                ReportConfigId
  }

ReportConfigToAddModifyList ::=
  reportConfigId              SEQUENCE (SIZE (1..maxReportConfigId)) OF SEQUENCE {
  reportConfig                ReportConfigId,
                                CHOICE {
  reportConfigEUTRA            ReportConfigEUTRA,
  reportConfigInterRAT         ReportConfigInterRAT,
  reportConfigPeriodical       ReportConfigPeriodical
                                }
  }

-- ASN1STOP

```

<i>MeasurementConfiguration</i> field descriptions	
measIdToRemoveList	List of measurement identities to remove.
measIdToAddModifyList	List of measurement identities to add/ modify.
measId	Used to link a measurement object to a reporting configuration.
measObjectToRemoveList	List of measurement objects to remove.
measObjectToAddModifyList	List of measurement objects to add/ modify.
measObjectId	Used to identify a measurement object configuration.
measObject	Specifies measurement object configurations for E-UTRA, UTRA, GERAN, or CDMA2000 measurements.
reportConfigToRemoveList	List of measurement reporting configurations to remove.
reportConfigToAddModifyList	List of measurement reporting configurations to add/ modify.
reportConfigId	Used to identify a measurement reporting configuration.
reportConfig	Specifies measurement reporting configurations for E-UTRA, UTRA, GERAN, or CDMA2000 measurements.
quantityConfig	Specifies measurement quantities for E-UTRA, UTRA, GERAN, or CDMA2000 and L3 filtering coefficients for E-UTRA, UTRA or GERAN measurements.
measGapConfig	Used to configure measurement gap pattern and control activation/ deactivation of measurement gaps.
gapPattern	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]
measurementGapActivation	This parameter is used to start/stop a measurement gap configuration. TRUE means activated.
s-Measure	Serving cell quality threshold controlling whether or not the UE is required to perform measurements. Value in dBm. The definition of this parameter and the applicability to intra-frequency, inter-frequency and inter-RAT are FFS.
cdma2000-SystemTimeInfo	Provides the CDMA2000 system time information relative to E-UTRA of the carrier frequency for which this configuration is valid.
mbsfn-NeighbourCellConfig	Parameter: <i>Neighbour-cell configuration</i> [RAN1 spec; cf. RAN2-59: R2-073598; FFS]

QuantityConfig

The IE *QuantityConfig* specifies the measurement quantities and filtering coefficients.

QuantityConfig information element

```
-- ASN1START
QuantityConfig ::=
    SEQUENCE {
        quantityConfigEUTRA      QuantityConfigEUTRA      OPTIONAL,  -- Need OC
        quantityConfigUTRA       QuantityConfigUTRA         OPTIONAL,  -- Need OC
        quantityConfigGERAN       QuantityConfigGERAN        OPTIONAL,  -- Need OC
        quantityConfigCDMA2000    QuantityConfigCDMA2000     OPTIONAL,  -- Need OC
    }

QuantityConfigEUTRA ::=
    SEQUENCE {
        measQuantityEUTRA        SEQUENCE {},              -- FFS
        filterCoefficient         SEQUENCE {}               -- FFS
    }

QuantityConfigUTRA ::=
    SEQUENCE {
        measQuantityUTRA          SEQUENCE {},              -- FFS
        filterCoefficient          SEQUENCE {}               -- FFS
    }

QuantityConfigGERAN ::=
    SEQUENCE {
```

```

    measQuantityGERAN          SEQUENCE {},
    filterCoefficient          SEQUENCE {}
}
-- FFS
-- FFS

QuantityConfigCDMA2000 ::=
    measQuantityCDMA2000      SEQUENCE {
    }
-- FFS

-- ASN1STOP

```

QuantityConfig field descriptions	
quantityConfigEUTRA	Specifies quantity configurations for E-UTRA measurements.
measQuantityEUTRA	Measurement quantity used for E-UTRA measurements.
quantityConfigUTRA	Specifies quantity configurations for UTRA measurements.
measQuantityUTRA	Measurement quantity used for UTRA measurements.
quantityConfigGERAN	Specifies quantity configurations for GERAN measurements.
measQuantityGERAN	Measurement quantity used for GERAN measurements.
quantityConfigCDMA2000	Specifies quantity configurations for CDMA2000 measurements.
measQuantityCDMA2000	Measurement quantity used for CDMA2000 measurements.
filterCoefficient	Specifies the filtering coefficient.

– **ReportConfigEUTRA**

The IE *ReportConfigEUTRA* specifies criteria for triggering of an E-UTRA measurement reporting event. The E-UTRA measurement reporting events are labelled A*N* with *N* equal to 1, 2 and so on.

- Event A1: Serving becomes better than absolute threshold;
- Event A2: Serving becomes worse than absolute threshold;
- Event A3: Neighbour becomes amount of offset better than serving;
- Event A4: Neighbour becomes better than absolute threshold;
- Event A5: Serving becomes worse than absolute threshold1 AND Neighbour becomes better than another absolute threshold2.

ReportConfigEUTRA information element

```

-- ASN1START
ReportConfigEUTRA ::=
    eventId          CHOICE {
        eventA1      SEQUENCE {
            a1-Threshold      INTEGER (0)
        },
        eventA2      SEQUENCE {
            a2-Threshold      INTEGER (0)
        },
        eventA3      SEQUENCE {
            a3-Offset        INTEGER (0)
        },
        eventA4      SEQUENCE {
            a4-Threshold      INTEGER (0)
        },
        eventA5      SEQUENCE {
            a5-Threshold1     INTEGER (0),
            a5-Threshold2     INTEGER (0)
        }
    }
-- value range FFS
-- value range FFS
-- value range FFS but will include positive and negative values
-- value range FFS
-- value range FFS
-- value range FFS
-- value range FFS

```

```

    },
    hysteresis                INTEGER (0),                -- value range FFS
    timeToTrigger             INTEGER (0),                -- value range FFS
    maxReportCells            INTEGER (1..maxCellReport),
    reportInterval            SEQUENCE {},                OPTIONAL, -- Need OP
    reportAmount              SEQUENCE {},                OPTIONAL -- Need OP
}
-- ASN1STOP
```

ReportConfigEUTRA field descriptions	
eventId	Choice of E-UTRA event triggered reporting criteria.
hysteresis	Hysteresis parameter for entering/ leaving measurement report triggering condition. Value in dB.
timeToTrigger	Time during which specific criteria for the event needs to be met in order to trigger a measurement report. Value in seconds.
maxReportCells	Max number of cells to include in the measurement report.
reportInterval	If included, the event triggers the UE to perform periodical reporting with the indicated interval. Value in seconds.
reportAmount	Number of reports in case of periodical reporting triggered by event (if limited).

– **ReportConfigId**

The IE *ReportConfigId* is used to identify a measurement reporting configuration.

ReportConfigId information element

```

-- ASN1START
ReportConfigId ::=          INTEGER (1..maxReportConfigId)
-- ASN1STOP
```

ReportConfigId field descriptions	
Void	

– **ReportConfigInterRAT**

The IE *ReportConfigInterRAT* specifies criteria for triggering of an inter-RAT measurement reporting event. The inter-RAT measurement reporting events are labelled BN with *N* equal to 1, 2 and so on.

- Event B1: Neighbour becomes better than absolute threshold;
- Event B2: Serving becomes worse than absolute threshold1 AND Neighbour becomes better than another absolute threshold2.

ReportConfigInterRAT information element

```

-- ASN1START
ReportConfigInterRAT ::=
    SEQUENCE {
        eventId          CHOICE {
            eventB1       SEQUENCE {
                b1-Threshold    INTEGER (0)                -- value range FFS
            },
            eventB2       SEQUENCE {
                b2-Threshold1    INTEGER (0),                -- value range FFS
                b2-Threshold2    INTEGER (0)                -- value range FFS
            }
        }
    },
}
-- ASN1STOP
```

```
timeToTrigger          INTEGER (0),           -- value range FFS
maxReportCells         INTEGER (1..maxCellReport),
reportQuantity         SEQUENCE {}           OPTIONAL,-- Need OP; FFS
reportInterval         SEQUENCE {}           OPTIONAL,  -- Need OP
reportAmount           SEQUENCE {}           OPTIONAL   -- Need OP
}
-- ASN1STOP
```

ReportConfigInterRAT field descriptions
eventId Choice of inter-RAT event triggered reporting criteria.
timeToTrigger Time during which specific criteria for the event needs to be met in order to trigger a measurement report.
maxReportCells Max number of cells to include in the measurement report.
reportQuantity Need is FFS.
reportInterval If included, the event triggers the UE to perform periodical reporting with the indicated interval.
reportAmount Number of reports in case of periodical reporting triggered by event (if limited).

– ReportConfigPeriodical

The IE *ReportConfigPeriodical* specifies criteria for periodical measurement reporting.

ReportConfigPeriodical information element

```
-- ASN1START
ReportConfigPeriodical ::= SEQUENCE {
    maxReportCells         INTEGER (1..maxCellReport),
    reportQuantity         SEQUENCE {}           OPTIONAL,-- Need OP; FFS
    reportInterval         SEQUENCE {},
    reportAmount           SEQUENCE {}
}
-- ASN1STOP
```

ReportConfigPeriodical field descriptions
maxReportCells Max number of cells to include in the measurement report.
reportQuantity Need is FFS.
reportInterval The UE performs periodical reporting with the indicated interval.
reportAmount Number of reports.

6.3.6 Other information elements

– C-RNTI

The IE *C-RNTI* is used %%

C-RNTI information element

```
-- ASN1START
C-RNTI ::= SEQUENCE {
    -- Enter the IEs here.
}
-- ASN1STOP
```

-- ASN1STOP

C-RNTI field descriptions
%fieldIdentifier%

— EstablishmentCause

The IE *EstablishmentCause* is used %%

EstablishmentCause information element

-- ASN1START

EstablishmentCause ::=

ENUMERATED {

-- Enter establishment cause values here.

causeValue}

FFS

-- ASN1STOP

EstablishmentCause field descriptions
%fieldIdentifier%

— IMSI

The IE *IMSI* is used %%

IMSI information element

-- ASN1START

IMSI ::=

SEQUENCE {

-- Enter the IEs here.

}

FFS

-- ASN1STOP

IMSI field descriptions
%fieldIdentifier%

— InitialUE-Identity

The IE *InitialUE-Identity* is used to identify the UE in the contention based access at RRC connection establishment.

InitialUE-Identity information element

-- ASN1START

InitialUE-Identity ::=

CHOICE {

s-TMSI

S-TMSI,

randomValue

BIT STRING (SIZE (40))

}

-- ASN1STOP

<i>InitialUE-Identity</i> field descriptions
s-TMSI Field description is FFS.
randomValue Integer value in the range 0 to $2^{40} - 1$.

– *NAS-DedicatedInformation*

The IE *NAS-DedicatedInformation* is used to transfer UE specific NAS layer information between the network and the UE. The RRC layer is transparent for this information.

NAS-DedicatedInformation information element

```
-- ASN1START
NAS-DedicatedInformation ::=          SEQUENCE {
    -- Enter the IEs here.                                     FFS
}
-- ASN1STOP
```

<i>NAS-DedicatedInformation</i> field descriptions
%fieldIdentifier%

– *PagingCause*

The IE *PagingCause* is used %%

PagingCause information element

```
-- ASN1START
PagingCause ::=
    ENUMERATED {
        -- Enter paging cause values here.                     FFS
        causeValue}
-- ASN1STOP
```

<i>PagingCause</i> field descriptions
pagingCause Field description is FFS.

– *PagingUE-Identity*

The IE *PagingUE-Identity* is used %%

PagingUE-Identity information element

```
-- ASN1START
PagingUE-Identity ::=
    CHOICE {
        s-TMSI          S-TMSI,
        imsi             IMSI,
        tmsi             TMSI
    }
-- ASN1STOP
```

PagingUE-Identity field descriptions
s-TMSI Field description is FFS.
imsi Field description is FFS.
tmsi Field description is FFS.

– **RAT-Type**

The IE *RAT-Type* is used to indicate the type of radio access technology (RAT), including E-UTRA.

RAT-Type information element

```
-- ASN1START
RAT-Type ::=
    ENUMERATED {
        eutra, utran, geran, cdma2000
    }
-- ASN1STOP
```

RAT-Type field descriptions
Void

– **ReestabUE-Identity**

The IE *ReestabUE-Identity* is used to identify the UE in the contention based access at RRC connection re-establishment.

ReestabUE-Identity information element

```
-- ASN1START
ReestabUE-Identity ::=
    SEQUENCE {
        c-RNTI          C-RNTI,
        physCellIdentity PhysicalCellIdentity,
        shortMAC-I       BIT STRING (SIZE (16))
    }
-- ASN1STOP
```

-- field size FFS

ReestabUE-Identity field descriptions
shortMAC-I Field description is FFS.

– **RRC-TransactionIdentifier**

The IE *RRC-TransactionIdentifier* is used, together with the message type, for the identification of an RRC procedure (transaction).

RRC-TransactionIdentifier information element

```
-- ASN1START
RRC-TransactionIdentifier ::=
    INTEGER (0..3)
-- ASN1STOP
```

<i>RRC-TransactionIdentifier</i> field descriptions
<i>Void</i>

— *S-TMSI*

The IE *S-TMSI* is used %%

S-TMSI information element

-- ASN1START		
S-TMSI ::=	SEQUENCE {	
-- Enter the IEs here.		FFS
}		
-- ASN1STOP		

<i>S-TMSI</i> field descriptions
<i>%fieldIdentifier%</i>

— *TMSI*

The IE *TMSI* is used %%

TMSI information element

-- ASN1START		
TMSI ::=	SEQUENCE {	
-- Enter the IEs here.		FFS
}		
-- ASN1STOP		

<i>TMSI</i> field descriptions
<i>%fieldIdentifier%</i>

— *UE-EUTRA-Capability*

The IE *UE-EUTRA-Capability* is used %%

UE-EUTRA-Capability information element

-- ASN1START		
UE-EUTRA-Capability ::=	SEQUENCE {	
accessStratumRelease	AccessStratumRelease,	
ue-Category	INTEGER (1..16),	-- value range FFS
pdcp-Parameters	PDCP-Parameters,	
rlc-Parameters	RLC-Parameters,	
phyLayerParameters	PhyLayerParameters,	
rf-Parameters	RF-Parameters,	
measurementParameters	MeasurementParameters,	
interRAT-Parameters	SEQUENCE {	
utraFDD	IRAT-UTRA-FDD-Parameters	OPTIONAL,
utraTDD128	IRAT-UTRA-TDD128-Parameters	OPTIONAL,
utraTDD384	IRAT-UTRA-TDD384-Parameters	OPTIONAL,
utraTDD768	IRAT-UTRA-TDD768-Parameters	OPTIONAL,
geran	IRAT-GERAN-Parameters	OPTIONAL,
cdma2000-HRPD	IRAT-CDMA2000-HRPD-Parameters	OPTIONAL,
cdma2000-1xRTT	IRAT-CDMA2000-1xRTT-Parameters	OPTIONAL

```

    }
}

AccessStratumRelease ::=          ENUMERATED {
    rel8, spare7, spare6, spare5, spare4, spare3,
    spare2, spare1}

PDCP-Parameters ::=
    supportedROHCprofiles          SEQUENCE {
        profile0x0000              BOOLEAN,
        profile0x0001              BOOLEAN,
        profile0x0002              BOOLEAN,
        profile0x0003              BOOLEAN,
        profile0x0004              BOOLEAN,
        profile0x0006              BOOLEAN,
        profile0x0101              BOOLEAN,
        profile0x0103              BOOLEAN,
        profile0x0104              BOOLEAN
    },
    maxNumberROHC-ContextSessions  INTEGER (1..2)                -- value range FFS
}

RLC-Parameters ::=
    maxTotalL2BufferSize           SEQUENCE {
        ENUMERATED {size1, size2}                -- value range FFS
    }

PhyLayerParameters ::=
    ul-TxDiversitySupported        BOOLEAN,
    ue-SpecificRefSigsSupported    BOOLEAN,
    halfDuplexFDDSupported         BOOLEAN
}

RF-Parameters ::=
    supportedEUTRA-BandList        SEQUENCE {
        eutra-Band                 SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            INTEGER (1..64)
        }
    }
}

MeasurementParameters ::=
    eutra-BandList                 SEQUENCE {
        SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
                interFreqEUTRA-BandList
                interFreqNeedForDL-Gaps    BOOLEAN,
                interFreqNeedForUL-Gaps    BOOLEAN
            },
            interRAT-BandList              SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
                interRAT-NeedForDL-Gaps    BOOLEAN,
                interRAT-NeedForUL-Gaps    BOOLEAN
            }
        } OPTIONAL
    }
}

IRAT-UTRA-FDD-Parameters ::=
    supportedUTRA-FDD-BandList      SEQUENCE {
        eutra-FDD-Band              SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            ENUMERATED {
                bandI, bandII, bandIII, bandIV, bandV, bandVI,
                bandVII, bandVIII, bandIX, bandX, bandXI,
                bandXII, bandXIII, bandXIV, bandXV, bandXVI
            }
        }
    }
}

IRAT-UTRA-TDD128-Parameters ::=
    supportedUTRA-TDD128BandList    SEQUENCE {
        eutra-TDD128Band            SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            ENUMERATED {a, b, c, d}
        }
    }
}

IRAT-UTRA-TDD384-Parameters ::=
    supportedUTRA-TDD384BandList    SEQUENCE {
        eutra-TDD384Band            SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            ENUMERATED {a, b, c, d}
        }
    }
}

IRAT-UTRA-TDD768-Parameters ::=
    supportedUTRA-TDD768BandList    SEQUENCE {
        eutra-TDD768Band            SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            ENUMERATED {a, b, c, d}
        }
    }
}

```

```

IRAT-GERAN-Parameters ::= SEQUENCE {
    supportedGERAN-BandList
        geran-Band
        SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            ENUMERATED {
                gsm450, gsm480, gsm850, gsm900P, gsm900E, gsm1800,
                gsm1900, spare9, spare8, spare7, spare6, spare5,
                spare4, spare3, spare2, spare1}
            },
    interRAT-PS-HO-ToGERAN
        BOOLEAN
}

IRAT-CDMA2000-HRPD-Parameters ::= SEQUENCE {
    supportedHRPD-BandList
        cdma2000-HRPD-Band
        SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            ENUMERATED {
                band1, band2, spare6, spare5, spare4, spare3,
                spare2, spare1}
            },
    cdma2000-HRPD-TxConfig
        ENUMERATED {single, dual},
    cdma2000-HRPD-RxConfig
        ENUMERATED {single, dual}
}

IRAT-CDMA2000-1xRTT-Parameters ::= SEQUENCE {
    supported1xRTT-BandList
        cdma2000-1xRTT-Band
        SEQUENCE (SIZE (1..maxBands)) OF SEQUENCE {
            ENUMERATED {
                band1, band2, spare6, spare5, spare4, spare3,
                spare2, spare1}
            },
    cdma2000-1xRTT-TxConfig
        ENUMERATED {single, dual},
    cdma2000-1xRTT-RxConfig
        ENUMERATED {single, dual}
}

-- ASN1STOP

```

Editor's note: The extension mechanisms for this IE need to be considered.

Editor's note: The following GSM band seem to be missing: GSM 710, GSM 750, GSM 810, GSM 900R.

<i>UE-EUTRA-Capability</i> field descriptions
<i>accessStratumRelease</i> Set to rel8 in this version of the specification.
<i>ue-Category</i> UE category as defined in [5]. Set to values 1 to 5 in this version of the specification.
<i>eutra-Band</i> E-UTRA band as defined in [36.101].
<i>eutra-BandList</i> One entry corresponding to each supported E-UTRA band listed in the same order as in <i>supportedEUTRA-BandList</i> .
<i>interFreqEUTRA-BandList</i> One entry corresponding to each supported E-UTRA band listed in the same order as in <i>supportedEUTRA-BandList</i> .
<i>interFreqNeedForDL-Gaps</i> Indicates need for DL measurement gaps when operating on the E-UTRA band given by the entry in <i>eutraBandList</i> and measuring on the E-UTRA band given by the entry in <i>interFreqEUTRA-BandList</i> .
<i>interFreqNeedForUL-Gaps</i> Indicates need for UL measurement gaps when operating on the E-UTRA band given by the entry in <i>eutraBandList</i> and measuring on the E-UTRA band given by the entry in <i>interFreqEUTRA-BandList</i> .
<i>interRAT-BandList</i> One entry corresponding to each supported band of another RAT listed in the same order as in the <i>interRAT-Parameters</i> .
<i>interRATNeedForDL-Gaps</i> Indicates need for DL measurement gaps when operating on the E-UTRA band given by the entry in <i>eutraBandList</i> and measuring on the inter-RAT band given by the entry in the <i>interRAT-Parameters</i> .
<i>interRATNeedForUL-Gaps</i> Indicates need for UL measurement gaps when operating on the E-UTRA band given by the entry in <i>eutraBandList</i> and measuring on the inter-RAT band given by the entry in the <i>interRAT-Parameters</i> .
<i>utra-FDD-Band</i> E-UTRA band as defined in [25.101].
<i>utra-TDD128Band</i> E-UTRA band as defined in [25.102].
<i>utra-TDD384Band</i> E-UTRA band as defined in [25.102].
<i>utra-TDD768Band</i> E-UTRA band as defined in [25.102].
<i>geran-Band</i> GERAN band as defined in [45.005].
<i>cdma2000-HRPD-Band</i> CDMA2000 HRPD band as defined in [ref].
<i>cdma2000-1xRTT-Band</i> CDMA2000 1xRTT band as defined in [ref].

Editor's note: The IE *UE-EUTRA-Capability* does not include AS security capability information, since these are assumed to be the same as the NAS-security capabilities. Consequently it is also assumed that AS need not provide "man-in-the-middle" protection for the security capabilities, i.e., it is assumed that NAS provides this functionality.

– *UE-RadioAccessCapRequest*

The IE *UE-RadioAccessCapRequest* is used to request the UE to transfer UE radio access capabilities for E-UTRA and/or other RATs, e.g., UTRA, GERAN or CDMA2000.

UE-RadioAccessCapRequest information element

```
-- ASN1START
UE-RadioAccessCapRequest ::=          SEQUENCE {
    -- Enter the IEs here.
}
-- ASN1STOP
```

FFS

<i>UE-RadioAccessCapRequest</i> field descriptions
%fieldIdentifier%

– UE-RelatedInforamtion

The IE *UE-RelatedInforamtion* is used to convey miscellaneous UE related information.

UE-RelatedInforamtion information element

```
-- ASN1START
UE-RelatedInforamtion ::=          SEQUENCE {
    newUE-Identity                  C-RNTI                      OPTIONAL    -- Cond Handover
}
-- ASN1STOP
```

UE-RelatedInforamtion field descriptions	
newUE-Identity	Field description and need is FFS.

Conditional presence	Explanation
Handover	This IE should be mandatory present in case of handover, i.e., if the IE <i>MobilityControlInformation</i> is included, otherwise it is optional, continue (FFS).

– UE-TimersAndConstants

The IE *UE-TimersAndConstants* contains %%

UE-TimersAndConstants information element

```
-- ASN1START
UE-TimersAndConstants ::=          SEQUENCE {
    -- Enter the IEs here.
}
-- ASN1STOP
```

UE-TimersAndConstants field descriptions	
%fieldIdentifier%	

6.4 RRC multiplicity and type constraints values

– Multiplicity and type constraints definitions

A brief descriptive text to be added here (FFS).

```
-- ASN1START
maxAC                INTEGER ::= 1    -- FFS
maxBands              INTEGER ::= 1    -- Maximum number of bands listed in EUTRA UE caps FFS
maxCellBlack          INTEGER ::= 1    -- Maximum number of blacklisted cells FFS
maxCellInter          INTEGER ::= 1    -- Maximum number of neighbouring inter-frequency cells listed in SIB type 5 FFS
maxCellIntra          INTEGER ::= 1    -- Maximum number of neighbouring intra-frequency cells listed in SIB type 4 FFS
maxCellMeas           INTEGER ::= 1    -- Maximum number of neighbouring cells within a measurement object FFS
maxCellReport         INTEGER ::= 1    -- Maximum number of reported cells FFS
maxCellUTRA           INTEGER ::= 1    -- Maximum number of neighbouring UTRA cells FFS
maxDRB                INTEGER ::= 1    -- Maximum number of Data Radio Bearers FFS
maxEARFCN             INTEGER ::= 1    -- Maximum value of EUTRA carrier fequency FFS
```

```

maxFreq          INTEGER ::= 1  -- Maximum number of EUTRA carrier frequencies  FFS
maxGERAN-Carrier INTEGER ::= 1  -- Maximum number of GERAN carrier frequencies  FFS
maxMCS-1         INTEGER ::= 1  -- Maximim number of PUCCH formats (MCS)        FFS
maxMeasId        INTEGER ::= 1  --                                              FFS
maxNN            INTEGER ::= 1  --                                              FFS
maxObjectId      INTEGER ::= 1  --                                              FFS
maxPageRec       INTEGER ::= 1  --                                              FFS
maxPNOOffset     INTEGER ::= 1  -- Maximum number of CDMA2000 PNOffsets          FFS
maxRAT-Capabilities INTEGER ::= 1  -- Maximum number of interworking RATs (incl EUTRA) FFS
maxReportConfigId INTEGER ::= 1  --                                              FFS
maxROHC-Profile  INTEGER ::= 16 -- Maximum number of profiles supported by ROHC on  FFS
-- a given RB.
maxSIB           INTEGER ::= 1  -- Maximum number of SIBs                    FFS
maxSI-Message    INTEGER ::= 1  -- Maximum number of SI messages              FFS
maxUTRA-Carrier  INTEGER ::= 1  -- Maximum number of UTRA carrier fequencies  FFS

-- ASN1STOP

```

Editor's note: A table with parameter descriptions should be considered as an alternative to the inline comments above. If there are more than a few words of comment, the code above gets rather messy.

– End of EUTRA-RRC-Definitions

```

-- ASN1START

END

-- ASN1STOP

```

7 Variables and constants

7.1 UE variables

7.2 Counters

Counter	Reset	Incremented	When reaching max value
V300	When initiating the procedure RRC connection establishment	Upon expiry of T300.	When V300 > N300, the UE enters RRC_IDLE.
V301	When initiating the procedure RRC connection re-establishment	Upon expiry of T301.	When V301 > N301, the UE enters RRC_IDLE.

7.3 Timers

Timer	Start	Stop	At expiry
T300 (Need is FFS)	Transmission of RRC CONNECTION REQUEST	Reception of RRC CONNECTION SETUP with the IE "Initial UE identity" equal to the IE that the UE included in the RRC CONNECTION REQUEST message	Retransmit RRC CONNECTION REQUEST if V300 <= N300, else go to RRC_IDLE
T301 (Need is FFS)	Transmission of RRC CONNECTION RE-ESTABLISHMENT REQUEST	Reception of RRC CONNECTION RE-ESTABLISHMENT with the IE "Re-establishment UE identity" equal to the IE that the UE included in the RRC CONNECTION RE-ESTABLISHMENT REQUEST message	Retransmit RRC CONNECTION RE-ESTABLISHMENT REQUEST if V301 <= N301, else go to RRC_IDLE
T302	Reception of RRC CONNECTION REJECT including the IE 'Wait time'	Upon cell re-selection	Perform RRC connection request retry
T303	Unsuccessful access barring check while UE is not performing an emergency call	Upon entering RRC_CONNECTED, upon cell re-selection and upon receiving SIB type 2 including a value of the IE Access probability factor or the IE Access class barring time different from the stored value	None
T304	Reception of RRC RECONFIGURATION message including the IE 'Mobility control information'	Criterion for successful handover completion is met	Consider handover to have failed and perform re-establishment on the 'best cell' (details FFS)
T310	Upon detecting radio link problems	Upon recovery from radio link problems	Start T311
T311	Upon T310 expiry	Reception of RRC CONNECTION RE-ESTABLISHMENT or RRC CONNECTION RE-ESTABLISHMENT REJECT with the IE "Re-establishment UE identity" equal to the IE that the UE included in the RRC CONNECTION RE-ESTABLISHMENT REQUEST message	Enter RRC_IDLE
T320	Upon receiving IE Cell re-selection priority expiry timer	Upon entering RRC_CONNECTED	Specified in [4], i.e. discard the Inter-frequency and inter-RAT priority information

7.4 Constants

Constant	Usage
N300	Maximum number of retransmissions of the RRC CONNECTION REQUEST message
N301	Maximum number of retransmissions of the RRC CONNECTION RE-ESTABLISHMENT REQUEST message

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 Specified and default radio configurations

Specified and default configurations are configurations of which the details are specified in the standard. Specified configurations are fixed while default configurations can be modified using dedicated signalling.

9.1 Specified configurations

BCCH configuration:

PDCP: N/A

RLC: TM

MAC: TM

NOTE 1 RRC will perform padding, if required due to the granularity of the TF signalling

CCCH configuration:

PDCP: UL: N/A, DL: FFS i.e. FFS if integrity protection is used for RRC CONNECTION RE-ESTABLISHMENT

RLC: TM

MAC: : normal MAC headers are used

Editor's note: Contention resolution may be moved MAC, in which case SRB0 in DL may become DCCH rather than CCCH

PCCH configuration:

PDCP: N/A

RLC: TM

MAC: TM

NOTE 2 RRC will perform padding, if required due to the granularity of the TF signalling

9.2 Default radio configurations

Editor's note: It has been agreed to introduce a default RLC configuration for SRB1. Details are FFS. Use of default configurations for other parts of the Radio resource configuration are FFS.

10 Radio information related interactions between network nodes

10.1 General

This section specifies RRC messages that are transferred between network nodes. These RRC messages may be transferred to/ from the UE via another Radio Access Technology. Consequently, these messages have similar

characteristics as the RRC messages that are transferred across the E-UTRA radio interface, i.e. the same transfer syntax and protocol extension mechanisms apply.

10.2 RRC messages transferred across network nodes

This section specifies RRC messages that are sent either across the X2- or the S1-interface, either to or from the eNB, i.e. a single ‘logical channel’ is used for all RRC messages transferred across network nodes. The information could originate from/ be destined for another RAN.

10.2.1 INTER RAT MESSAGE

Inter-RAT message, e.g. a handover command

Transfer characteristics: tbs

Name	Need	Multi	Type/ reference	Semantics description	Ver
Message Type	MP		<ref>		
Inter-RAT message	MP		<ref>	E.g. source eNB sends the handover command generated by the target RAN generates the entire RRC to the UE	

10.2.2 HANDOVER COMMAND

E-UTRA RRC handover command

Transfer characteristics: tbs

Name	Need	Multi	Type/ reference	Semantics description	Ver
Message Type	MP		<ref>		
Handover command message	MP		<ref>	Target eNB generates the entire RRC CONNECTION RECONFIGURATION message as signalled to the UE	

10.2.3 HANDOVER PREPARATION INFORMATION

E-UTRA RRC information used by the target eNB during handover preparation, excluding UE capability information

Transfer characteristics: tbs

Name	Need	Multi	Type/ reference	Semantics description	Ver
Message Type	MP		<ref>		
AS-configuration	OP			Radio resource configuration excluding physical layer information. Applicable in case of intra-E-UTRA handover	
RRM configuration	OP			FFS if applicable for Inter-RAT HO	
UE radio access capability information	FFS		<ref>	Including E-UTRA, GERAN and UTRA radio access capabilities (separated)	

10.2.4 UE RADIO ACCESS CAPABILITY INFORMATION

UE radio access capability transfer, covering both upload & download

Transfer characteristics: tbs

Name	Need	Multi	Type/ reference	Semantics description	Ver
------	------	-------	--------------------	-----------------------	-----

Name	Need	Multi	Type/ reference	Semantics description	Ver
Message Type	MP		<ref>		
UE radio access capability information	MP		<ref>	Including E-UTRA, GERAN and UTRA radio access capabilities (separated)	

11 Performance requirements (FFS)

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

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

11.1 UE capability related constraints

The following table lists constraints regarding the UE capabilities that E-UTRAN is assumed to take into account.

Parameter	Description	Value
#DRBs	The number of DRBs that a UE of categories 1- 5 shall support	8
#RLC-AM	The number of RLC AM entities that a UE of categories 1- 5 shall support (depends on the RLC mode of SRB2)	9 or 10
#Events	The number of instances of a measurement that the UE is required to support	FFS

Editor's note: It has been agreed to define a limitation, the details are FFS

11.2 Processing delay requirements (FFS)

Annex A (informative): Change history

Editor's 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.

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
28 June 2007	CC-2 RAN2#58 bis	TD-02 R2-072616			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)	0.0.1	0.0.2
2 July 2007	RAN2#58 bis	R2-072975			Same as version 0.0.2, that was agreed during RAN2#58bis, but now without change marks	0.0.2	0.1.0
2 July 2007		R2-072977 R2-072978			Included/ changes: ▪ E-UTRA RRC TP on System information procedure ▪ E-UTRA RRC TP on System Information Blocks	0.1.0	0.1.1
2 July 2007					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	0.1.1	0.1.2
8 August 2007					Included/ changes: ▪ RAN2#58bis agreements on integrity protection allocation ▪ Editorial corrections e.g. additional references, renaming of RRC CONNECTION CHANGE message	0.1.2	0.1.3
13 August 2007					Included/ changes: ▪ RAN2#58bis agreements on RRC connection establishment according to text proposal agreed during e-mail review	0.1.3	0.1.4
24 August 2007					Included/ changes: ▪ Note clarifying that the use of pre-configuration upon RRC connection establishment is not precluded	0.1.4	0.2.0
24 August 2007					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	0.2.0	0.2.1
5 September 2007					Included/ changes: ▪ Editorial corrections (references)	0.2.1	0.3.0
16 October 2007		R2-074012 R2-074014 R2-074015 R2-074016 R2-074508			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	0.3.0	0.3.1
22 October 2007					Included/ change (agreements RAN2#59bis) ▪ RRC concatenation of system information ▪ BCCH change notification using paging for UEs in idle and using periodic BCCH monitoring for UEs in connected ▪ Three intra-frequency measurement events and associated parameters ▪ Only dedicated measurement control for UEs 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	0.3.1	0.3.2

				▪ Introduction of UE capability transfer (removal of FFS)		
29 October 2007				Main changes (based on comments e-mail review) ▪ Clarification is added that for detected cells, UTRAN indicates 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	0.3.2	0.3.3
9 November 2007	RAN2#60	R2-074969		Same as version 0.3.3, but now without change marks	0.3.3	0.4.0
13 November 2007				▪ 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	0.4.0	0.4.1
19 November 2007				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	0.4.1	0.4.2
21 November 2007				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)	0.4.2	0.5.0
22 November 2007				Same as 0.5.0	0.5.0	1.0.0

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
12/2007	RP-38	RP-070920	-		Approved at TSG-RAN #38 and placed under Change Control	1.0.0	8.0.0
03/2008	RP-39	RP-080163	0001	4	CR to 36.331 with Miscellaneous corrections	8.0.0	8.1.0
03/2008	RP-39	RP-080164	0002	2	CR to 36.331 to convert RRC to agreed ASN.1 format	8.0.0	8.1.0