TSG-RAN Meeting #12 *RP-010311*
Stockholm, Sweden, 12 - 15 June 2001

Title: **Agreed CRs (Release '99 and Rel-4 category A) to TS 25.331 (1)**

Source: **TSG-RAN WG2**

Agenda item: **8.2.3**

Doc-1st-	Status-	Spec	CR	Rev	Phase	Subject	Cat	Version	Versio
R2-011222	agreed	25.331	730	1	R99	Clarification of the IE 'spreading factor' in Uplink DPCH info for FDD mode	F	3.6.0	3.7.0
R2-011223	agreed	25.331	731		Rel-4	Clarification of the IE 'spreading factor' in Uplink DPCH info for FDD mode	A	4.0.0	4.1.0
R2-011224	agreed	25.331	732	1	R99	Correction of UE Radio Access Capability depending on UTRAN FDD bands	F	3.6.0	3.7.0
R2-011225	agreed	25.331	733		Rel-4	Correction of UE Radio Access Capability depending on UTRAN FDD bands	A	4.0.0	4.1.0
R2-011424	agreed	25.331	734	2	R99	Clarification on Security mode control	F	3.6.0	3.7.0
R2-011425	agreed	25.331	735		Rel-4	Clarification on Security mode control	A	4.0.0	4.1.0
R2-011226	agreed	25.331	737	1	R99	Correction of TrCH parameter handling	F	3.6.0	3.7.0
R2-011227	agreed	25.331	738		Rel-4	Correction of TrCH parameter handling	A	4.0.0	4.1.0
R2-011228	agreed	25.331	739	1	R99	TFC Subsets in TDD	F	3.6.0	3.7.0
R2-011229	agreed	25.331	740		Rel-4	TFC Subsets in TDD	A	4.0.0	4.1.0
R2-011426	agreed	25.331	745	2	R99	RRC containers	F	3.6.0	3.7.0
R2-011427	agreed	25.331	746		Rel-4	RRC containers	A	4.0.0	4.1.0
R2-011232	agreed	25.331	747	1	R99	Various corrections	F	3.6.0	3.7.0
R2-011233	agreed	25.331	748		Rel-4	Various corrections	A	4.0.0	4.1.0
R2-011235	agreed	25.331	749	1	R99	General error handling for system information	F	3.6.0	3.7.0
R2-011236	agreed	25.331	750		Rel-4	General error handling for system information	A	4.0.0	4.1.0
R2-011332	agreed	25.331	751	1	R99	Order of elements in strings	F	3.6.0	3.7.0
R2-011429	agreed	25.331	752		Rel-4	Order of elements in strings	A	4.0.0	4.1.0
R2-011241	agreed	25.331	753	1	R99	Configuration consistency checks	F	3.6.0	3.7.0
R2-011474	agreed	25.331	754		Rel-4	Configuration consistency checks	A	4.0.0	4.1.0

3GPP TSG-RAN-WG2 Meeting #21
Busan, Korea, May 21-25, 2001

TSGR2#21(01)1222

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **730** ⌘ rev **r1** ⌘ Current version: **3.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Clarification of the IE "spreading factor" in Uplink DPCH info for FDD mode
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	22.05.2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	The IE "Uplink DPCH Info" contains the IE spreading factor, which is defined as "SF of the channelisation code for data part". However, the spreading factor can change from frame to frame in the uplink depending on the amount of data to be sent. Therefore it is not clear, what is meant by this IE. This IE refers to the minimum allowed spreading factor, as this is the case for the RACH and stated in 10.3.6.52 (PRACH info)
Summary of change:	⌘	It is clarified that the spreading factor is the minimum allowed spreading factor, and wording is adjusted for both DPCH and RACH to "minimum allowed SF"
Consequences if not approved:	⌘	Incorrect description of FDD mode.

Clauses affected:	⌘	10.3.6.52, 10.3.6.88
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

10.3.6.52 PRACH info (for RACH)

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>Available Signature	MP		Bitstring(16)	(Note1) 0000000000000001:Signature 0 0000000000000010:Signature 1 0000000000000011:Signature 0&1 .....: 1111111111111111:Signature 0to15
>>Available SF	MP		Integer (32,64,128,256)	In chips per symbol Defines the ~~smallest permitted~~minimum allowed SF (i.e. the maximum rate)
>>Preamble scrambling code number	MP		Integer (0 .. 15)	Identification of scrambling code see [28]
>>Puncturing Limit	MP		Real(0.40..1.00 by step of 0.04)	
>>Available Sub Channel Number	MP		Bitstring(12)	(Note2) 000000000001:SubChNumber 0 000000000010:SubChNumber 1 000000000011:SubChNumber 0&1 ...: 111111111111:SubChNumber 0to11
>TDD				
>>Timeslot number	MP		Timeslot number 10.3.6.84	
>>PRACH Channelisation Code List	MP		PRACH Channelisation Code List 10.3.6.51	
>>PRACH Midamble	MP		Enumerated (Direct, Direct/Inverted)	Direct or direct and inverted midamble are used for PRACH

NOTE 1: Each bit is 0 or 1 to indicate available signature_x, x= 0 to 15.

NOTE 2: Each bit is 0 or 1 to indicate available sub channel number _x, x= 0 to 11.

10.3.6.88 Uplink DPCH info

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Uplink DPCH power control info	OP		Uplink DPCH power control info 10.3.6.91	
CHOICE *mode*	MP			
>FDD				
>>Scrambling code type	MP		Enumerated(short, long)	
>>Scrambling code number	MP		Integer(0..16 777215)	
>>Number of DPDCH	MD		Integer(2..maxDPDCH)	Default value is 1. Number of DPDCH is 1 in HANDOVER TO UTRAN COMMAND
>>Spreading factor	MP		Integer(4, 8, 16, 32, 64, 128, 256)	Minimum allowed SF of the channelisation code for data part
>>TFCI existence	MD		Boolean	TRUE means existence. Default value is "TRUE"
>>Number of FBI bits	CH		Integer (1, 2)	In bits. Number of FBI bits is needed if SSDT or FB Mode Transmit Signalling is supported.
>>Puncturing Limit	MP		Real(0.40 ..1 by step of 0.04)	
>TDD				
>>Uplink Timing Advance Control	OP		Uplink Timing Advance Control 10.3.6.96	
>>UL CCTrCH List	MP	1 to <maxCCTrCH>		
>>>TFCS ID	MD		Integer(1..8)	Default value is 1.
>>>Time info	MP		Time info 10.3.6.83	
>>>Common timeslot info	MD		Common timeslot info 10.3.6.10	Default is the current Common timeslot info
>>>Uplink DPCH timeslots and codes	MD		Uplink Timeslots and Codes 10.3.6.94	Default is to use the old timeslots and codes.

Condition	Explanation
Single	This IE is included if IE "Number of DPDCH" is "1"

3GPP TSG-RAN-WG2 Meeting #21
Busan, Korea, May 21-25, 2001

TSGR2#21(01)1223

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **731** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Clarification of the IE "spreading factor" in Uplink DPCH info for FDD mode
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	22.05.2001
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	The IE "Uplink DPCH Info" contains the IE spreading factor, which is defined as "SF of the channelisation code for data part". However, the spreading factor can change from frame to frame in the uplink depending on the amount of data to be sent. Therefore it is not clear, what is meant by this IE. This IE refers to the minimum allowed spreading factor, as this is the case for the RACH and stated in 10.3.6.52 (PRACH info) Backwards compatibility is given, since the text only clarifies what is meant.
Summary of change:	⌘	It is clarified that the spreading factor is the minimum allowed spreading factor, and wording is adjusted for both DPCH and RACH to "minimum allowed SF"
Consequences if not approved:	⌘	Incorrect description of FDD mode.

Clauses affected:	⌘	10.3.6.52, 10.3.6.88
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

10.3.6.52 PRACH info (for RACH)

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>Available Signature	MP		Bitstring(16)	(Note1) 0000000000000001:Signature 0 0000000000000010:Signature 1 0000000000000011:Signature 0&1 .....: 1111111111111111:Signature 0to15
>>Available SF	MP		Integer (32,64,128,256)	In chips per symbol Defines the ~~smallest permitted~~minimum allowed SF (i.e. the maximum rate)
>>Preamble scrambling code number	MP		Integer (0 .. 15)	Identification of scrambling code see [28]
>>Puncturing Limit	MP		Real(0.40..1.00 by step of 0.04)	
>>Available Sub Channel Number	MP		Bitstring(12)	(Note2) 000000000001:SubChNumber 0 000000000010:SubChNumber 1 000000000011:SubChNumber 0&1 ...: 111111111111:SubChNumber 0to11
>TDD				
>>Timeslot number	MP		Timeslot number 10.3.6.84	
>>PRACH Channelisation Code List	MP		PRACH Channelisation Code List 10.3.6.51	
>>PRACH Midamble	MP		Enumerated (Direct, Direct/Inverted)	Direct or direct and inverted midamble are used for PRACH

NOTE 1: Each bit is 0 or 1 to indicate available signature_x, x= 0 to 15.

NOTE 2: Each bit is 0 or 1 to indicate available sub channel number _x, x= 0 to 11.

10.3.6.88 Uplink DPCH info

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Uplink DPCH power control info	OP		Uplink DPCH power control info 10.3.6.91	
CHOICE *mode*	MP			
>FDD				
>>Scrambling code type	MP		Enumerated(short, long)	
>>Scrambling code number	MP		Integer(0..16 777215)	
>>Number of DPDCH	MD		Integer(2..maxDPDCH)	Default value is 1. Number of DPDCH is 1 in HANDOVER TO UTRAN COMMAND
>>Spreading factor	MP		Integer(4, 8, 16, 32, 64, 128, 256)	Minimum allowed SF of the channelisation code for data part
>>TFCI existence	MD		Boolean	TRUE means existence. Default value is "TRUE"
>>Number of FBI bits	CH		Integer (1, 2)	In bits. Number of FBI bits is needed if SSDT or FB Mode Transmit Signalling is supported.
>>Puncturing Limit	MP		Real(0.40 ..1 by step of 0.04)	
>TDD				
>>Uplink Timing Advance Control	OP		Uplink Timing Advance Control 10.3.6.96	
>>UL CCTrCH List	MP	1 to <maxCCTrCH>		
>>>TFCS ID	MD		Integer(1..8)	Default value is 1.
>>>Time info	MP		Time info 10.3.6.83	
>>>Common timeslot info	MD		Common timeslot info 10.3.6.10	Default is the current Common timeslot info
>>>Uplink DPCH timeslots and codes	MD		Uplink Timeslots and Codes 10.3.6.94	Default is to use the old timeslots and codes.

Condition	Explanation
Single	This IE is included if IE "Number of DPDCH" is "1"

3GPP TSG RAN WG2 #21
21st – 25th May 2001
Pusan, Korea

Tdoc RAN WG2 011224

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **732** ⌘ rev **r1** ⌘ Current version: **3.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title:	⌘	Correction of UE Radio Access Capability depending on UTRAN FDD bands
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	21 May 2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘ Depending on the UTRAN bands where the UE is operating, e.g. UTRAN FDD 1900 MHz, 2100 MHz:

- the measurement capabilities (i.e. need for compressed mode) for the monitoring of other RATs or other UMTS frequencies may be different.

- the RF capabilities (i.e. power class, Tx/Rx frequency separation) may be different

Summary of change:	⌘	One set of UE measurement capabilities and one set of FDD RF capabilities are added for UTRAN FDD 2100, 1900 MHz frequency band in which the UE may operate. Include reception of the extended IE version within 8.1.3.6 also The naming of variable UE_CAPABILITY_REQUESTED in 8.6.3.X was wrong and this has been corrected, A "correct" number (e.g. 8.6.3.12) has been assigned to the new chapter 8.6.3.X, The explict reference to 8.6.3.X for variable UE_CAPABILITY_REQUESTED should be removed form "Transmission of UE capabilities" procedure. The same has been done also for the RRC CONNECTION SETUP case, since it is not really needed there either A general reference to 8.6 in the "UE capability enquiry" procedure is missing and has been added Clarification has been added that the UE shall clear the variable UE_CAPABILITY_REQUESTED upon completion of the procedures RRC connection establishment and Transmission of UE capabilities The conditions for applying the extended version of the IE are specified now to be independent of the support of other RAT, since that is not required anymore because also in case the IE is signalled via another RAT of the default of 2100MHz applies for the original version of the IE UE Power Class range is extended at 8 values in the in the UE Radio Access Capability extension in order to enable future introduction of other Power Class. However in the current specification only 4 Power Classes are defined. ~~Backwards compatibility:~~ ~~the solution is backward compatible in the sense that an UE supporting only 2100 MHz frequency band and not supporting multi-RAT shall use the current "RF Capability" and "Measurement Capability" existing in the "UE Radio Access capability". In the future, for UEs supporting multiple frequency bands or a frequency band other than 2100 MHz or having multi-RAT capabilities then the "RF Capability" and "Measurement Capability" associated to each supported FDD frequency band shall be included in "UE Radio Access capability extension" and shall be absent from "UE Radio Access capability". The new IE "UE Radio Access capability extension" is encoded as an non-critical extension.~~ Backwards compatibility: - functionality found erroneous: indication of supported FDD frequency band in UE Radio Access Capability - correction being brought: added new IEs in non-critical extension and also new procedural description text - backwards compatible: yes
Consequences if not approved:	⌘	there is no indication which FDD frequency bands is supported

Clauses affected:	⌘	8.1.3.6, 8.1.6.2, 8.1.6.4, 8.1.7.3, 8.6.3.12~~x~~ (new), 10.2.41, 10.2.56, 10.3.3.21a (new), 10.3.3.33, 10.3.3.33a (new), 10.3.3.33b (new), 10.3.3.42, 10.3.3.42a (new), 10.3.10, 11, 13.4.27g (new), 13.4.28
Other specs Affected:	⌘	[X] Other core specifications ⌘ [X] Test specifications [ ] O&M Specifications

Other comments: ⌘

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at:
http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.1.3.6 Reception of an RRC CONNECTION SETUP message by the UE

The UE shall compare the value of the IE "Initial UE identity" in the received RRC CONNECTION SETUP message with the value of the variable INITIAL_UE_IDENTITY.

If the values are different, the UE shall:

- ignore the rest of the message;

If the values are identical, the UE shall:

- stop timer T300, and act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following;
  - if the UE will be in the CELL_FACH state at the conclusion of this procedure:
    - if the IE "Frequency info" is included:
      - select a suitable UTRA cell according to [4] on that frequency;
    - select PRACH according to subclause 8.6.6.2;
    - select Secondary CCPCH according to subclause 8.6.6.5;
- enter a state according to subclause 8.6.3.3;
- submit an RRC CONNECTION SETUP COMPLETE message to the lower layers on the uplink DCCH after successful state transition per subclause 8.6.3.3, with the contents set as specified below:
  - set the IE "RRC transaction identifier" to
    - the value of "RRC transaction identifier" in the entry for the RRC CONNECTION SETUP message in the table "Accepted transactions" in the variable TRANSACTIONS; and
    - clear that entry.
  - calculate START values for each CN domain according to subclause 8.5.9 and include the result in the IE "START list";
  - ~~update variable UE_CAPABILITY_REQUESTED according to the requirement given in the IE "Capability update requirement" in the RRC CONNECTION SETUP message as specified in section 8.6.3.X;~~
  - retrieve its UTRA UE radio access capability information elements from variable UE_CAPABILITY_REQUESTED and include this in IE “UE radio access capability” and IE “UE radio access capability extension”, provided this IE is included in variable UE_CAPABILITY_REQUESTED,
  - retrieve its inter-RAT-specific UE radio access capability information elements from variable UE_CAPABILITY_REQUESTED and include this in IE “UE system specific capability”,
  - ~~if the IE "UE radio access FDD capability update requirement" included in the RRC CONNECTION SETUP message has the value TRUE:~~
    - ~~include its UTRAN-specific FDD capabilities and its UTRAN-specific capabilities common to FDD and TDD in the IE "UE radio access capability";~~
- ~~if the IE "UE radio access TDD capability update requirement" included in the RRC CONNECTION SETUP message has the value TRUE:~~
  - ~~include its UTRAN-specific TDD capabilities and its UTRAN-specific capabilities common to FDD and TDD in the IE "UE radio access capability";~~
- ~~if the IE "System specific capability update requirement list" is present in the RRC CONNECTION SETUP message:~~
  - ~~include its inter-RAT capabilities for the requested systems in the IE "UE system specific capability".~~

When of the RRC CONNECTION SETUP COMPLETE message has been submitted to lower layers for transmission the UE shall:

- if the UE has entered CELL_FACH state:
  - start timer T305 using its initial value if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- ~~update its~~ store the contents of the variable UE_CAPABILITY_REQUESTED into the variable UE_CAPABILITY_TRANSFERRED ~~which UE capabilities it has transmitted to the UTRAN~~;
- clear the variable UE_CAPABILITY_REQUESTED;
- if the IE "Transport format combination subset" was not included in the RRC CONNECTION SETUP message:
  - set the IE "Current TFC subset" in the variable TFS_SUBSET to "Full transport format combination set";
- set the "Status" in the variable CIPHERING_STATUS to "Not started";
- set the "Reconfiguration" in the variable CIPHERING_STATUS to FALSE;
- set the "Status" in the variable INTEGRITY_PROTECTION_INFO to "Not started";
- set the "Historical status" in the variable INTEGRITY_PROTECTION_INFO to "Never been active";
- set the "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE;
- set the variable CELL_UPDATE_STARTED to FALSE;
- set the variable ORDERED_RECONFIGURATION to FALSE;
- set the variable FAILURE_INDICATOR to FALSE;
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
- set the variable INVALID_CONFIGURATION to FALSE;
- set the variable PROTOCOL_ERROR_INDICATOR to FALSE;
- set the variable PROTOCOL_ERROR_REJECT to FALSE;
- set the variable TGSN_REPORTED to FALSE;
- set the variable UNSUPPORTED_CONFIGURATION to FALSE;
- clear all optional IEs in all variables, except those optional IEs that are set in this procedure;
- consider the procedure to be successful;

And the procedure ends.

8.1.6 Transmission of UE capability information

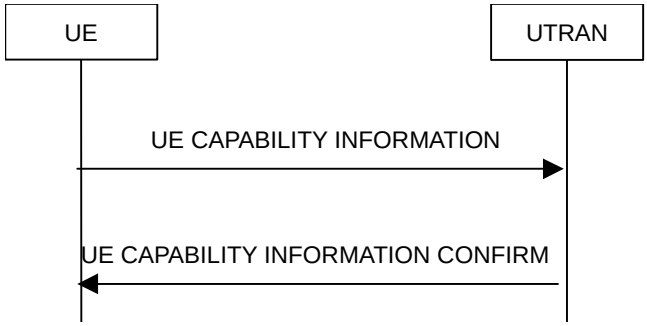

Figure 12: Transmission of UE capability information, normal flow

8.1.6.1 General

The UE capability update procedure is used by the UE to convey UE specific capability information to the UTRAN.

8.1.6.2 Initiation

The UE shall initiate the UE capability update procedure in the following situations:

- the UE receives a UE CAPABILITY ENQUIRY message from the UTRAN;
- while in connected mode the UE capabilities change compared to those stored in the variable UE_CAPABILITY_TRANSFERRED

If the UE CAPABILITY INFORMATION message is sent in response to a UE CAPABILITY ENQUIRY message, the UE shall:

- include the IE "RRC transaction identifier"; and
- set it to the value of "RRC transaction identifier" in the entry for the UE CAPABILITY ENQUIRY message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- ~~update variable UE_CAPABILITY_REQUESTED according to the requirement given in the IE "Capability update requirement" in the UE CAPABILITY ENQUIRY message as specified in section 8.6.3.X;~~
- retrieve its UTRA UE radio access capability information elements ~~and its inter-RAT-specific UE radio access capability information elements~~ from variable UE_CAPABILITY_REQUESTED and include this in IE “UE radio access capability” and in IE “UE radio access capability extension”, provided this IE is included in variable UE_CAPABILITY_REQUESTED,
- retrieve its inter-RAT-specific UE radio access capability information elements from variable UE_CAPABILITY_REQUESTED and include this in IE “UE system specific capability”,
- ~~include the UTRAN-specific UE capability information elements into the IE "UE radio capability", according to the requirement given in the IE "Capability update requirement" in the UE CAPABILITY ENQUIRY message;~~
- ~~include one or more inter-RAT classmarks into the IE "UE system specific capability", according to the requirement given in the IE "Capability update requirement" in the UE CAPABILITY ENQUIRY message.~~

If the UE CAPABILITY INFORMATION message is sent because one or more of the UE capabilities change compared to those stored in the variable UE_CAPABILITY_TRANSFERRED while in connected state, the UE shall include the information elements associated with the capabilities that have changed in the UE CAPABILITY INFORMATION message.

If the UE is in CELL_PCH or URA_PCH state, it shall first perform a cell update procedure using the cause "uplink data transmission", see subclause 8.3.1.

The UE RRC shall submit the UE CAPABILITY INFORMATION message to the lower layers for transmission on the uplink DCCH using AM RLC. When the message has been sent on the radio interface the UE RRC shall start timer T304 and set counter V304 to 1.

8.1.6.4 Reception of the UE CAPABILITY INFORMATION CONFIRM message by the UE

Upon reception of a UE CAPABILITY INFORMATION CONFIRM message, the UE shall:

- stop timer T304;
- update its variable UE_CAPABILITY_TRANSFERRED with the UE capabilities it has last transmitted to the UTRAN during the current RRC connection;.
- clear the variable UE_CAPABILITY_REQUESTED;

and the procedure ends.

8.1.7.3 Reception of an UE CAPABILITY ENQUIRY message by the UE

Upon reception of an UE CAPABILITY ENQUIRY message, the UE shall act on the received information elements as specified in subclause 8.6 and initiate the transmission of UE capability information procedure, which is specified in subclause 8.1.6.

8.6.3.11 RRC transaction identifier

If the IE "RRC transaction identifier" is included in a received message, the UE shall perform the actions below. The UE shall:

If the received message is any of the messages:

- RADIO BEARER SETUP; or
- RADIO BEARER RECONFIGURATION; or
- RADIO BEARER RELEASE; or
- TRANSPORT CHANNEL RECONFIGURATION; or
- PHYSICAL CHANNEL RECONFIGURATION:

the UE shall:

- if the variable ORDERED_RECONFIGURATION is set to FALSE; and
- if the variable CELL_UPDATE_STARTED is set to FALSE; and
- if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
  - accept the transaction; and
  - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
- else:
- if the variable ORDERED_RECONFIGURATION is set to TRUE; or
- if the variable CELL_UPDATE_STARTED is set to TRUE; or
- if the table "Accepted transactions" in the variable TRANSACTIONS contains an entry with an IE "Message Type" set to ACTIVE SET UPDATE; or
- if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored for the same "Message Type" as the received message in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received;
    - and end the procedure;
  - else:
    - reject the transaction; and
    - if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

Else:

If the received message is any of the messages:

- RRC CONNECTION SETUP; or
- CELL UPDATE CONFIRM; or
- URA UPDATE CONFIRM:

the UE shall:

- if the IE "Message Type" of the received message is not present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
    - accept the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
  - else:
  - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
    - reject the transaction; and
    - if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.
- else:
- if the IE "Message Type" of the received message is present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received; and
    - end the procedure;
  - else:
  - if the IE "RRC transaction identifier" of the received message is different from the "RRC transaction identifier" stored for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
      - ignore the once accepted transaction and instead accept the new transaction; and
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS, replacing the previous entry;
    - else:
    - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
      - reject the transaction; and

- if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
  - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

Else:

If the received message is any other message, the UE shall:

- if the IE "Message Type" of the received message is not present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
    - accept the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
  - else:
  - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
    - reject the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.
- else:
- if the IE "Message Type" of the received message is present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored in any entry for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received; and
    - end the procedure;
  - else:
  - if the IE "RRC transaction identifier" of the received message is different from the "RRC transaction identifier" stored in all entries for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
      - accept the additional transaction; and
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS, in addition to the already existing entries;
    - else:
    - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:

- reject the transaction; and
- store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

8.6.3.12~~X~~ Capability Update Requirement

If the IE "Capability Update Requirement" is included the UE shall:

- if the IE "UE radio access FDD capability update requirement" has the value TRUE:
  - if the UE supports FDD mode:
    - include its UTRA FDD capabilities and its UTRA capabilities common to FDD and TDD in the IE "UE radio access capability" and the IE "UE radio access capability extension" within variable UE_CAPABILITY~~IES~~_REQUESTED as specified below:
      - ~~if the UE supports only the 2100 MHz UTRA FDD Frequency Band; and~~
      - ~~if the UE does not support any RAT other than UTRA:~~
        - ~~include in the IE "UE radio access capability" the IEs "FDD RF capability FDD" and "Measurement capability" associated to this UTRA FDD frequency band;~~
      - if the UE supports multiple UTRA FDD Frequency Bands; or
      - if the UE supports a single UTRA FDD Frequency Band different from 2100 MHz~~; or~~:
      - ~~if the UE supports a RAT other than UTRA:~~
        - include the IE “UE radio access capability”, excluding IEs “RF capability FDD” and “Measurement capability”;
        - include the IE “UE radio access capability extension”, including ~~include in the IE "UE radio access capability extension"~~ the IEs "~~FDD~~ RF capability FDD extension" and the "Measurement capability extension" associated to each supported UTRA FDD frequency band indicated in the IE "Frequency band";
      - else:
        - include in the IE "UE radio access capability", including the IEs "RF capability FDD" and "Measurement capability" associated to the 2100 MHz UTRA FDD frequency band;
- if the IE "UE radio access TDD capability update requirement" has the value TRUE:
  - if the UE supports TDD mode:
    - include its UTRA TDD capabilities and its UTRA capabilities common to FDD and TDD in the IE "UE radio access capability" within variable UE_CAPABILITY~~IES~~_REQUESTED;
- if the IE "System specific capability update requirement list" is present:
  - for each of the RAT requested in the IE "UE system specific capability”
    - if the UE supports the concerned RAT:
      - include its inter-RAT radio access capabilities for the concerned system in the IE "UE system specific capability" within variable UE_CAPABILITY~~IES~~_REQUESTED

If the IE " Capability update requirement " is not present, the UE shall assume the default values as specified in 10.3.3.2 and act in accordance with the above.

8.6.4 Radio bearer information elements

10.2.41 RRC CONNECTION SETUP COMPLETE

This message confirms the establishment of the RRC Connection by the UE.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE Information Elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
START list	MP	1 to <maxCNdomains>		START [40] values for all CN domains.
>CN domain identity	MP		CN domain identity 10.3.1.1	
>START	MP		START 10.3.3.38	START value to be used in this CN domain.
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
Other information elements				
UE system specific capability	OP	1 to <maxSystemCapability>		
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	

10.2.56 UE CAPABILITY INFORMATION

This message is sent by UE to convey UE specific capability information to the UTRAN.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	OP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	Integrity check info is included if integrity protection is applied
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
Other information elements				
UE system specific capability	OP	1 to <maxSystemCapability>		
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability10.3.8.7	

10.3.3.21a Measurement capability extension

This IE may be used to replace the measurement capability information provided within IE “Measurement capability”

Information Element/Group name	Need	Multi	Type and reference	Semantics description
FDD measurements	MP	1 to <maxFreqBandsFDD>		
>FDD Frequency band	MD~~P~~		Enumerated(FDD2100, FDD1900)	The default value is the same as indicated in the IE "Frequency band" included in the IE " UE radio access capability extension". A~~a~~t least one spare value is needed
>Need for DL compressed mode	MP		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on the FDD frequency band indicated by the IE "FDD Frequency band"
>Need for UL compressed mode	MP		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on the FDD frequency band indicated by the IE "FDD Frequency band"
TDD measurements	CV *tdd_sup*	1 to <maxFreqBandsTDD>		
>TDD Frequency band	MP		Enumerated(a, b, c)	
>Need for DL compressed mode	MP		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on TDD frequency band indicated by the IE "TDD Frequency band"
>Need for UL compressed mode	MP		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on TDD frequency band indicated by the IE "TDD Frequency band"
GSM measurements	CV *gsm_sup*	1 to <maxFreqBandsGSM>		
>GSM Frequency band	MP		Enumerated(GSM450, GSM480, GSM850, GSM 900P, GSM900E, GSM1800, GSM1900)	as defined in [45] at least one spare value
>Need for DL compressed mode	MP		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on GSM frequency band indicated by the IE "GSM Frequency band"
>Need for UL compressed mode	MP		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on GSM frequency band indicated by the IE "GSM Frequency band"

Multi-carrier measurement	CV *mc_sup*			
>Need for DL compressed mode	MP		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on multi-carrier
>Need for UL compressed mode	MP		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on multi-carrier

Condition	**Explanation**
tdd_sup	Presence is mandatory if IE Multi-mode capability has the value "TDD" or "FDD/TDD". Otherwise this field is not needed in the message.
Gsm_sup	Presence is mandatory if IE Support of GSM has the value TRUE. Otherwise this field is not needed in the message.
mc_sup	Presence is mandatory if IE Support of multi-carrier has the value TRUE. Otherwise this field is not needed in the message.

10.3.3.33 RF capability FDD

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
~~FDD RF capability~~	~~CH-*fdd_req_sup*~~			
~~>~~UE power class	MP		Enumerated(1..4)	as defined in [21]
~~>~~Tx/Rx frequency separation	MP		Enumerated(190, 174.8-205.2, 134.8-245.2)	In MHz as defined in [21]. NOTE: Not applicable if UE is not operating in frequency band a (as defined in [21]).
~~TDD RF capability~~	~~CH-*tdd_req_sup*~~			
~~>UE power class~~	~~MP~~		~~Enumerated (1..4)~~	~~as defined in [22]~~
~~>Radio frequency bands~~	~~MP~~		~~Enumerated(a, b, c, a+b, a+c, b+c, a+b+c)~~	~~as defined in [22]~~
~~>Chip rate capability~~	~~MP~~		~~Enumerated(3.84Mcps,1.28Mcps)~~	~~as defined in [22]~~

~~Condition~~	~~Explanation~~
~~*Tdd_req_sup*~~	~~Presence is mandatory if IE Multi-mode capability has the value "TDD" or "FDD/TDD" and a TDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.~~
~~*Fdd_req_sup*~~	~~Presence is mandatory if IE Multi-mode capability has the value "FDD" or "FDD/TDD" and a FDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.~~

10.3.3.33ba~~a~~ RF capability TDD

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE power class	MP		Enumerated (1..4)	as defined in [22]
Radio frequency bands	MP		Enumerated(a, b, c, a+b, a+c, b+c, a+b+c)	as defined in [22]
Chip rate capability	MP		Enumerated(3.84Mcps,1.28Mcps)	as defined in [22]

10.3.3.33a~~b~~ RF capability FDD extension

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE power class extension	MP		Enumerated(1..4)	as defined in [21]. Al least one spare value is needed
Tx/Rx frequency separation	MP		Enumerated(190, 174.8-205.2, 134.8-245.2)	In MHz as defined in [21]. NOTE: Not applicable if UE is not operating in frequency band a (as defined in [21]).

10.3.3.42 UE radio access capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description
ICS version	MP		Enumerated(R99)	Indicates the release version of [42]-2 (Implementation Conformance Statement (ICS) proforma specification) that is applicable for the UE.
PDCP capability	MP		PDCP capability 10.3.3.24	
RLC capability	MP		RLC capability 10.3.3.34	
Transport channel capability	MP		Transport channel capability 10.3.3.40	
~~FDD~~ RF capability FDD	~~CH-~~ *~~fdd_req_sup~~* ~~MP~~OP		RF capability FDD 10.3.3.33	
~~TDD~~ RF Capability TDD	~~CH-~~ *~~tdd_req_sup~~* ~~OP~~		10.3.3.33~~ba~~ RF capability TDD	
Physical channel capability	MP		Physical channel capability 10.3.3.25	
UE multi-mode/multi-RAT capability	MP		UE multi-mode/multi-RAT capability 10.3.3.41	
Security capability	MP		Security capability 10.3.3.37	
UE positioning capability	MP		UE positioning capability 10.3.3.45	
Measurement capability	CH-*fdd_req_sup*		Measurement capability 10.3.3.21	

Condition	Explanation
fdd_req_sup	Presence is mandatory if IE Multi-mode capability has the value "FDD" or "FDD/TDD" and a FDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.

10.3.3.42a UE radio access capability extension

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Frequency band specific capability list	~~CV-~~ ~~*fdd_req_sup*~~MP	1 to < maxFreqbandsFDD>		
>Frequency band	MP		Enumerated(FDD2100, FDD1900)	Aat least one spare value is needed
>~~FDD~~ RF capability FDD extension	MD		10.3.3.33a~~b~~ RF ~~FDD~~ capability FDD extension	the default values are the same values as in the immediately preceeding IE "~~FDD~~ RF capability FDD extension"; the first occurence is MP
>Measurement capability extension	MP		Measurement capability extension 10.3.3.21a	

~~Condition~~	~~Explanation~~
~~*fdd_req_sup*~~	~~Presence is mandatory if IE Multi-mode capability has the value "FDD" or "FDD/TDD" and a FDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.~~

10.3.10 Multiplicity values and type constraint values

The following table includes constants that are either used as multi bounds (name starting with "max") or as high or low value in a type specification (name starting with "lo" or "hi"). Constants are specified only for values appearing more than once in the RRC specification. In case a constant is related to one or more other constants, an expression is included in the "value" column instead of the actual value.

Constant	Explanation	Value
CN information		
MaxCNdomains	Maximum number of CN domains	4
UTRAN mobility information		
MaxRAT	Maximum number or Radio Access Technologies	maxOtherRAT + 1
MaxOtherRAT	Maximum number or other Radio Access Technologies	15
MaxURA	Maximum number of URAs in a cell	8
MaxInterSysMessages	Maximum number of Inter System Messages	4
MaxRABsetup	Maximum number of RABs to be established	16
UE information		
Maxtransactions	Maximum number of parallel RRC transactions in downlink	25
MaxPDCPalgoType	Maximum number of PDCP algorithm types	8
MaxDRACclasses	Maximum number of UE classes which would require different DRAC parameters	8
~~maxFrequencybands~~	~~Maximum number of frequency bands supported by the UE as defined in 25.102~~	~~4~~
maxFreqBandsFDD	Maximum number of frequency bands supported by the UE as defined in 25.101	8
maxFreqBandsTDD	Maximum number of frequency bands supported by the UE as defined in 25.102	4
maxFreqBandsGSM	Maximum number of frequency bands supported by the UE as defined in 05.05	16
maxPage1	Number of UEs paged in the Paging Type 1 message	8
maxSystemCapability	Maximum number of system specific capabilities that can be requested in one message.	16
RB information		
maxPredefConfig	Maximum number of predefined configurations	16
maxRB	Maximum number of RBs	32
maxSRBsetup	Maximum number of signalling RBs to be established	8
maxRBperRAB	Maximum number of RBs per RAB	8
maxRBallRABs	Maximum number of non signalling RBs	27
maxRBMuxOptions	Maximum number of RB multiplexing options	8
maxLoCHperRLC	Maximum number of logical channels per RLC entity	2
TrCH information		
maxTrCH	Maximum number of transport channels used in one direction (UL or DL)	32
maxTrCHpreconf	Maximum number of preconfigured Transport channels, per direction	16
maxCCTrCH	Maximum number of CCTrCHs	8
maxTF	Maximum number of different transport formats that can be included in the Transport format set for one transport channel	32
maxTF-CPCH	Maximum number of TFs in a CPCH set	16
maxTFC	Maximum number of Transport Format Combinations	1024
maxTFCI-1-Combs	Maximum number of TFCI (field 1) combinations	512
maxTFCI-2-Combs	Maximum number of TFCI (field 2) combinations	512
maxCPCHsets	Maximum number of CPCH sets per cell	16
maxSIBperMsg	Maximum number of complete system information blocks per SYSTEM INFORMATION message	16
maxSIB	Maximum number of references to other system information blocks.	32
maxSIB-FACH	Maximum number of references to system information blocks on the FACH	8
PhyCH information		
maxSubCh	Maximum number of sub-channels on PRACH	12
maxPCPCH-APsubCH	Maximum number of available sub-channels for AP signature on PCPCH	12
maxPCPCH-CDsubCH	Maximum number of available sub-channels for CD signature on PCPCH	12
maxSig	Maximum number of signatures on PRACH	16
maxPCPCH-APsig	Maximum number of available signatures for AP on PCPCH	16
maxPCPCH-CDsig	Maximum number of available signatures for CD on PCPCH	16
maxAC	Maximum number of access classes	16
maxASC	Maximum number of access service classes	8

maxASCmap	Maximum number of access class to access service classes mappings	7
maxASCpersist	Maximum number of access service classes for which persistence scaling factors are specified	6
maxPRACH	Maximum number of PRACHs in a cell	16
maxFACHPCH	Maximum number of FACHs and PCHs mapped onto one secondary CCPCHs	8
maxRL	Maximum number of radio links	8
maxSCCPCH	Maximum number of secondary CCPCHs per cell	16
maxDPDCH-UL	Maximum number of DPDCHs per cell	6
maxDPCH-DLchan	Maximum number of channelisation codes used for DL DPCH	8
maxDPCHcodesPerTS	Maximum number of codes for one timeslots (TDD)	16
maxPUSCH	Maximum number of PUSCHs	(8)
maxPDSCH	Maximum number of PDSCHs	8
maxPDSCHcodes	Maximum number of codes for PDSCH	16
maxPDSCH-TFCIgroups	Maximum number of TFCI groups for PDSCH	256
maxPDSCHcodeGroups	Maximum number of code groups for PDSCH	256
maxPCPCHs	Maximum number of PCPCH channels in a CPCH Set	64
maxPCPCH-SF	Maximum number of available SFs on PCPCH	7
maxTS	Maximum number of timeslots used in one direction (UL or DL)	14
HiPUSCHIdentities	Maximum number of PDSCH Identities	64
HiPDSCHIdentities	Maximum number of PDSCH Identities	64
Measurement information		
maxTGPS	Maximum number of transmission gap pattern sequences	6
maxAdditionalMeas	Maximum number of additional measurements for a given measurement identity	4
maxMeasEvent	Maximum number of events that can be listed in measurement reporting criteria	8
maxMeasParEvent	Maximum number of measurement parameters (e.g. thresholds) per event	2
maxMeasIntervals	Maximum number of intervals that define the mapping function between the measurements for the cell quality Q of a cell and the representing quality value	1
maxCellMeas	Maximum number of cells to measure	32
maxReportedGSMCells	Maximum number of GSM cells to be reported	6
maxFreq	Maximum number of frequencies to measure	8
maxSat	Maximum number of satellites to measure	16
HiRM	Maximum number that could be set as rate matching attribute for a transport channel	256
Frequency information		
maxFDDFreqList	Maximum number of FDD carrier frequencies to be stored in USIM	4
maxTDDFreqList	Maximum number of TDD carrier frequencies to be stored in USIM	4
maxFDDFreqCellList	Maximum number of neighbouring FDD cells to be stored in USIM	32
maxTDDFreqCellList	Maximum number of neighbouring TDD cells to be stored in USIM	32
maxGSMCellList	Maximum number of GSM cells to be stored in USIM	32
Other information		
maxNumGSMFreqRanges	Maximum number of GSM Frequency Ranges to store	32
maxNumFDDFreqs	Maximum number of FDD centre frequencies to store	8
maxNumTDDFreqs	Maximum number of TDD centre frequencies to store	8
maxNumCDMA200Freqs	Maximum number of CDMA2000 centre frequencies to store	8

11.2 PDU definitions

```
--**************************************************************
--
-- TABULAR: The message type and integrity check info are not
-- visible in this module as they are defined in the class module.
-- Also, all FDD/TDD specific choices have the FDD option first
-- and TDD second, just for consistency.
--
--**************************************************************

PDU-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

--**************************************************************
--
-- IE parameter types from other modules
--
--**************************************************************

IMPORTS

-- Core Network IEs :
    CN-DomainIdentity,
    CN-InformationInfo,
    NAS-Message,
    PagingRecordTypeID,
-- UTRAN Mobility IEs :
    URA-Identity,
-- User Equipment IEs :
    ActivationTime,
    C-RNTI,
    CapabilityUpdateRequirement,
    CellUpdateCause,
    CipheringAlgorithm,
    CipheringModeInfo,
    EstablishmentCause,
    FailureCauseWithProtErr,
    FailureCauseWithProtErrTrId,
    InitialUE-Identity,
    IntegrityProtActivationInfo,
    IntegrityProtectionModeInfo,
    N-308,
    PagingCause,
    PagingRecordList,
    ProtocolErrorIndicator,
    ProtocolErrorIndicatorWithMoreInfo,
    Rb-timer-indicator,
    Re-EstablishmentTimer,
    RedirectionInfo,
    RejectionCause,
    ReleaseCause,
    RRC-StateIndicator,
    RRC-TransactionIdentifier,
    SecurityCapability,
    START-Value,
    STARTList,
    U-RNTI,
    U-RNTI-Short,
    UE-RadioAccessCapability,
    UE-RadioAccessCapabBandExt1,
    UE-RadioAccessCapability-v370ext
    UE-ConnTimersAndConstants,
    URA-UpdateCause,
    UTRAN-DRX-CycleLengthCoefficient,
    WaitTime,
-- Radio Bearer IEs :
    DefaultConfigIdentity,
    DefaultConfigMode,
    DL-CounterSynchronisationInfo,
    PredefinedConfigIdentity,
    RAB-Info,
    RAB-Info-Post,
    RAB-InformationList,
    RAB-InformationReconfigList,
    RAB-InformationSetupList,
    RB-ActivationTimeInfo,
    RB-ActivationTimeInfoList,
    RB-COUNT-C-InformationList,
    RB-COUNT-C-MSB-InformationList,
    RB-IdentityList,
```

```
    RB-InformationAffectedList,
    RB-InformationReconfigList,
    RB-InformationReleaseList,
    RB-InformationSetupList,
    RB-WithPDCP-InfoList,
    SRB-InformationSetupList,
    SRB-InformationSetupList2,
    UL-CounterSynchronisationInfo,
-- Transport Channel IEs:
    CPCH-SetID,
    DL-AddReconfTransChInfo2List,
    DL-AddReconfTransChInfoList,
    DL-CommonTransChInfo,
    DL-DeletedTransChInfoList,
    DRAC-StaticInformationList,
    TFC-Subset,
    TFCS-Identity,
    UL-AddReconfTransChInfoList,
    UL-CommonTransChInfo,
    UL-DeletedTransChInfoList,
-- Physical Channel IEs :
    AllocationPeriodInfo,
    Alpha,
    CCTrCH-PowerControlInfo,
    ConstantValue,
    CPCH-SetInfo,
    DL-CommonInformation,
    DL-CommonInformationPost,
    DL-InformationPerRL,
    DL-InformationPerRL-List,
    DL-InformationPerRL-ListPostFDD,
    DL-InformationPerRL-PostTDD,
    DL-DPCH-PowerControlInfo,
    DL-PDSCH-Information,
    DPCH-CompressedModeStatusInfo,
    FrequencyInfo,
    FrequencyInfoFDD,
    FrequencyInfoTDD,
    IndividualTS-InterferenceList,
    MaxAllowedUL-TX-Power,
    PDSCH-CapacityAllocationInfo,
    PDSCH-Identity,
    PDSCH-Info,
    PRACH-RACH-Info,
    PrimaryCCPCH-TX-Power,
    PUSCH-CapacityAllocationInfo,
    PUSCH-Identity,
    RL-AdditionInformationList,
    RL-RemovalInformationList,
    SpecialBurstScheduling,
    SSDT-Information,
    TFC-ControlDuration,
    TimeslotList,
    TX-DiversityMode,
    UL-ChannelRequirement,
    UL-ChannelRequirementWithCPCH-SetID,
    UL-DPCH-Info,
    UL-DPCH-InfoPostFDD,
    UL-DPCH-InfoPostTDD,
    UL-TimingAdvance,
    UL-TimingAdvanceControl,
-- Measurement IEs :
    AdditionalMeasurementID-List,
    Band-Indicator,
    EventResults,
    InterRAT-TargetCellDescription,
    MeasuredResults,
    MeasuredResultsList,
    MeasuredResultsOnRACH,
    MeasurementCommand,
    MeasurementIdentity,
    MeasurementReportingMode,
    PrimaryCCPCH-RSCP,
    TimeslotListWithISCP,
    TrafficVolumeMeasuredResultsList,
    UE-Positioning-GPS-AssistanceData,
    UE-Positioning-OTDOA-AssistanceData,
-- Other IEs :
    BCCH-ModificationInfo,
    CDMA2000-MessageList,
    GSM-MessageList,
    InterRAT-ChangeFailureCause,
    InterRAT-HO-Failure,
    InterRAT-UE-RadioAccessCapabilityList,
```

```
    InterRAT-UE-SecurityCapList,
    InterRATMessage,
    IntraDomainNasNodeSelector,
    ProtocolErrorInformation,
    ProtocolErrorMoreInformation,
    Rplmn-Information,
    SegCount,
    SegmentIndex,
    SFN-Prime,
    SIB-Data-fixed,
    SIB-Data-variable,
    SIB-Type
FROM InformationElements

    maxSIBperMsg,
    maxSystemCapability
FROM Constant-definitions;
```

```
-- **************************************************
--
-- RRC CONNECTION SETUP COMPLETE
--
-- **************************************************

RRCConnectionSetupComplete ::= SEQUENCE {
    -- TABULAR: Integrity protection shall not be performed on this message.
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        startList                       STARTList,
        ue-RadioAccessCapability        UE-RadioAccessCapability            OPTIONAL,
    --  Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
    -- Non critical eExtensions mechanism for non- release99 information
        v360NnonCriticalExtensions          SEQUENCE {
            ue-RadioAccessCapabilityExt1        UE-RadioAccessCapabilityExt1            OPTIONAL,
            -- Reserved for future non critical eExtension mechanism for non- release99 information
            nonCriticalExtensions           SEQUENCE {}     OPTIONAL
    }       OPTIONAL
    -- Non critical extensions
        v370NonCriticalExtensions           SEQUENCE {
            rrcConnectionSetupComplete-v370ext  RRCConnectionSetupComplete-v370ext,
            -- Reserved for future non critical extension
            nonCriticalExtensions           SEQUENCE {}     OPTIONAL
        }       OPTIONAL
}

RRCConnectionSetupComplete-v370ext ::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-v370ext    UE-RadioAccessCapability-v370ext    OPTIONAL
}


}
```

```
-- ************************************************
--
-- UE CAPABILITY INFORMATION
--
-- ************************************************

UECapabilityInformation ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier           OPTIONAL,
        ue-RadioAccessCapability        UE-RadioAccessCapability            OPTIONAL,
    -- Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList
    OPTIONAL,
    -- Non critical eExtensions mechanism for non- release99 information
        v360NnonCriticalExtensions          SEQUENCE {
            ue-RadioAccessCapabilityExt1        UE-RadioAccessCapababilityExt1          OPTIONAL,
            -- Reserved for future eExtensions mechanism for non- release99 information
            nonCriticalExtensions           SEQUENCE {}     OPTIONAL
    }       OPTIONAL
    -- Non critical extensions
        v370NonCriticalExtensions           SEQUENCE {
            ueCapabilityInformation-v370ext UECapabilityInformation-v370ext,
            -- Reserved for future non critical extension
            nonCriticalExtensions           SEQUENCE {}     OPTIONAL
        }       OPTIONAL
}

UECapabilityInformation-v370ext::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-v370ext        UE-RadioAccessCapability-v370ext        OPTIONAL
}


}
```

11.3 Information element definitions

```
-- **************************************************
--
--     USER EQUIPMENT INFORMATION ELEMENTS (10.3.3)
--
-- **************************************************

ActivationTime ::=                  INTEGER (0..255)
-- TABULAR : value 'now' always appear as default, and is encoded by absence of the field

BackoffControlParams ::=            SEQUENCE {
    n-AP-RetransMax                     N-AP-RetransMax,
    n-AccessFails                       N-AccessFails,
    nf-BO-NoAICH                        NF-BO-NoAICH,
    ns-BO-Busy                          NS-BO-Busy,
    nf-BO-AllBusy                       NF-BO-AllBusy,
    nf-BO-Mismatch                      NF-BO-Mismatch,
    t-CPCH                              T-CPCH
}

C-RNTI ::=                          BIT STRING (SIZE (16))

CapabilityUpdateRequirement ::=     SEQUENCE {
    ue-RadioCapabilityFDDUpdateRequirement  BOOLEAN,
    ue-RadioCapabilityTDDUpdateRequirement  BOOLEAN,
    systemSpecificCapUpdateReqList      SystemSpecificCapUpdateReqList      OPTIONAL
}

CellUpdateCause ::=                 ENUMERATED {
                                        cellReselection,
                                        periodicalCellUpdate,
                                        uplinkDataTransmission,
                                        utran-pagingResponse,
                                        re-enteredServiceArea,
                                        radiolinkFailure,
                                        rlc-unrecoverableError,
                                        spare1 }

ChipRateCapability ::=              ENUMERATED {
                                        mcps3-84, mcps1-28 }

CipheringAlgorithm ::=              ENUMERATED {
                                        uea0, uea1 }

CipheringModeCommand ::=            CHOICE {
    startRestart                        CipheringAlgorithm,
    stopCiphering                       NULL
}

CipheringModeInfo ::=               SEQUENCE {
    cipheringModeCommand                CipheringModeCommand,
    -- TABULAR: The ciphering algorithm is included in
    -- the CipheringModeCommand.
    activationTimeForDPCH               ActivationTime                      OPTIONAL,
    rb-DL-CiphActivationTimeInfo        RB-ActivationTimeInfoList           OPTIONAL
}

CN-DRX-CycleLengthCoefficient ::=   INTEGER (6..9)

CN-PagedUE-Identity ::=             CHOICE {
    imsi-GSM-MAP                        IMSI-GSM-MAP,
    tmsi-GSM-MAP                        TMSI-GSM-MAP,
    p-TMSI-GSM-MAP                      P-TMSI-GSM-MAP,
    imsi-DS-41                          IMSI-DS-41,
    tmsi-DS-41                          TMSI-DS-41
}

CompressedModeMeasCapability ::=    SEQUENCE {
    fdd-Measurements                    BOOLEAN,
    -- TABULAR: The IEs below are made optional since they are conditional based
    -- on another information element. Their absence corresponds to the case where
    -- the condition is not true.
    tdd-Measurements                    BOOLEAN                             OPTIONAL,
    gsm-Measurements                    GSM-Measurements                    OPTIONAL,
    multiCarrierMeasurements            BOOLEAN                             OPTIONAL
}

CompressedModeMeasCapabFDDList ::=  SEQUENCE (SIZE (1..maxFreqBandsFDD)) OF
                                        CompressedModeMeasCapabFDD

CompressedModeMeasCapabFDD ::=      SEQUENCE {
```

```
    radioFrequencyBandFDD               RadioFrequencyBandFDD   OPTIONAL,
    dl-MeasurementsFDD                  BOOLEAN,
    ul-MeasurementsFDD                  BOOLEAN
}

CompressedModeMeasCapabTDDList ::=  SEQUENCE (SIZE (1..maxFreqBandsTDD)) OF
                                        CompressedModeMeasCapabTDD

CompressedModeMeasCapabTDD ::=      SEQUENCE {
    radioFrequencyBandTDD               RadioFrequencyBandTDD,
    dl-MeasurementsTDD                  BOOLEAN,
    ul-MeasurementsTDD                  BOOLEAN
}

CompressedModeMeasCapabGSMList ::=  SEQUENCE (SIZE (1..maxFreqBandsGSM)) OF
                                        CompressedModeMeasCapabGSM

CompressedModeMeasCapabGSM ::=      SEQUENCE {
    radioFrequencyBandGSM               RadioFrequencyBandGSM,
    dl-MeasurementsGSM                  BOOLEAN,
    ul-MeasurementsGSM                  BOOLEAN
}

CompressedModeMeasCapabMC ::=       SEQUENCE {
    dl-MeasurementsMC                   BOOLEAN,
    ul-MeasurementsMC                   BOOLEAN
}


CPCH-Parameters ::=                 SEQUENCE {
    initialPriorityDelayList            InitialPriorityDelayList            OPTIONAL,
    backoffControlParams                BackoffControlParams,
    powerControlAlgorithm               PowerControlAlgorithm,
    -- TABULAR: TPC step size nested inside PowerControlAlgorithm
    dl-DPCCH-BER                        DL-DPCCH-BER
}

DL-DPCCH-BER ::=                    INTEGER (0..63)

DL-PhysChCapabilityFDD ::=          SEQUENCE {
    maxNoDPCH-PDSCH-Codes               INTEGER (1..8),
    maxNoPhysChBitsReceived             MaxNoPhysChBitsReceived,
    supportForSF-512                    BOOLEAN,
    supportOfPDSCH                      BOOLEAN,
    simultaneousSCCPCH-DPCH-Reception   SimultaneousSCCPCH-DPCH-Reception
}

DL-PhysChCapabilityTDD ::=          SEQUENCE {
    maxTS-PerFrame                      MaxTS-PerFrame,
    maxPhysChPerFrame                   MaxPhysChPerFrame,
    minimumSF                           MinimumSF-DL,
    supportOfPDSCH                      BOOLEAN,
    maxPhysChPerTS                      MaxPhysChPerTS
}

DL-TransChCapability ::=            SEQUENCE {
    maxNoBitsReceived                   MaxNoBits,
    maxConvCodeBitsReceived             MaxNoBits,
    turboDecodingSupport                TurboSupport,
    maxSimultaneousTransChs             MaxSimultaneousTransChsDL,
    maxSimultaneousCCTrCH-Count         MaxSimultaneousCCTrCH-Count,
    maxReceivedTransportBlocks          MaxTransportBlocksDL,
    maxNumberOfTFC-InTFCS               MaxNumberOfTFC-InTFCS-DL,
    maxNumberOfTF                       MaxNumberOfTF
}

DRAC-SysInfo ::=                    SEQUENCE {
    transmissionProbability             TransmissionProbability,
    maximumBitRate                      MaximumBitRate
}

DRAC-SysInfoList ::=                SEQUENCE (SIZE (1..maxDRACclasses)) OF
                                        DRAC-SysInfo

ESN-DS-41 ::=                       BIT STRING (SIZE (32))

EstablishmentCause ::=              ENUMERATED {
                                        originatingConversationalCall,
                                        originatingStreamingCall,
                                        originatingInteractiveCall,
                                        originatingBackgroundCall,
                                        originatingSubscribedTrafficCall,
                                        terminatingConversationalCall,
```

```
                                        terminatingStreamingCall,
                                        terminatingInteractiveCall,
                                        terminatingBackgroundCall,
                                        emergencyCall,
                                        interRAT-CellReselection,
                                        interRAT-CellChangeOrder,
                                        registration,
                                        detach,
                                        originatingHighPrioritySignalling,
                                        originatingLowPrioritySignalling,
                                        callRe-establishment,
                                        terminatingHighPrioritySignalling,
                                        terminatingLowPrioritySignalling,
                                        terminatingCauseUnknown,
                                        spare1 }

FailureCauseWithProtErr ::=         CHOICE {
    configurationUnsupported            NULL,
    physicalChannelFailure              NULL,
    incompatibleSimultaneousReconfiguration
                                        NULL,
    compressedModeRuntimeError          TGPSI,
    protocolError                       ProtocolErrorInformation,
    cellUpdateOccurred                  NULL,
    invalidConfiguration                NULL,
    configurationIncomplete             NULL,
    unsupportedMeasurement              NULL,
    spare1                              NULL,
    spare2                              NULL,
    spare3                              NULL,
    spare4                              NULL,
    spare5                              NULL,
    spare6                              NULL,
    spare7                              NULL
}

FailureCauseWithProtErrTrId ::=     SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr
}

GSM-Measurements ::=                SEQUENCE {
    gsm900                              BOOLEAN,
    dcs1800                             BOOLEAN,
    gsm1900                             BOOLEAN
}


ICS-Version ::=                     ENUMERATED {
                                        r99 }

IMSI-and-ESN-DS-41 ::=              SEQUENCE {
    imsi-DS-41                          IMSI-DS-41,
    esn-DS-41                           ESN-DS-41
}

IMSI-DS-41 ::=                      OCTET STRING (SIZE (5..7))

InitialPriorityDelayList ::=        SEQUENCE (SIZE (maxASC)) OF
                                        NS-IP

InitialUE-Identity ::=              CHOICE {
    imsi                                IMSI-GSM-MAP,
    tmsi-and-LAI                        TMSI-and-LAI-GSM-MAP,
    p-TMSI-and-RAI                      P-TMSI-and-RAI-GSM-MAP,
    imei                                IMEI,
    esn-DS-41                           ESN-DS-41,
    imsi-DS-41                          IMSI-DS-41,
    imsi-and-ESN-DS-41                  IMSI-and-ESN-DS-41,
    tmsi-DS-41                          TMSI-DS-41
}

IntegrityCheckInfo ::=              SEQUENCE {
    messageAuthenticationCode           MessageAuthenticationCode,
    rrc-MessageSequenceNumber           RRC-MessageSequenceNumber
}

IntegrityProtActivationInfo ::=     SEQUENCE {
    rrc-MessageSequenceNumberList       RRC-MessageSequenceNumberList
}

IntegrityProtectionAlgorithm ::=    ENUMERATED {
                                        uia1 }
```

```
IntegrityProtectionModeCommand ::=  CHOICE {
    startIntegrityProtection            SEQUENCE {
        integrityProtInitNumber             IntegrityProtInitNumber
    },
    modify                              SEQUENCE {
        dl-IntegrityProtActivationInfo      IntegrityProtActivationInfo
    }
}

IntegrityProtectionModeInfo ::=     SEQUENCE {
    integrityProtectionModeCommand      IntegrityProtectionModeCommand,
    -- TABULAR: DL integrity protection activation info and Integrity
    -- protection intialisation number have been nested inside
    -- IntegrityProtectionModeCommand.
    integrityProtectionAlgorithm        IntegrityProtectionAlgorithm        OPTIONAL
}

IntegrityProtInitNumber ::=         BIT STRING (SIZE (32))

MaxHcContextSpace ::=                   ENUMERATED  {
                                            by512, by1024, by2048, by4096,
                                            by8192 }


MaximumAM-EntityNumberRLC-Cap ::=   ENUMERATED {
                                        am3, am4, am5, am6,
                                        am8, am16, am30 }

-- Actual value = IE value * 16
MaximumBitRate ::=                  INTEGER (0..32)

MaximumRLC-WindowSize ::=           ENUMERATED { mws2047, mws4095 }

MaxNoDPDCH-BitsTransmitted ::=      ENUMERATED {
                                        b600, b1200, b2400, b4800,
                                        b9600, b19200, b28800, b38400,
                                        b48000, b57600 }

MaxNoBits ::=                       ENUMERATED {
                                        b640, b1280, b2560, b3840, b5120,
                                        b6400, b7680, b8960, b10240,
                                        b20480, b40960, b81920, b163840 }

MaxNoPhysChBitsReceived ::=         ENUMERATED {
                                        b600, b1200, b2400, b3600,
                                        b4800, b7200, b9600, b14400,
                                        b19200, b28800, b38400, b48000,
                                        b57600, b67200, b76800 }

MaxNoSCCPCH-RL ::=                  ENUMERATED {
                                        rl1 }

MaxNumberOfTF ::=                   ENUMERATED {
                                        tf32, tf64, tf128, tf256,
                                        tf512, tf1024 }

MaxNumberOfTFC-InTFCS-DL ::=        ENUMERATED {
                                        tfc16, tfc32, tfc48, tfc64, tfc96,
                                        tfc128, tfc256, tfc512, tfc1024 }

MaxNumberOfTFC-InTFCS-UL ::=        ENUMERATED {
                                        tfc4, tfc8, tfc16, tfc32, tfc48, tfc64,
                                        tfc96, tfc128, tfc256, tfc512, tfc1024 }

MaxPhysChPerFrame ::=               INTEGER (1..224)

MaxPhysChPerTimeslot ::=            ENUMERATED {
                                        ts1, ts2 }

MaxPhysChPerTS ::=                  INTEGER (1..16)

MaxSimultaneousCCTrCH-Count ::=     INTEGER (1..8)

MaxSimultaneousTransChsDL ::=       ENUMERATED {
                                        e4, e8, e16, e32 }

MaxSimultaneousTransChsUL ::=       ENUMERATED {
                                        e2, e4, e8, e16, e32 }

MaxTransportBlocksDL ::=            ENUMERATED {
                                        tb4, tb8, tb16, tb32, tb48,
```

```
                                    tb64, tb96, tb128, tb256, tb512 }

MaxTransportBlocksUL ::=            ENUMERATED {
                                    tb2, tb4, tb8, tb16, tb32, tb48,
                                    tb64, tb96, tb128, tb256, tb512 }

MaxTS-PerFrame ::=                  INTEGER (1..14)

-- TABULAR: This IE contains dependencies to UE-MultiModeRAT-Capability,
-- the conditional fields have been left mandatory for now.
MeasurementCapability ::=           SEQUENCE {
    downlinkCompressedMode              CompressedModeMeasCapability,
    uplinkCompressedMode                CompressedModeMeasCapability
}

MeasurementCapabilityExt1 ::=       SEQUENCE{
    compressedModeMeasCapabFDDList      CompressedModeMeasCapabFDDList,
    compressedModeMeasCapabTDDList      CompressedModeMeasCapabTDDList  OPTIONAL,
    compressedModeMeasCapabGSMList      CompressedModeMeasCapabGSMList  OPTIONAL,
    compressedModeMeasCapabMC           CompressedModeMeasCapabMC       OPTIONAL
}

MessageAuthenticationCode ::=       BIT STRING (SIZE (32))

MinimumSF-DL ::=                    ENUMERATED {
                                    sf1, sf16 }

MinimumSF-UL ::=                    ENUMERATED {
                                    sf1, sf2, sf4, sf8, sf16 }

MultiModeCapability ::=             ENUMERATED {
                                    tdd, fdd, fdd-tdd }

MultiRAT-Capability ::=             SEQUENCE {
    supportOfGSM                        BOOLEAN,
    supportOfMulticarrier               BOOLEAN
}

N-300 ::=                           INTEGER (0..7)

N-301 ::=                           INTEGER (0..7)

N-302 ::=                           INTEGER (0..7)

N-304 ::=                           INTEGER (0..7)

N-308 ::=                           INTEGER (1..8)

N-310 ::=                           INTEGER (0..7)

N-312 ::=                           ENUMERATED {
                                    s1, s50, s100, s200, s400,
                                    s600, s800, s1000 }

N-313 ::=                           ENUMERATED {
                                    s1, s2, s4, s10, s20,
                                     s50, s100, s200 }

N-315 ::=                           ENUMERATED {
                                    s1, s50, s100, s200, s400,
                                    s600, s800, s1000 }

N-AccessFails ::=                   INTEGER (1..64)

N-AP-RetransMax ::=                 INTEGER (1..64)

NetworkAssistedGPS-Supported ::=    ENUMERATED {
                                    networkBased,
                                    ue-Based,
                                    bothNetworkAndUE-Based,
                                    noNetworkAssistedGPS }

NF-BO-AllBusy ::=                   INTEGER (0..31)

NF-BO-NoAICH ::=                    INTEGER (0..31)

NF-BO-Mismatch ::=                  INTEGER (0..127)

NS-BO-Busy ::=                      INTEGER (0..63)

NS-IP ::=                           INTEGER (0..28)

P-TMSI-and-RAI-GSM-MAP ::=          SEQUENCE {
```

```
    p-TMSI                              P-TMSI-GSM-MAP,
    rai                                 RAI
}

PagingCause ::=                     ENUMERATED {
                                        terminatingConversationalCall,
                                        terminatingStreamingCall,
                                        terminatingInteractiveCall,
                                        terminatingBackgroundCall,
                                        terminatingHighPrioritySignalling,
                                        terminatingLowPrioritySignalling,
                                        terminatingCauseUnknown
 }

PagingRecord ::=                    CHOICE {
    cn-Identity                         SEQUENCE {
        pagingCause                         PagingCause,
        cn-DomainIdentity                   CN-DomainIdentity,
        cn-pagedUE-Identity                 CN-PagedUE-Identity
    },
    utran-Identity                      SEQUENCE {
        u-RNTI                              U-RNTI,
        cn-OriginatedPage-connectedMode-UE  SEQUENCE {
            pagingCause                         PagingCause,
            cn-DomainIdentity                   CN-DomainIdentity,
            pagingRecordTypeID                  PagingRecordTypeID
        }                                                                   OPTIONAL
    }
}

PagingRecordList ::=                SEQUENCE (SIZE (1..maxPage1)) OF
                                        PagingRecord

PDCP-Capability ::=                 SEQUENCE {
    losslessSRNS-RelocationSupport      BOOLEAN,
    supportForRfc2507                   CHOICE {
        notSupported                        NULL,
        supported                           MaxHcContextSpace
    }
}

PhysicalChannelCapability ::=       SEQUENCE {
        fddPhysChCapability                 SEQUENCE {
            downlinkPhysChCapability            DL-PhysChCapabilityFDD,
            uplinkPhysChCapability              UL-PhysChCapabilityFDD
        }                                           OPTIONAL,
        tddPhysChCapability                 SEQUENCE {
            downlinkPhysChCapability            DL-PhysChCapabilityTDD,
            uplinkPhysChCapability              UL-PhysChCapabilityTDD
        }                                           OPTIONAL
}

ProtocolErrorCause ::=              ENUMERATED {
                                        asn1-ViolationOrEncodingError,
                                        messageTypeNonexistent,
                                        messageNotCompatibleWithReceiverState,
                                        ie-ValueNotComprehended,
                                        conditionalInformationElementError,
                                        messageExtensionNotComprehended,
                                        spare1, spare2 }

ProtocolErrorIndicator ::=          ENUMERATED {
                                        noError, errorOccurred }

ProtocolErrorIndicatorWithMoreInfo ::=
                                    CHOICE {
    noError                             NULL,
    errorOccurred                       SEQUENCE {
        rrc-TransactionIdentifier           RRC-TransactionIdentifier,
        protocolErrorInformation            ProtocolErrorInformation
    }
}

ProtocolErrorMoreInformation ::=    SEQUENCE {
    diagnosticsType                     CHOICE {
        type1                               CHOICE {
            asn1-ViolationOrEncodingError       NULL,
            messageTypeNonexistent              NULL,
            messageNotCompatibleWithReceiverState
                                                IdentificationOfReveivedMessage,
            ie-ValueNotComprehended             IdentificationOfReveivedMessage,
            conditionalInformationElementError  IdentificationOfReveivedMessage,
            messageExtensionNotComprehended     IdentificationOfReveivedMessage,
```

```
            spare1                              NULL,
            spare2                              NULL
        },
        spare                               NULL
    }
}

RadioFrequencyBandFDD ::=           ENUMERATED {
                                        fdd2100,
                                        fdd1900,
                                        spare1, spare2, spare3, spare4, spare5, spare6}

RadioFrequencyBandTDDList ::=       ————————ENUMERATED {
                                        a, b, c, ab, ac, bc, abc }

RadioFrequencyBandTDD ::=           ENUMERATED (a, b, c, spare)

RadioFrequencyBandGSM ::=           ENUMERATED {
                                        gsm450,
                                        gsm480,
                                        gsm850,
                                        gsm900P,
                                        gsm900E,
                                        gsm1800,
                                        gsm1900,
                                        spare1, spare2, spare3, spare4, spare5,
                                        spare6, spare7, spare8, spare9}

Rb-timer-indicator ::=              SEQUENCE {
    t314-expired                        BOOLEAN,
    t315-expired                        BOOLEAN }

Re-EstablishmentTimer ::=           ENUMERATED {
                                        useT314, useT315
}

RedirectionInfo ::=                 CHOICE {
    frequencyInfo                       FrequencyInfo,
    interRATInfo                        InterRATInfo
}

RejectionCause ::=                  ENUMERATED {
                                        congestion,
                                        unspecified }

ReleaseCause ::=                    ENUMERATED {
                                        normalEvent,
                                        unspecified,
                                        pre-emptiveRelease,
                                        congestion,
                                        re-establishmentReject,
                                        directedsignallingconnectionre-establishment,
                                        userInactivity }

RF-Capability ::=                   SEQUENCE {
        fddRF-Capability                SEQUENCE {
            ue-PowerClass                   UE-PowerClass,
            txRxFrequencySeparation         TxRxFrequencySeparation
        }                       OPTIONAL,
        tddRF-Capability                            SEQUENCE {
            ue-PowerClass               UE-PowerClass,
            radioFrequencyTDDBandList   ————RadioFrequencyBandTDDList,
            chipRateCapability          ChipRateCapability
        }                                   OPTIONAL

}

RLC-Capability ::=                  SEQUENCE {
    totalRLC-AM-BufferSize              TotalRLC-AM-BufferSize,
    maximumRLC-WindowSize               MaximumRLC-WindowSize,
    maximumAM-EntityNumber              MaximumAM-EntityNumberRLC-Cap
}

RRC-MessageSequenceNumber ::=       INTEGER (0..15)


RRC-MessageSequenceNumberList ::=   SEQUENCE (SIZE (4..5)) OF
                                        RRC-MessageSequenceNumber

RRC-StateIndicator ::=              ENUMERATED {
                                        cell-DCH, cell-FACH, cell-PCH, ura-PCH }

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

```
S-RNTI ::=                          BIT STRING (SIZE (20))

S-RNTI-2 ::=                        BIT STRING (SIZE (10))

SecurityCapability ::=              SEQUENCE {
    cipheringAlgorithmCap                   BIT STRING (SIZE (16)),
    integrityProtectionAlgorithmCap     BIT STRING (SIZE (16))
}

SimultaneousSCCPCH-DPCH-Reception ::= CHOICE {
    notSupported                        NULL,
    supported                           SEQUENCE {
        maxNoSCCPCH-RL                      MaxNoSCCPCH-RL,
        simultaneousSCCPCH-DPCH-DPDCH-Reception
                                            BOOLEAN
        -- The IE above is applicable only if IE Support of PDSCH = TRUE
    }
}

SRNC-Identity ::=                   BIT STRING (SIZE (12))


START-Value ::=                     BIT STRING (SIZE (20))

STARTList ::=                       SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        STARTSingle

STARTSingle ::=                     SEQUENCE {
    cn-DomainIdentity                   CN-DomainIdentity,
    start-Value                         START-Value
}

SystemSpecificCapUpdateReq ::=      ENUMERATED {
                                        gsm }

SystemSpecificCapUpdateReqList ::= SEQUENCE (SIZE (1..maxSystemCapability)) OF
                                        SystemSpecificCapUpdateReq


T-300 ::=                           ENUMERATED {
                                        ms100, ms200, ms400, ms600, ms800,
                                        ms1000, ms1200, ms1400, ms1600,
                                        ms1800, ms2000, ms3000, ms4000,
                                        ms6000, ms8000 }

T-301 ::=                           ENUMERATED {
                                        ms100, ms200, ms400, ms600, ms800,
                                        ms1000, ms1200, ms1400, ms1600,
                                        ms1800, ms2000, ms3000, ms4000,
                                        ms6000, ms8000 }

T-302 ::=                           ENUMERATED {
                                        ms100, ms200, ms400, ms600, ms800,
                                        ms1000, ms1200, ms1400, ms1600,
                                        ms1800, ms2000, ms3000, ms4000,
                                        ms6000, ms8000 }

T-304 ::=                           ENUMERATED {
                                        ms100, ms200, ms400,
                                        ms1000, ms2000, spare1, spare2, spare3 }

T-305 ::=                           ENUMERATED {
                                        noUpdate, m5, m10, m30,
                                        m60, m120, m360, m720 }

T-307 ::=                           ENUMERATED {
                                        s5, s10, s15, s20,
                                        s30, s40, s50 }

T-308 ::=                           ENUMERATED {
                                        ms40, ms80, ms160, ms320 }

T-309 ::=                           INTEGER (1..8)

T-310 ::=                           ENUMERATED {
                                        ms40, ms80, ms120, ms160,
                                        ms200, ms240, ms280, ms320 }

T-311 ::=                           ENUMERATED {
                                        ms250, ms500, ms750, ms1000,
                                        ms1250, ms1500, ms1750, ms2000 }
```

```
T-312 ::=                           INTEGER (0..15)

T-313 ::=                           INTEGER (0..15)

T-314 ::=                           ENUMERATED {
                                        s0, s2, s4, s6, s8,
                                        s12, s16, s20 }

T-315 ::=                           ENUMERATED {
                                        s0, s10, s30, s60, s180,
                                        s600, s1200, s1800 }

T-316 ::=                           ENUMERATED {
                                        s0, s10, s20, s30, s40,
                                        s50, s-inf }

T-317 ::=                           ENUMERATED {
                                        s0, s10, s30, s60, s180,
                                        s600, s1200, s1800 }

T-CPCH ::=                          ENUMERATED {
                                        ct0, ct1 }

TMSI-and-LAI-GSM-MAP ::=            SEQUENCE {
    tmsi                                TMSI-GSM-MAP,
    lai                                 LAI
}

TMSI-DS-41 ::=                      OCTET STRING (SIZE (2..12))

TotalRLC-AM-BufferSize ::=          ENUMERATED {
                                        kb2, kb10, kb50, kb100,
                                        kb150, kb500, kb1000 }

-- Actual value = IE value * 0.125
TransmissionProbability ::=         INTEGER (1..8)

TransportChannelCapability ::=      SEQUENCE {
    dl-TransChCapability                DL-TransChCapability,
    ul-TransChCapability                UL-TransChCapability
}

TurboSupport ::=                    CHOICE {
    notSupported                        NULL,
    supported                           MaxNoBits
}

TxRxFrequencySeparation ::=         ENUMERATED {
                                        mhz190, mhz174-8-205-2,
                                        mhz134-8-245-2 }

U-RNTI ::=                          SEQUENCE {
    srnc-Identity                       SRNC-Identity,
    s-RNTI                              S-RNTI
}

U-RNTI-Short ::=                    SEQUENCE {
    srnc-Identity                       SRNC-Identity,
    s-RNTI-2                            S-RNTI-2
}

UE-ConnTimersAndConstants ::=       SEQUENCE {
-- Optional is used also for parameters for which the default value is the last one read in SIB1
-- t-301 and n-301 should not be used by the UE in this release of the protocol
    t-301                               T-301                               DEFAULT ms2000,
    n-301                               N-301                               DEFAULT 2,
    t-302                               T-302                               DEFAULT ms4000,
    n-302                               N-302                               DEFAULT 3,
    t-304                               T-304                               DEFAULT ms2000,
    n-304                               N-304                               DEFAULT 2,
    t-305                               T-305                               DEFAULT m30,
    t-307                               T-307                               DEFAULT s30,
    t-308                               T-308                               DEFAULT ms160,
    t-309                               T-309                               DEFAULT 5,
    t-310                               T-310                               DEFAULT ms160,
    n-310                               N-310                               DEFAULT 4,
    t-311                               T-311                               DEFAULT ms2000,
    t-312                               T-312                               DEFAULT 1,
    n-312                               N-312                               DEFAULT s1,
    t-313                               T-313                               DEFAULT 3,
    n-313                               N-313                               DEFAULT s20,
    t-314                               T-314                               DEFAULT s12,
    t-315                               T-315                               DEFAULT s180,
```

```
    n-315                               N-315                               DEFAULT s1,
    t-316                               T-316                               DEFAULT s30,
    t-317                               T-317                               DEFAULT s180
}

UE-IdleTimersAndConstants ::=       SEQUENCE {
    t-300                               T-300,
    n-300                               N-300,
    t-312                               T-312,
    n-312                               N-312
}

UE-MultiModeRAT-Capability ::=      SEQUENCE {
    multiRAT-CapabilityList             MultiRAT-Capability,
    multiModeCapability                 MultiModeCapability
}

UE-PowerClass ::=                   INTEGER (1..4)

UE-PowerClassExt ::=                ENUMERATED(1, 2, 3, 4, spare1, spare2, spare3, spare4)

UE-RadioAccessCapability ::=        SEQUENCE {
    ics-Version                         ICS-Version,
    pdcp-Capability                     PDCP-Capability,
    rlc-Capability                      RLC-Capability,
    transportChannelCapability          TransportChannelCapability,
    rf-Capability                       RF-Capability,
    physicalChannelCapability           PhysicalChannelCapability,
    ue-MultiModeRAT-Capability          UE-MultiModeRAT-Capability,
    securityCapability                  SecurityCapability,
    ue-positioning-Capability           ————————UE-Positioning-Capability,
    measurementCapability               MeasurementCapability       OPTIONAL
}

UE-RadioAccessCapability-v370ext::=     SEQUENCE {
    ue-RadioAccessCapabBandFDDList      UE-RadioAccessCapabBandFDDList— OPTIONAL
}

UE-RadioAccessCapabBandFDDList ::=  SEQUENCE (SIZE (1..maxFreqBandsFDD)) OF
                                        UE-RadioAccessCapabBandFDD

UE-RadioAccessCapabBandFDD ::=      SEQUENCE{
    radioFrequencyBandFDD               RadioFrequencyBandFDD,
    fddRF-Capability                    SEQUENCE {
        ue-PowerClass                   UE-PowerClassExt,
        txRxFrequencySeparation         TxRxFrequencySeparation
    }                                                               OPTIONAL,
    measurementCapability               MeasurementCapabilityExt
}

UL-PhysChCapabilityFDD ::=          SEQUENCE {
    maxNoDPDCH-BitsTransmitted          MaxNoDPDCH-BitsTransmitted,
    supportOfPCPCH                      BOOLEAN
}

UL-PhysChCapabilityTDD ::=          SEQUENCE {
    maxTS-PerFrame                      MaxTS-PerFrame,
    maxPhysChPerTimeslot                MaxPhysChPerTimeslot,
    minimumSF                           MinimumSF-UL,
    supportOfPUSCH                      BOOLEAN
}

UL-TransChCapability ::=            SEQUENCE {
    maxNoBitsTransmitted                MaxNoBits,
    maxConvCodeBitsTransmitted          MaxNoBits,
    turboDecodingSupport                TurboSupport,
    maxSimultaneousTransChs             MaxSimultaneousTransChsUL,
    modeSpecificInfo                    CHOICE {
        fdd                                 NULL,
        tdd                                 SEQUENCE {
            maxSimultaneousCCTrCH-Count         MaxSimultaneousCCTrCH-Count
        }
    },
    maxTransmittedBlocks                MaxTransportBlocksUL,
    maxNumberOfTFC-InTFCS               MaxNumberOfTFC-InTFCS-UL,
    maxNumberOfTF                       MaxNumberOfTF
}

UE-Positioning-Capability ::=               SEQUENCE {
    standaloneLocMethodsSupported       BOOLEAN,
    ue-BasedOTDOA-Supported             BOOLEAN,
    networkAssistedGPS-Supported        NetworkAssistedGPS-Supported,
    gps-ReferenceTimeCapable            BOOLEAN,
```

```
    supportForIDL                       BOOLEAN
}

URA-UpdateCause ::=                 ENUMERATED {
                                        changeOfURA,
                                        periodicURAUpdate,
                                        re-enteredServiceArea,
                                        spare1 }

UTRAN-DRX-CycleLengthCoefficient ::= INTEGER (3..9)

WaitTime ::=                        INTEGER (0..15)
```

11.4 Constant definitions

```
Constant-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

hiPDSCHidentities           INTEGER ::= 64
hiPUSCHidentities           INTEGER ::= 64
hiRM                        INTEGER ::= 256
maxAC                       INTEGER ::= 16
maxAdditionalMeas           INTEGER ::= 4
maxASC                      INTEGER ::= 8
maxASCmap                   INTEGER ::= 7
maxASCpersist               INTEGER ::= 6
maxCCTrCH                   INTEGER ::= 8
maxCellMeas                 INTEGER ::= 32
maxCellMeas-1               INTEGER ::= 31
maxCNdomains                INTEGER ::= 4
maxCPCHsets                 INTEGER ::= 16
maxDPCH-DLchan              INTEGER ::= 8
maxDPCHcodesPerTS           INTEGER ::= 16
-- **TODO**
maxDPDCH-UL                 INTEGER ::= 6
maxDRACclasses              INTEGER ::= 8
-- **TODO**
maxFACH                     INTEGER ::= 8
maxFreq                     INTEGER ::= 8
maxFrequencybands           INTEGER ::= 4
maxFreqBandsFDD             INTEGER ::= 8
maxFreqBandsTDD             INTEGER ::= 4
maxFreqBandsGSM             INTEGER ::= 16
maxInterSysMessages         INTEGER ::= 4
maxLoCHperRLC               INTEGER ::= 2
maxMeasEvent                INTEGER ::= 8
maxMeasIntervals            INTEGER ::= 3
maxMeasParEvent             INTEGER ::= 2
maxNumCDMA2000Freqs         INTEGER ::=  8
maxNumGSMFreqRanges         INTEGER ::= 32
maxNumFDDFreqs              INTEGER ::=  8
maxNumTDDFreqs              INTEGER ::=  8
maxNoOfMeas                 INTEGER ::= 16
maxOtherRAT                 INTEGER ::= 15
maxPage1                    INTEGER ::= 8
maxPCPCH-APsig              INTEGER ::= 16
maxPCPCH-APsubCh            INTEGER ::= 12
maxPCPCH-CDsig              INTEGER ::= 16
maxPCPCH-CDsubCh            INTEGER ::= 12
maxPCPCH-SF                 INTEGER ::= 7
maxPCPCHs                   INTEGER ::= 64
maxPDCPAlgoType             INTEGER ::= 8
maxPDSCH                    INTEGER ::= 8
maxPDSCH-TFCIgroups         INTEGER ::= 256
maxPRACH                    INTEGER ::= 16
maxPredefConfig             INTEGER ::= 16
maxPUSCH                    INTEGER ::= 8
maxRABsetup                 INTEGER ::= 16
maxRAT                      INTEGER ::= 16
maxRB                       INTEGER ::= 32
maxRBallRABs                INTEGER ::= 27
maxRBMuxOptions             INTEGER ::= 8
maxRBperRAB                 INTEGER ::= 8
maxReportedGSMCells         INTEGER ::= 6
maxRL                       INTEGER ::= 8
maxRL-1                     INTEGER ::= 7
maxSat                      INTEGER ::= 16
maxSCCPCH                   INTEGER ::= 16
maxSIB                      INTEGER ::= 32
-- **TODO**
maxSIB-FACH                 INTEGER ::= 8
maxSIBperMsg                INTEGER ::= 16
maxSig                      INTEGER ::= 16
maxSRBsetup                 INTEGER ::= 8
maxSubCh                    INTEGER ::= 12
maxSystemCapability         INTEGER ::= 16
maxTF                       INTEGER ::= 32
maxTF-CPCH                  INTEGER ::= 16
maxTFC                      INTEGER ::= 1024
maxTFCI-2-Combs             INTEGER ::= 512
maxTGPS                     INTEGER ::= 6
maxTrCH                     INTEGER ::= 32
maxTrCHpreconf              INTEGER ::= 16
maxTS                       INTEGER ::= 14
```

```
maxTS-1                     INTEGER ::= 13
maxURA                      INTEGER ::= 8

END
```

13.4.28 UE_CAPABILITY_TRANSFERRED

This variable stores information about which UE capabilities that have been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
UE system specific capability	OP	1 to <maxSystemCapability>	Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	

13.4.27g~~8a~~UE_CAPABILITY_REQUESTED

This variable stores information about the UE capabilities that have been requested by UTRAN but that have not yet been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
UE system specific capability	OP	1 to <maxSystemCapability>	Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	

3GPP TSG RAN WG2 #21
21st – 25th May 2001
Pusan, Korea

Tdoc RAN WG2 011225

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **733** ⌘ rev ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☐

Title:	⌘	Correction of UE Radio Access Capability depending on UTRAN FDD bands
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	21 May 2001
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘ Depending on the UTRAN bands where the UE is operating, e.g. UTRAN FDD 1900 MHz, 2100 MHz:

- the measurement capabilities (i.e. need for compressed mode) for the monitoring of other RATs or other UMTS frequencies may be different.

- the RF capabilities (i.e. power class, Tx/Rx frequency separation) may be different

Summary of change:	⌘	One set of UE measurement capabilities and one set of FDD RF capabilities are added for UTRAN FDD 2100, 1900 MHz frequency band in which the UE may operate. include reception of the extended IE version within 8.1.3.6 also the naming of variable UE_CAPABILITY_REQUESTED in 8.6.3.X was wrong and this has been corrected, a "correct" number (e.g. 8.6.3.12) has been assigned to the new chapter 8.6.3.X, the explict reference to 8.6.3.X for variable UE_CAPABILITY_REQUESTED should be removed form "Transmission of UE capabilities" procedure. The same has been done also for the RRC CONNECTION SETUP case, since it is not really needed there either a general reference to 8.6 in the "UE capability enquiry" procedure is missing and has been added clarification has been added that the UE shall clear the variable UE_CAPABILITY_REQUESTED upon completion of the procedures RRC connection establishment and Transmission of UE capabilities the conditions for applying the extended version of the IE are specified now to be independent of the support of other RAT, since that is not required anymore because also in case the IE is signalled via another RAT of the default of 2100MHz applies for the original version of the IE
Consequences if not approved:	⌘	there is no indication which FDD frequency bands is supported

Clauses affected:	⌘	8.1.3.6, 8.1.6.2, 8.1.6.4, 8.1.7.3, 8.6.3.12~~x~~ (new), 10.2.41, 10.2.56, 10.3.3.21a (new), 10.3.3.33, 10.3.3.33a (new), 10.3.3.33b (new), 10.3.3.42, 10.3.3.42a (new), 10.3.10, 11, 13.4.27g (new), 13.4.28
Other specs Affected:	⌘	[X] Other core specifications ⌘ [X] Test specifications [ ] O&M Specifications
Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.1.3.6 Reception of an RRC CONNECTION SETUP message by the UE

The UE shall compare the value of the IE "Initial UE identity" in the received RRC CONNECTION SETUP message with the value of the variable INITIAL_UE_IDENTITY.

If the values are different, the UE shall:

- ignore the rest of the message;

If the values are identical, the UE shall:

- stop timer T300, and act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following;
  - if the UE will be in the CELL_FACH state at the conclusion of this procedure:
    - if the IE "Frequency info" is included:
      - select a suitable UTRA cell according to [4] on that frequency;
    - select PRACH according to subclause 8.6.6.2;
    - select Secondary CCPCH according to subclause 8.6.6.5;
- enter a state according to subclause 8.6.3.3;
- submit an RRC CONNECTION SETUP COMPLETE message to the lower layers on the uplink DCCH after successful state transition per subclause 8.6.3.3, with the contents set as specified below:
  - set the IE "RRC transaction identifier" to
    - the value of "RRC transaction identifier" in the entry for the RRC CONNECTION SETUP message in the table "Accepted transactions" in the variable TRANSACTIONS; and
    - clear that entry.
  - calculate START values for each CN domain according to subclause 8.5.9 and include the result in the IE "START list";
  - retrieve its UTRA UE radio access capability information elements from variable UE_CAPABILITY_REQUESTED and include this in IE “UE radio access capability” and IE “UE radio access capability extension”, provided this IE is included in variable UE_CAPABILITY_REQUESTED,
  - retrieve its inter-RAT-specific UE radio access capability information elements from variable UE_CAPABILITY_REQUESTED and include this in IE “UE system specific capability”,
  - ~~if the IE "UE radio access FDD capability update requirement" included in the RRC CONNECTION SETUP message has the value TRUE:~~
    - ~~include its UTRAN-specific FDD capabilities and its UTRAN –specific capabilities common to FDD and TDD in the IE "UE radio access capability";~~
  - ~~if the IE "UE radio access 3.84Mcps TDD capability update requirement" included in the RRC CONNECTION SETUP message has the value TRUE:~~
    - ~~include its UTRAN-specific 3.84Mcps TDD capabilities and its UTRAN –specific capabilities common to FDD and TDD in the IE "UE radio access capability";~~
  - ~~if the IE "UE radio access 1.28Mcps TDD capability update requirement" included in the RRC CONNECTION SETUP message has the value TRUE:~~
    - ~~include its UTRAN-specific 1.28Mcps TDD capabilities and its UTRAN –specific capabilities common to FDD and TDD in the IE "UE radio access capability";~~
  - ~~if the IE "System specific capability update requirement list" is present in the RRC CONNECTION SETUP message:~~

~~- include its inter-RAT capabilities for the requested systems in the IE "UE system specific capability".~~

When of the RRC CONNECTION SETUP COMPLETE message has been submitted to lower layers for transmission the UE shall:

- if the UE has entered CELL_FACH state:
  - start timer T305 using its initial value if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- store the contents of the variable UE_CAPABILITY_REQUESTED into the ~~update its~~ variable UE_CAPABILITY_TRANSFERRED ~~which UE capabilities it has transmitted to the UTRAN~~;
- clear the variable UE_CAPABILITY_REQUESTED;
- if the IE "Transport format combination subset" was not included in the RRC CONNECTION SETUP message:
  - set the IE "Current TFC subset" in the variable TFS_SUBSET to "Full transport format combination set";
- set the "Status" in the variable CIPHERING_STATUS to "Not started";
- set the "Reconfiguration" in the variable CIPHERING_STATUS to FALSE;
- set the "Status" in the variable INTEGRITY_PROTECTION_INFO to "Not started";
- set the "Historical status" in the variable INTEGRITY_PROTECTION_INFO to "Never been active";
- set the "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE;
- set the variable CELL_UPDATE_STARTED to FALSE;
- set the variable ORDERED_RECONFIGURATION to FALSE;
- set the variable FAILURE_INDICATOR to FALSE;
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
- set the variable INVALID_CONFIGURATION to FALSE;
- set the variable PROTOCOL_ERROR_INDICATOR to FALSE;
- set the variable PROTOCOL_ERROR_REJECT to FALSE;
- set the variable TGSN_REPORTED to FALSE;
- set the variable UNSUPPORTED_CONFIGURATION to FALSE;
- clear all optional IEs in all variables, except those optional IEs that are set in this procedure;
- consider the procedure to be successful;

And the procedure ends.

8.1.6 Transmission of UE capability information

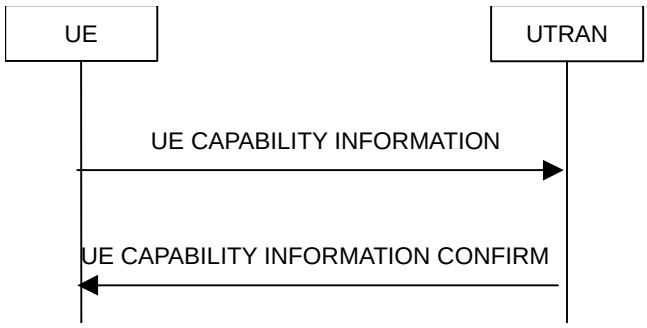

Figure 12: Transmission of UE capability information, normal flow

8.1.6.1 General

The UE capability update procedure is used by the UE to convey UE specific capability information to the UTRAN.

8.1.6.2 Initiation

The UE shall initiate the UE capability update procedure in the following situations:

- the UE receives a UE CAPABILITY ENQUIRY message from the UTRAN;
- while in connected mode the UE capabilities change compared to those stored in the variable UE_CAPABILITY_TRANSFERRED

If the UE CAPABILITY INFORMATION message is sent in response to a UE CAPABILITY ENQUIRY message, the UE shall:

- include the IE "RRC transaction identifier"; and
- set it to the value of "RRC transaction identifier" in the entry for the UE CAPABILITY ENQUIRY message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- retrieve its UTRA UE radio access capability information elements ~~and its inter-RAT-specific UE radio access capability information elements~~ from variable UE_CAPABILITY_REQUESTED and include this in IE “UE radio access capability” and in IE “UE radio access capability extension”, provided this IE is included in variable UE_CAPABILITY_REQUESTED,
- retrieve its inter-RAT-specific UE radio access capability information elements from variable UE_CAPABILITY_REQUESTED and include this in IE “UE system specific capability”,
- ~~include the UTRAN-specific UE capability information elements into the IE "UE radio capability", according to the requirement given in the IE "Capability update requirement" in the UE CAPABILITY ENQUIRY message;~~
- ~~include one or more inter-RAT classmarks into the IE "UE system specific capability", according to the requirement given in the IE "Capability update requirement" in the UE CAPABILITY ENQUIRY message.~~

If the UE CAPABILITY INFORMATION message is sent because one or more of the UE capabilities change compared to those stored in the variable UE_CAPABILITY_TRANSFERRED while in connected state, the UE shall include the information elements associated with the capabilities that have changed in the UE CAPABILITY INFORMATION message.

If the UE is in CELL_PCH or URA_PCH state, it shall first perform a cell update procedure using the cause "uplink data transmission", see subclause 8.3.1.

The UE RRC shall submit the UE CAPABILITY INFORMATION message to the lower layers for transmission on the uplink DCCH using AM RLC. When the message has been sent on the radio interface the UE RRC shall start timer T304 and set counter V304 to 1.

8.1.6.4 Reception of the UE CAPABILITY INFORMATION CONFIRM message by the UE

Upon reception of a UE CAPABILITY INFORMATION CONFIRM message, the UE shall:

- stop timer T304;
- update its variable UE_CAPABILITY_TRANSFERRED with the UE capabilities it has last transmitted to the UTRAN during the current RRC connection;
- clear the variable UE_CAPABILITY_REQUESTED;

and the procedure ends.

8.1.7.3 Reception of an UE CAPABILITY ENQUIRY message by the UE

Upon reception of an UE CAPABILITY ENQUIRY message, the UE shall act on the received information elements as specified in subclause 8.6 and initiate the transmission of UE capability information procedure, which is specified in subclause 8.1.6.

8.6.3.11 RRC transaction identifier

If the IE "RRC transaction identifier" is included in a received message, the UE shall perform the actions below. The UE shall:

If the received message is any of the messages:

- RADIO BEARER SETUP; or
- RADIO BEARER RECONFIGURATION; or
- RADIO BEARER RELEASE; or
- TRANSPORT CHANNEL RECONFIGURATION; or
- PHYSICAL CHANNEL RECONFIGURATION:

the UE shall:

- if the variable ORDERED_RECONFIGURATION is set to FALSE; and
- if the variable CELL_UPDATE_STARTED is set to FALSE; and
- if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
  - accept the transaction; and
  - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
- else:
- if the variable ORDERED_RECONFIGURATION is set to TRUE; or
- if the variable CELL_UPDATE_STARTED is set to TRUE; or
- if the table "Accepted transactions" in the variable TRANSACTIONS contains an entry with an IE "Message Type" set to ACTIVE SET UPDATE; or
- if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored for the same "Message Type" as the received message in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received;
    - and end the procedure;
  - else:
    - reject the transaction; and
    - if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

Else:

If the received message is any of the messages:

- RRC CONNECTION SETUP; or
- CELL UPDATE CONFIRM; or
- URA UPDATE CONFIRM:

the UE shall:

- if the IE "Message Type" of the received message is not present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
    - accept the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
  - else:
  - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
    - reject the transaction; and
    - if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.
- else:
- if the IE "Message Type" of the received message is present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received; and
    - end the procedure;
  - else:
  - if the IE "RRC transaction identifier" of the received message is different from the "RRC transaction identifier" stored for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
      - ignore the once accepted transaction and instead accept the new transaction; and
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS, replacing the previous entry;
    - else:
    - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
      - reject the transaction; and

- if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
  - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

Else:

If the received message is any other message, the UE shall:

- if the IE "Message Type" of the received message is not present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
    - accept the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
  - else:
  - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
    - reject the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.
- else:
- if the IE "Message Type" of the received message is present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored in any entry for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received; and
    - end the procedure;
  - else:
  - if the IE "RRC transaction identifier" of the received message is different from the "RRC transaction identifier" stored in all entries for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
      - accept the additional transaction; and
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS, in addition to the already existing entries;
    - else:
    - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
      - reject the transaction; and

- store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

8.6.3.12 Capability Update Requirement

If the IE "Capability Update Requirement" is included the UE shall:

- if the IE "UE radio access FDD capability update requirement" has the value TRUE:
  - if the UE supports FDD mode:
    - include its UTRA FDD capabilities and its UTRA capabilities common to FDD and TDD in the IE "UE radio access capability" and the IE "UE radio access capability extension" within variable UE_CAPABILITY_REQUESTED as specified below:
      - if the UE supports multiple UTRA FDD Frequency Bands; or
      - if the UE supports a single UTRA FDD Frequency Band different from 2100 MHz:
        - include the IE “UE radio access capability, excluding IEs “RF capability FDD” and “Measurement capability”;
        - include the IE “UE radio access capability extension”, including the IEs "RF capability FDD extension" and the "Measurement capability extension" associated to each supported UTRA FDD frequency band indicated in the IE "Frequency band";
      - else:
        - include in the IE "UE radio access capability", including the IEs "RF capability FDD" and "Measurement capability" associated to the 2100 MHz UTRA FDD frequency band;
- if the IE "UE radio access 3.84Mcps TDD capability update requirement" has the value TRUE:
  - if the UE supports 3.84Mcps TDD mode:
    - include its UTRAN-specific 3.84Mcps TDD capabilities and its UTRAN –specific capabilities common to FDD and TDD within variable UE_CAPABILITY_REQUESTED;
- if the IE "UE radio access 1.28Mcps TDD capability update requirement" has the value TRUE:
  - if the UE supports 1.28Mcps TDD mode:
    - include its UTRAN-specific 1.28Mcps TDD capabilities and its UTRAN –specific capabilities common to FDD and TDD within variable UE_CAPABILITY_REQUESTED ;
- if the IE "System specific capability update requirement list" is present:
  - for each of the RAT requested in the IE "UE system specific capability”
    - if the UE supports the concerned RAT:
      - include its inter-RAT radio access capabilities for the concerned system in the IE "UE system specific capability" within variable UE_CAPABILITY_REQUESTED

If the IE " Capability update requirement " is not present, the UE shall assume the default values as specified in 10.3.3.2 and act in accordance with the above.

8.6.4 Radio bearer information elements

10.2.41 RRC CONNECTION SETUP COMPLETE

This message confirms the establishment of the RRC Connection by the UE.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE Information Elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
START list	MP	1 to <maxCNdomains>		START [40] values for all CN domains.
>CN domain identity	MP		CN domain identity 10.3.1.1	
>START	MP		START 10.3.3.38	START value to be used in this CN domain.
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
Other information elements				
UE system specific capability	OP	1 to <maxSystemCapability>		
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	

10.2.56 UE CAPABILITY INFORMATION

This message is sent by UE to convey UE specific capability information to the UTRAN.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	OP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	Integrity check info is included if integrity protection is applied
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
Other information elements				
UE system specific capability	OP	1 to <maxSystemCapability>		
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability10.3.8.7	

10.3.3.21a Measurement capability extension

This IE may be used to replace the measurement capability information provided within IE “Measurement capability”

Information Element/Group name	Need	Multi	Type and reference	Semantics description
FDD measurements	MP	1 to <maxFreq BandsFDD>		
>FDD Frequency band	MD		Enumerated(FDD2100, FDD1900)	The default value is the same as indicated in the IE "Frequency band" included in the IE " UE radio access capability extension". At least one spare value is needed
>Need for DL compressed mode	MP		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on the FDD frequency band indicated by the IE "FDD Frequency band"
>Need for UL compressed mode	MP		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on the FDD frequency band indicated by the IE "FDD Frequency band"
TDD measurements	CV *tdd_sup*	1 to <maxFreq BandsTDD>		
>TDD Frequency band	MP		Enumerated(a, b, c)	
>Need for DL compressed mode	MP		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on TDD frequency band indicated by the IE "TDD Frequency band"
>Need for UL compressed mode	MP		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on TDD frequency band indicated by the IE "TDD Frequency band"
GSM measurements	CV *gsm_sup*	1 to <maxFreq BandsGSM>		
>GSM Frequency band	MP		Enumerated(GSM450, GSM480, GSM850, GSM 900P, GSM900E, GSM1800, GSM1900)	as defined in [45] at least one spare value
>Need for DL compressed mode	MP		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on GSM frequency band indicated by the IE "GSM Frequency band"
>Need for UL compressed mode	MP		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on GSM frequency band indicated by the IE "GSM Frequency band"

Multi-carrier measurement	CV *mc_sup*			
>Need for DL compressed mode	MP		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on multi-carrier
>Need for UL compressed mode	MP		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on multi-carrier

Condition	**Explanation**
tdd_sup	Presence is mandatory if IE Multi-mode capability has the value "TDD" or "FDD/TDD". Otherwise this field is not needed in the message.
Gsm_sup	Presence is mandatory if IE Support of GSM has the value TRUE. Otherwise this field is not needed in the message.
mc_sup	Presence is mandatory if IE Support of multi-carrier has the value TRUE. Otherwise this field is not needed in the message.

10.3.3.33 RF capability FDD

Information Element/Group name	Need	Multi	Type and Reference	Semantics description	Version
~~FDD RF capability~~	~~CH-*tdd_req_sup*~~				
~~>~~UE power class	MP		Enumerated(1..4)	as defined in [21]	
~~>~~Tx/Rx frequency separation	MP		Enumerated(190, 174.8-205.2, 134.8-245.2)	In MHz as defined in [21]. NOTE: Not applicable if UE is not operating in frequency band a (as defined in [21]).	
~~TDD RF capability~~	~~CH-*tdd_req_sup*~~	~~1 to 2~~		~~One "TDD RF capability" entity shall be included for every Chip rate capability supported.~~	~~Multi=2 is included in REL-4~~
~~>UE power class~~	~~MP~~		~~Enumerated (1..4)~~	~~as defined in [22]~~	
~~>Radio frequency bands~~	~~MP~~		~~Enumerated(a, b, c, a+b, a+c, b+c, a+b+c)~~	~~as defined in [22]~~	
~~>Chip rate capability~~	~~MP~~		~~Enumerated(3.84Mcps,1.28Mcps)~~	~~as defined in [22]~~	

~~Condition~~	~~Explanation~~
~~*tdd_req_sup*~~	~~Presence is mandatory if IE Multi-mode capability has the value "TDD" or "FDD/TDD" and a 3.84Mcps TDD capability update or a 1.28Mcps TDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.~~
~~*fdd_req_sup*~~	~~Presence is mandatory if IE Multi-mode capability has the value "FDD" or "FDD/TDD" and a FDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.~~

10.3.3.33~~b~~a RF capability TDD

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE power class	MP		Enumerated (1..4)	as defined in [22]
Radio frequency bands	MP		Enumerated(a, b, c, a+b, a+c, b+c, a+b+c)	as defined in [22]
Chip rate capability	MP		Enumerated(3.84Mcps,1.28Mcps)	as defined in [22]

10.3.3.33~~ab~~ RF capability FDD extension

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE power class extension	MP		Enumerated(1..4)	as defined in [21]. Al least one spare value is needed
Tx/Rx frequency separation	MP		Enumerated(190, 174.8-205.2, 134.8-245.2)	In MHz as defined in [21]. NOTE: Not applicable if UE is not operating in frequency band a (as defined in [21]).

10.3.3.42 UE radio access capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
ICS version	MP		Enumerated(R99, REL-4)	Indicates the release version of [42]-2 (Implementation Conformance Statement (ICS) proforma specification) that is applicable for the UE.	Value REL-4 added in REL-4
PDCP capability	MP		PDCP capability 10.3.3.24		
RLC capability	MP		RLC capability 10.3.3.34		
Transport channel capability	MP		Transport channel capability 10.3.3.40		
RF capability FDD	~~MP~~OP		RF capability 10.3.3.33		
RF capability TDD	OP	1 to 2	10.3.3.33~~a~~ RF capability TDD	One "TDD RF capability" entity shall be included for every Chip rate capability supported.	Multi=2 is included in REL-4
Physical channel capability	MP		Physical channel capability 10.3.3.25		
UE multi-mode/multi-RAT capability	MP		UE multi-mode/multi-RAT capability 10.3.3.41		
Security capability	MP		Security capability 10.3.3.37		
UE positioning capability	MP		UE positioning capability 10.3.3.45		
Measurement capability	CH-*fdd_req_sup*		Measurement capability 10.3.3.21		

Condition	Explanation
fdd_req_sup	Presence is mandatory if IE Multi-mode capability has the value "FDD" or "FDD/TDD" and a FDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.

10.3.3.42a UE radio access capability extension

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Frequency band specific capability list	MP	1 to < maxFreqbandsFDD>		
>Frequency band	MP		Enumerated(FDD2100, FDD1900)	At least one spare value is needed
>RF capability FDD extension	MD		10.3.3.33ab RF capability FDD extension	the default values are the same values as in the immediately preceeding IE "RF capability FDD extension"; the first occurence is MP
>Measurement capability extension	MP		Measurement capability extension 10.3.3.21a	

10.3.10 Multiplicity values and type constraint values

The following table includes constants that are either used as multi bounds (name starting with "max") or as high or low value in a type specification (name starting with "lo" or "hi"). Constants are specified only for values appearing more than once in the RRC specification. In case a constant is related to one or more other constants, an expression is included in the "value" column instead of the actual value.

Constant	Explanation	Value
CN information		
maxCNdomains	Maximum number of CN domains	4
UTRAN mobility information		
maxRAT	Maximum number or Radio Access Technologies	maxOtherRAT + 1
maxOtherRAT	Maximum number or other Radio Access Technologies	15
maxURA	Maximum number of URAs in a cell	8
maxInterSysMessages	Maximum number of Inter System Messages	4
maxRABsetup	Maximum number of RABs to be established	16
UE information		
maxtransactions	Maximum number of parallel RRC transactions in downlink	25
maxPDCPalgoType	Maximum number of PDCP algorithm types	8
maxDRACclasses	Maximum number of UE classes which would require different DRAC parameters	8
~~maxFrequencybands~~	~~Maximum number of frequency bands supported by the UE as defined in 25.102~~	~~4~~
maxFreqBandsFDD	Maximum number of frequency bands supported by the UE as defined in 25.101	8
maxFreqBandsTDD	Maximum number of frequency bands supported by the UE as defined in 25.102	4
maxFreqBandsGSM	Maximum number of frequency bands supported by the UE as defined in 05.05	16
maxPage1	Number of UEs paged in the Paging Type 1 message	8
maxSystemCapability	Maximum number of system specific capabilities that can be requested in one message.	16
RB information		
maxPredefConfig	Maximum number of predefined configurations	16
maxRB	Maximum number of RBs	32
maxSRBsetup	Maximum number of signalling RBs to be established	8
maxRBperRAB	Maximum number of RBs per RAB	8
maxRBallRABs	Maximum number of non signalling RBs	27
maxRBMuxOptions	Maximum number of RB multiplexing options	8
maxLoCHperRLC	Maximum number of logical channels per RLC entity	2
MaxROHC-PacketSizes	Maximum number of packet sizes that are allowed to be produced by ROHC.	16
MaxROHC-Profiles	Maximum number of profiles supported by ROHC on a given RB.	8
TrCH information		
maxTrCH	Maximum number of transport channels used in one direction (UL or DL)	32
maxTrCHpreconf	Maximum number of preconfigured Transport channels, per direction	16
maxCCTrCH	Maximum number of CCTrCHs	8
maxTF	Maximum number of different transport formats that can be included in the Transport format set for one transport channel	32
maxTF-CPCH	Maximum number of TFs in a CPCH set	16
maxTFC	Maximum number of Transport Format Combinations	1024
maxTFCI-1-Combs	Maximum number of TFCI (field 1) combinations	512
maxTFCI-2-Combs	Maximum number of TFCI (field 2) combinations	512
maxCPCHsets	Maximum number of CPCH sets per cell	16
maxSIBperMsg	Maximum number of complete system information blocks per SYSTEM INFORMATION message	16
maxSIB	Maximum number of references to other system information blocks.	32
maxSIB-FACH	Maximum number of references to system information blocks on the FACH	8
PhyCH information		
maxSubCh	Maximum number of sub-channels on PRACH	12
maxPCPCH-APsubCH	Maximum number of available sub-channels for AP signature on PCPCH	12
maxPCPCH-CDsubCH	Maximum number of available sub-channels for CD signature on PCPCH	12
maxSig	Maximum number of signatures on PRACH	16

maxPCPCH-APsig	Maximum number of available signatures for AP on PCPCH	16
maxPCPCH-CDsig	Maximum number of available signatures for CD on PCPCH	16
maxAC	Maximum number of access classes	16
maxASC	Maximum number of access service classes	8
maxASCmap	Maximum number of access class to access service classes mappings	7
maxASCpersist	Maximum number of access service classes for which persistence scaling factors are specified	6
maxPRACH	Maximum number of PRACHs in a cell	16 (1 for 1.28Mcps TDD)
MaxPRACH_FPACH	Maximum number of PRACH / FPACH pairs in a cell (1.28 Mcps TDD)	8
maxFACHPCH	Maximum number of FACHs and PCHs mapped onto one secondary CCPCHs	8
maxRL	Maximum number of radio links	8
maxSCCPCH	Maximum number of secondary CCPCHs per cell	16
maxDPDCH-UL	Maximum number of DPDCHs per cell	6
maxDPCH-DLchan	Maximum number of channelisation codes used for DL DPCH	8
maxDPCHcodesPerTS	Maximum number of codes for one timeslots (TDD)	16
maxPUSCH	Maximum number of PUSCHs	(8)
maxPDSCH	Maximum number of PDSCHs	8
maxPDSCHcodes	Maximum number of codes for PDSCH	16
maxPDSCH-TFCIgroups	Maximum number of TFCI groups for PDSCH	256
maxPDSCHcodeGroups	Maximum number of code groups for PDSCH	256
maxPCPCHs	Maximum number of PCPCH channels in a CPCH Set	64
maxPCPCH-SF	Maximum number of available SFs on PCPCH	7
maxTS	Maximum number of timeslots used in one direction (UL or DL)	6 (1.28 Mcps TDD) 14 (3.84 Mcps TDD)
HiPUSCHIdentities	Maximum number of PDSCH Identities	64
HiPDSCHIdentities	Maximum number of PDSCH Identities	64
Measurement information		
maxTGPS	Maximum number of transmission gap pattern sequences	6
maxAdditionalMeas	Maximum number of additional measurements for a given measurement identity	4
maxMeasEvent	Maximum number of events that can be listed in measurement reporting criteria	8
maxMeasParEvent	Maximum number of measurement parameters (e.g. thresholds) per event	2
maxMeasIntervals	Maximum number of intervals that define the mapping function between the measurements for the cell quality Q of a cell and the representing quality value	1
maxCellMeas	Maximum number of cells to measure	32
maxReportedGSMCells	Maximum number of GSM cells to be reported	6
maxFreq	Maximum number of frequencies to measure	8
maxSat	Maximum number of satellites to measure	16
HiRM	Maximum number that could be set as rate matching attribute for a transport channel	256
Frequency information		
maxFDDFreqList	Maximum number of FDD carrier frequencies to be stored in USIM	4
maxTDDFreqList	Maximum number of TDD carrier frequencies to be stored in USIM	4
maxFDDFreqCellList	Maximum number of neighbouring FDD cells to be stored in USIM	32
maxTDDFreqCellList	Maximum number of neighbouring TDD cells to be stored in USIM	32
maxGSMCellList	Maximum number of GSM cells to be stored in USIM	32
Other information		
maxNumGSMFreqRanges	Maximum number of GSM Frequency Ranges to store	32
maxNumFDDFreqs	Maximum number of FDD centre frequencies to store	8
maxNumTDDFreqs	Maximum number of TDD centre frequencies to store	8
maxNumCDMA200Freqs	Maximum number of CDMA2000 centre frequencies to store	8

11.2 PDU definitions

```
--**************************************************************
--
-- TABULAR: The message type and integrity check info are not
-- visible in this module as they are defined in the class module.
-- Also, all FDD/TDD specific choices have the FDD option first
-- and TDD second, just for consistency.
--
--**************************************************************

PDU-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

--**************************************************************
--
-- IE parameter types from other modules
--
--**************************************************************

IMPORTS

-- Core Network IEs :
    CN-DomainIdentity,
    CN-InformationInfo,
    NAS-Message,
    PagingRecordTypeID,
-- UTRAN Mobility IEs :
    URA-Identity,
-- User Equipment IEs :
    ActivationTime,
    C-RNTI,
    CapabilityUpdateRequirement,
    CapabilityUpdateRequirement-r4,
    CapabilityUpdateRequirement-r4Ext,
    CellUpdateCause,
    CipheringAlgorithm,
    CipheringModeInfo,
    EstablishmentCause,
    FailureCauseWithProtErr,
    FailureCauseWithProtErrTrId,
    InitialUE-Identity,
    IntegrityProtActivationInfo,
    IntegrityProtectionModeInfo,
    N-308,
    PagingCause,
    PagingRecordList,
    ProtocolErrorIndicator,
    ProtocolErrorIndicatorWithMoreInfo,
    Rb-timer-indicator,
    Re-EstablishmentTimer,
    RedirectionInfo,
    RejectionCause,
    ReleaseCause,
    RRC-StateIndicator,
    RRC-TransactionIdentifier,
    SecurityCapability,
    START-Value,
    STARTList,
    U-RNTI,
    U-RNTI-Short,
    UE-RadioAccessCapability,
    UE-RadioAccessCapability-r4ext,
    UE-RadioAccessCapabability-v370eExt,
    UE-ConnTimersAndConstants,
    URA-UpdateCause,
    UTRAN-DRX-CycleLengthCoefficient,
    WaitTime,
-- Radio Bearer IEs :
    DefaultConfigIdentity,
    DefaultConfigMode,
    DL-CounterSynchronisationInfo,
    PredefinedConfigIdentity,
    RAB-Info,
    RAB-Info-Post,
```

```
    RAB-InformationList,
    RAB-InformationReconfigList,
    RAB-InformationSetupList,
    RAB-InformationSetupList-r4,
    RB-ActivationTimeInfo,
    RB-ActivationTimeInfoList,
    RB-COUNT-C-InformationList,
    RB-COUNT-C-MSB-InformationList,
    RB-IdentityList,
    RB-InformationAffectedList,
    RB-InformationReconfigList,
    RB-InformationReconfigList-r4,
    RB-InformationReleaseList,
    RB-InformationSetupList,
    RB-InformationSetupList-r4,
    RB-WithPDCP-InfoList,
    SRB-InformationSetupList,
    SRB-InformationSetupList2,
    UL-CounterSynchronisationInfo,
-- Transport Channel IEs:
    CPCH-SetID,
    DL-AddReconfTransChInfo2List,
    DL-AddReconfTransChInfoList,
    DL-CommonTransChInfo,
    DL-DeletedTransChInfoList,
    DRAC-StaticInformationList,
    TFC-Subset,
    TFCS-Identity,
    UL-AddReconfTransChInfoList,
    UL-CommonTransChInfo,
    UL-DeletedTransChInfoList,
-- Physical Channel IEs :
    AllocationPeriodInfo,
    Alpha,
    CCTrCH-PowerControlInfo,
    CCTrCH-PowerControlInfo-r4,
    ConstantValue,
    CPCH-SetInfo,
    DL-CommonInformation,
    DL-CommonInformation-r4,
    DL-CommonInformationPost,
    DL-InformationPerRL,
    DL-InformationPerRL-List,
    DL-InformationPerRL-List-r4,
    DL-InformationPerRL-ListPostFDD,
    DL-InformationPerRL-PostTDD,
    DL-InformationPerRL-PostTDD-LCR,
    DL-DPCH-PowerControlInfo,
    DL-PDSCH-Information,
    DPCH-CompressedModeStatusInfo,
    FrequencyInfo,
    FrequencyInfoFDD,
    FrequencyInfoTDD,
    IndividualTS-InterferenceList,
    MaxAllowedUL-TX-Power,
    OpenLoopPowerControl-IPDL-TDD,
    PDSCH-CapacityAllocationInfo,
    PDSCH-CapacityAllocationInfo-r4,
    PDSCH-Identity,
    PDSCH-Info,
    PDSCH-Info-r4,
    PRACH-RACH-Info,
    PrimaryCCPCH-TX-Power,
    PUSCH-CapacityAllocationInfo,
    PUSCH-CapacityAllocationInfo-r4,
    PUSCH-Identity,
    RL-AdditionInformationList,
    RL-RemovalInformationList,
    SpecialBurstScheduling,
    SSDT-Information,
    TFC-ControlDuration,
    SSDT-UL,                        -- REL-4
    TimeslotList,
    TimeslotList-r4,
    TX-DiversityMode,
    UL-ChannelRequirement,
    UL-ChannelRequirement-r4,
    UL-ChannelRequirementWithCPCH-SetID,
```

```
    UL-ChannelRequirementWithCPCH-SetID-r4,
    UL-DPCH-Info,
    UL-DPCH-Info-r4,
    UL-DPCH-InfoPostFDD,
    UL-DPCH-InfoPostTDD,
    UL-DPCH-InfoPostTDD-LCR,
    UL-SynchronisationParameters,
    UL-TimingAdvance,
    UL-TimingAdvanceControl,
    UL-TimingAdvanceControl-r4,
-- Measurement IEs :
    AdditionalMeasurementID-List,
    Band-Indicator,
    EventResults,
    InterFreqEventResults-LCR,
    InterRAT-TargetCellDescription,
    MeasuredResults,
    MeasuredResultsList,
    MeasuredResultsList-LCR,
    MeasuredResultsOnRACH,
    MeasurementCommand,
    MeasurementCommand-r4,
    MeasurementIdentity,
    MeasurementReportingMode,
    PrimaryCCPCH-RSCP,
    TimeslotListWithISCP,
    TrafficVolumeMeasuredResultsList,
    UE-Positioning-GPS-AssistanceData,
    UE-Positioning-OTDOA-AssistanceData,
    UP-IPDL-Parameters-TDD,
-- Other IEs :
    BCCH-ModificationInfo,
    CDMA2000-MessageList,
    GSM-MessageList,
    InterRAT-ChangeFailureCause,
    InterRAT-HO-Failure,
    InterRAT-UE-RadioAccessCapabilityList,
    InterRAT-UE-SecurityCapList,
    InterRATMessage,
    IntraDomainNasNodeSelector,
    ProtocolErrorInformation,
    ProtocolErrorMoreInformation,
    Rplmn-Information,
    Rplmn-Information-r4,
    SegCount,
    SegmentIndex,
    SFN-Prime,
    SIB-Data-fixed,
    SIB-Data-variable,
    SIB-Type
FROM InformationElements

    maxSIBperMsg,
    maxSystemCapability
FROM Constant-definitions;
```

```
-- **************************************************
--
-- RRC CONNECTION SETUP COMPLETE
--
-- **************************************************

RRCConnectionSetupComplete ::= SEQUENCE {
    -- TABULAR: Integrity protection shall not be performed on this message.
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        startList                       STARTList,
        ue-RadioAccessCapability        UE-RadioAccessCapability            OPTIONAL,
    --  Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
    -- Extension mechanism for non- release99 information
    -- Non critical extensions
        v370NonCriticalExtensions           SEQUENCE {
            rrcConnectionSetupComplete-v370ext  RRCConnectionSetupComplete-v370ext,
            -- Reserved for future non critical extension
            v4NonCriticalExtensions         SEQUENCE {
        nonCriticalExtensions-r3        SEQUENCE {
            ____rrcConnectionSetupComplete-r4ext RRCConnectionSetupComplete-r4ext,
            ____nonCriticalExtensions-r4        SEQUENCE {}     OPTIONAL
            }       OPTIONAL
        }       OPTIONAL
}

RRCConnectionSetupComplete-v370ext ::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-v370eExt   UE-RadioAccessCapability-v370eExt   OPTIONAL
}

RRCConnectionSetupComplete-rv4ext ::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-rv4ext     UE-RadioAccessCapability-rv4ext     OPTIONAL
}
```

```
-- **************************************************
--
-- UE CAPABILITY INFORMATION
--
-- **************************************************

UECapabilityInformation ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier           OPTIONAL,
        ue-RadioAccessCapability        UE-RadioAccessCapability            OPTIONAL,
    -- Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList
    OPTIONAL,
    -- Extension mechanism for non- release99 information
    -- Non critical extensions
        v370NonCriticalExtensions           SEQUENCE {
            ueUECapabilityInformation-v370ext   UECapabilityInformation-v370ext,
            -- Reserved for future non critical extension
            v4NonCriticalExtensions         SEQUENCE {
        nonCriticalExtensions-r3        SEQUENCE {
            ____ueCapabilityInformation-rv4ext  UECapabilityInformation-rv4ext,
            ____nonCriticalExtensions-rv4       SEQUENCE {}     OPTIONAL
        ____}       OPTIONAL
        }       OPTIONAL
}

UECapabilityInformation-v370ext::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-v370ext        UE-RadioAccessCapability-v370ext        OPTIONAL
}

UECapabilityInformation-rv4ext ::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-rv4ext     UE-RadioAccessCapability-rv4ext     OPTIONAL
}
```

11.3 Information element definitions

```
-- **************************************************
--
--     USER EQUIPMENT INFORMATION ELEMENTS (10.3.3)
--
-- **************************************************

ActivationTime ::=                  INTEGER (0..255)
-- TABULAR : value 'now' always appear as default, and is encoded by absence of the field

BackoffControlParams ::=            SEQUENCE {
    n-AP-RetransMax                     N-AP-RetransMax,
    n-AccessFails                       N-AccessFails,
    nf-BO-NoAICH                        NF-BO-NoAICH,
    ns-BO-Busy                          NS-BO-Busy,
    nf-BO-AllBusy                       NF-BO-AllBusy,
    nf-BO-Mismatch                      NF-BO-Mismatch,
    t-CPCH                              T-CPCH
}

C-RNTI ::=                          BIT STRING (SIZE (16))

CapabilityUpdateRequirement ::=     SEQUENCE {
    ue-RadioCapabilityFDDUpdateRequirement-FDD  BOOLEAN,
-- The following is for 3.84Mcps TDD update requirement
    ue-RadioCapabilityTDDUpdateRequirement-TDD  BOOLEAN,
    systemSpecificCapUpdateReqList      SystemSpecificCapUpdateReqList      OPTIONAL
}

CapabilityUpdateRequirement-r4Ext ::= SEQUENCE {
    ue-RadioCapabilityUpdateRequirement-TDD128  BOOLEAN
}

CapabilityUpdateRequirement-r4 ::=  SEQUENCE {
    ue-RadioCapabilityFDDUpdateRequirement-FDD  BOOLEAN,
    ue-RadioCapabilityTDDUpdateRequirement-TDD384   BOOLEAN,
    ue-RadioCapabilityTDDUpdateRequirement-TDD128   BOOLEAN,
    systemSpecificCapUpdateReqList      SystemSpecificCapUpdateReqList      OPTIONAL
}

CellUpdateCause ::=                 ENUMERATED {
                                        cellReselection,
                                        periodicalCellUpdate,
                                        uplinkDataTransmission,
                                        utran-pagingResponse,
                                        re-enteredServiceArea,
                                        radiolinkFailure,
                                        rlc-unrecoverableError,
                                        spare1 }

ChipRateCapability ::=              ENUMERATED {
                                        mcps3-84, mcps1-28 }

CipheringAlgorithm ::=              ENUMERATED {
                                        uea0, uea1 }

CipheringModeCommand ::=            CHOICE {
    startRestart                        CipheringAlgorithm,
    stopCiphering                       NULL
}

CipheringModeInfo ::=               SEQUENCE {
    cipheringModeCommand                CipheringModeCommand,
    -- TABULAR: The ciphering algorithm is included in
    -- the CipheringModeCommand.
    activationTimeForDPCH               ActivationTime                      OPTIONAL,
    rb-DL-CiphActivationTimeInfo        RB-ActivationTimeInfoList           OPTIONAL
}

CN-DRX-CycleLengthCoefficient ::=   INTEGER (6..9)

CN-PagedUE-Identity ::=             CHOICE {
    imsi-GSM-MAP                        IMSI-GSM-MAP,
    tmsi-GSM-MAP                        TMSI-GSM-MAP,
    p-TMSI-GSM-MAP                      P-TMSI-GSM-MAP,
```

```
    imsi-DS-41                          IMSI-DS-41,
    tmsi-DS-41                          TMSI-DS-41
}

CompressedModeMeasCapability ::=    SEQUENCE {
    fdd-Measurements                    BOOLEAN,
    -- TABULAR: The IEs below are made optional since they are conditional based
    -- on another information element. Their absence corresponds to the case where
    -- the condition is not true.
    -- tdd-Measurements indicates need for compressed mode for 3.84Mcps TDD measurements
    tdd-Measurements                    BOOLEAN                             OPTIONAL,
    gsm-Measurements                    GSM-Measurements                    OPTIONAL,
    multiCarrierMeasurements            BOOLEAN                             OPTIONAL
}

CompressedModeMeasCapability-LCR ::=    SEQUENCE {
    tdd128-Measurements                    BOOLEAN                         OPTIONAL
}

CompressedModeMeasCapabFDDList ::=  SEQUENCE (SIZE (1..maxFreqBandsFDD)) OF
                                        CompressedModeMeasCapabFDD

CompressedModeMeasCapabFDD ::=      SEQUENCE {
    radioFrequencyBandFDD               RadioFrequencyBandFDD   OPTIONAL,
    dl-MeasurementsFDD                  BOOLEAN,
    ul-MeasurementsFDD                  BOOLEAN
}

CompressedModeMeasCapabTDDList ::=  SEQUENCE (SIZE (1..maxFreqBandsTDD)) OF
                                        CompressedModeMeasCapabTDD

CompressedModeMeasCapabTDD ::=      SEQUENCE {
    radioFrequencyBandTDD               RadioFrequencyBandTDD,
    dl-MeasurementsTDD                  BOOLEAN,
    ul-MeasurementsTDD                  BOOLEAN
}

CompressedModeMeasCapabGSMList ::=  SEQUENCE (SIZE (1..maxFreqBandsGSM)) OF
                                        CompressedModeMeasCapabGSM

CompressedModeMeasCapabGSM ::=      SEQUENCE {
    radioFrequencyBandGSM               RadioFrequencyBandGSM,
    dl-MeasurementsGSM                  BOOLEAN,
    ul-MeasurementsGSM                  BOOLEAN
}

CompressedModeMeasCapabMC ::=       SEQUENCE {
    dl-MeasurementsMC                   BOOLEAN,
    ul-MeasurementsMC                   BOOLEAN
}

CPCH-Parameters ::=                 SEQUENCE {
    initialPriorityDelayList            InitialPriorityDelayList            OPTIONAL,
    backoffControlParams                BackoffControlParams,
    powerControlAlgorithm               PowerControlAlgorithm,
    -- TABULAR: TPC step size nested inside PowerControlAlgorithm
    dl-DPCCH-BER                        DL-DPCCH-BER
}

DL-DPCCH-BER ::=                    INTEGER (0..63)

DL-PhysChCapabilityFDD ::=          SEQUENCE {
    maxNoDPCH-PDSCH-Codes               INTEGER (1..8),
    maxNoPhysChBitsReceived             MaxNoPhysChBitsReceived,
    supportForSF-512                    BOOLEAN,
    supportOfPDSCH                      BOOLEAN,
    simultaneousSCCPCH-DPCH-Reception   SimultaneousSCCPCH-DPCH-Reception
}

DL-PhysChCapabilityTDD ::=          SEQUENCE {
    maxTS-PerFrame                      MaxTS-PerFrame,
    maxPhysChPerFrame                   MaxPhysChPerFrame,
    minimumSF                           MinimumSF-DL,
    supportOfPDSCH                      BOOLEAN,
    maxPhysChPerTS                      MaxPhysChPerTS
}

DL-PhysChCapabilityTDD-LCR ::=      SEQUENCE {
```

```
    maxTS-PerSubFrame                   MaxTS-PerSubFrame,
    maxPhysChPerFrame                   MaxPhysChPerSubFrame,
    minimumSF                           MinimumSF-DL,
    supportOfPDSCH                      BOOLEAN,
    maxPhysChPerTS                      MaxPhysChPerTS,
    supportOf8PSK                       BOOLEAN
}

DL-TransChCapability ::=            SEQUENCE {
    maxNoBitsReceived                   MaxNoBits,
    maxConvCodeBitsReceived             MaxNoBits,
    turboDecodingSupport                TurboSupport,
    maxSimultaneousTransChs             MaxSimultaneousTransChsDL,
    maxSimultaneousCCTrCH-Count         MaxSimultaneousCCTrCH-Count,
    maxReceivedTransportBlocks          MaxTransportBlocksDL,
    maxNumberOfTFC-InTFCS               MaxNumberOfTFC-InTFCS-DL,
    maxNumberOfTF                       MaxNumberOfTF
}

DRAC-SysInfo ::=                    SEQUENCE {
    transmissionProbability             TransmissionProbability,
    maximumBitRate                      MaximumBitRate
}

DRAC-SysInfoList ::=                SEQUENCE (SIZE (1..maxDRACclasses)) OF
                                        DRAC-SysInfo

ESN-DS-41 ::=                       BIT STRING (SIZE (32))

EstablishmentCause ::=              ENUMERATED {
                                        originatingConversationalCall,
                                        originatingStreamingCall,
                                        originatingInteractiveCall,
                                        originatingBackgroundCall,
                                        originatingSubscribedTrafficCall,
                                        terminatingConversationalCall,
                                        terminatingStreamingCall,
                                        terminatingInteractiveCall,
                                        terminatingBackgroundCall,
                                        emergencyCall,
                                        interRAT-CellReselection,
                                        interRAT-CellChangeOrder,
                                        registration,
                                        detach,
                                        originatingHighPrioritySignalling,
                                        originatingLowPrioritySignalling,
                                        callRe-establishment,
                                        terminatingHighPrioritySignalling,
                                        terminatingLowPrioritySignalling,
                                        terminatingCauseUnknown,
                                        spare1 }

FailureCauseWithProtErr ::=         CHOICE {
    configurationUnsupported            NULL,
    physicalChannelFailure              NULL,
    incompatibleSimultaneousReconfiguration
                                        NULL,
    compressedModeRuntimeError          TGPSI,
    protocolError                       ProtocolErrorInformation,
    cellUpdateOccurred                  NULL,
    invalidConfiguration                NULL,
    configurationIncomplete             NULL,
    unsupportedMeasurement              NULL,
    spare1                              NULL,
    spare2                              NULL,
    spare3                              NULL,
    spare4                              NULL,
    spare5                              NULL,
    spare6                              NULL,
    spare7                              NULL
}

FailureCauseWithProtErrTrId ::=     SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr
}

GSM-Measurements ::=                SEQUENCE {
```

```
    gsm900                              BOOLEAN,
    dcs1800                             BOOLEAN,
    gsm1900                             BOOLEAN
}


-- If ICS-Version-r4 is included, the following IE shall be ignored.
ICS-Version ::=                     ENUMERATED {
                                        r99 }

ICS-Version-r4 ::=                  ENUMERATED {
                                        rel-4 }

IMSI-and-ESN-DS-41 ::=              SEQUENCE {
    imsi-DS-41                          IMSI-DS-41,
    esn-DS-41                           ESN-DS-41
}

IMSI-DS-41 ::=                      OCTET STRING (SIZE (5..7))

InitialPriorityDelayList ::=        SEQUENCE (SIZE (maxASC)) OF
                                        NS-IP

InitialUE-Identity ::=              CHOICE {
    imsi                                IMSI-GSM-MAP,
    tmsi-and-LAI                        TMSI-and-LAI-GSM-MAP,
    p-TMSI-and-RAI                      P-TMSI-and-RAI-GSM-MAP,
    imei                                IMEI,
    esn-DS-41                           ESN-DS-41,
    imsi-DS-41                          IMSI-DS-41,
    imsi-and-ESN-DS-41                  IMSI-and-ESN-DS-41,
    tmsi-DS-41                          TMSI-DS-41
}

IntegrityCheckInfo ::=              SEQUENCE {
    messageAuthenticationCode           MessageAuthenticationCode,
    rrc-MessageSequenceNumber           RRC-MessageSequenceNumber
}

IntegrityProtActivationInfo ::=     SEQUENCE {
    rrc-MessageSequenceNumberList       RRC-MessageSequenceNumberList
}

IntegrityProtectionAlgorithm ::=    ENUMERATED {
                                        uia1 }


IntegrityProtectionModeCommand ::=  CHOICE {
    startIntegrityProtection            SEQUENCE {
        integrityProtInitNumber             IntegrityProtInitNumber
    },
    modify                              SEQUENCE {
        dl-IntegrityProtActivationInfo      IntegrityProtActivationInfo
    }
}

IntegrityProtectionModeInfo ::=     SEQUENCE {
    integrityProtectionModeCommand      IntegrityProtectionModeCommand,
    -- TABULAR: DL integrity protection activation info and Integrity
    -- protection intialisation number have been nested inside
    -- IntegrityProtectionModeCommand.
    integrityProtectionAlgorithm        IntegrityProtectionAlgorithm        OPTIONAL
}

IntegrityProtInitNumber ::=         BIT STRING (SIZE (32))

MaxHcContextSpace ::=                   ENUMERATED  {
                                            by512, by1024, by2048, by4096,
                                            by8192 }


MaxROHC-ContextSessions ::=             ENUMERATED  {
                                            s2, s4, s8, s12, s16, s24, s32, s48,
                                            s64, s128, s256, s512, s1024, s16384 }

MaximumAM-EntityNumberRLC-Cap ::=   ENUMERATED {
                                        am3, am4, am5, am6,
                                        am8, am16, am30 }
```

```
-- Actual value = IE value * 16
MaximumBitRate ::=                  INTEGER (0..32)

MaximumRLC-WindowSize ::=           ENUMERATED { mws2047, mws4095 }

MaxNoDPDCH-BitsTransmitted ::=      ENUMERATED {
                                        b600, b1200, b2400, b4800,
                                        b9600, b19200, b28800, b38400,
                                        b48000, b57600 }

MaxNoBits ::=                       ENUMERATED {
                                        b640, b1280, b2560, b3840, b5120,
                                        b6400, b7680, b8960, b10240,
                                        b20480, b40960, b81920, b163840 }

MaxNoPhysChBitsReceived ::=         ENUMERATED {
                                        b600, b1200, b2400, b3600,
                                        b4800, b7200, b9600, b14400,
                                        b19200, b28800, b38400, b48000,
                                        b57600, b67200, b76800 }

MaxNoSCCPCH-RL ::=                  ENUMERATED {
                                        rl1 }

MaxNumberOfTF ::=                   ENUMERATED {
                                        tf32, tf64, tf128, tf256,
                                        tf512, tf1024 }

MaxNumberOfTFC-InTFCS-DL ::=        ENUMERATED {
                                        tfc16, tfc32, tfc48, tfc64, tfc96,
                                        tfc128, tfc256, tfc512, tfc1024 }

MaxNumberOfTFC-InTFCS-UL ::=        ENUMERATED {
                                        tfc4, tfc8, tfc16, tfc32, tfc48, tfc64,
                                        tfc96, tfc128, tfc256, tfc512, tfc1024 }

MaxPhysChPerFrame ::=               INTEGER (1..224)

MaxPhysChPerSubFrame ::=            INTEGER (1..96)

MaxPhysChPerTimeslot ::=            ENUMERATED {
                                        ts1, ts2 }

MaxPhysChPerTS ::=                  INTEGER (1..16)

MaxSimultaneousCCTrCH-Count ::=     INTEGER (1..8)

MaxSimultaneousTransChsDL ::=       ENUMERATED {
                                        e4, e8, e16, e32 }

MaxSimultaneousTransChsUL ::=       ENUMERATED {
                                        e2, e4, e8, e16, e32 }

MaxTransportBlocksDL ::=            ENUMERATED {
                                        tb4, tb8, tb16, tb32, tb48,
                                        tb64, tb96, tb128, tb256, tb512 }

MaxTransportBlocksUL ::=            ENUMERATED {
                                        tb2, tb4, tb8, tb16, tb32, tb48,
                                        tb64, tb96, tb128, tb256, tb512 }

MaxTS-PerFrame ::=                  INTEGER (1..14)

MaxTS-PerSubFrame ::=               INTEGER (1..6)

-- TABULAR: This IE contains dependencies to UE-MultiModeRAT-Capability,
-- the conditional fields have been left mandatory for now.
MeasurementCapability ::=           SEQUENCE {
    downlinkCompressedMode              CompressedModeMeasCapability,
    uplinkCompressedMode                CompressedModeMeasCapability
}

MeasurementCapability-v370 ::=      SEQUENCE{
    compressedModeMeasCapabFDDList      CompressedModeMeasCapabFDDList,
    compressedModeMeasCapabTDDList      CompressedModeMeasCapabTDDList  OPTIONAL,
    compressedModeMeasCapabGSMList      CompressedModeMeasCapabGSMList  OPTIONAL,
    compressedModeMeasCapabMC           CompressedModeMeasCapabMC       OPTIONAL
```

```
}

MeasurementCapability-r4Ext ::=     SEQUENCE {
    downlinkCompressedMode-LCR          CompressedModeMeasCapability-LCR,
    uplinkCompressedMode-LCR            CompressedModeMeasCapability-LCR
}

MessageAuthenticationCode ::=       BIT STRING (SIZE (32))

MinimumSF-DL ::=                    ENUMERATED {
                                        sf1, sf16 }

MinimumSF-UL ::=                    ENUMERATED {
                                        sf1, sf2, sf4, sf8, sf16 }

MultiModeCapability ::=             ENUMERATED {
                                        tdd, fdd, fdd-tdd }

MultiRAT-Capability ::=             SEQUENCE {
    supportOfGSM                        BOOLEAN,
    supportOfMulticarrier               BOOLEAN
}

N-300 ::=                           INTEGER (0..7)

N-301 ::=                           INTEGER (0..7)

N-302 ::=                           INTEGER (0..7)

N-304 ::=                           INTEGER (0..7)

N-308 ::=                           INTEGER (1..8)

N-310 ::=                           INTEGER (0..7)

N-312 ::=                           ENUMERATED {
                                        s1, s50, s100, s200, s400,
                                        s600, s800, s1000 }

N-313 ::=                           ENUMERATED {
                                        s1, s2, s4, s10, s20,
                                         s50, s100, s200 }

N-315 ::=                           ENUMERATED {
                                        s1, s50, s100, s200, s400,
                                        s600, s800, s1000 }

N-AccessFails ::=                   INTEGER (1..64)

N-AP-RetransMax ::=                 INTEGER (1..64)

NetworkAssistedGPS-Supported ::=    ENUMERATED {
                                        networkBased,
                                        ue-Based,
                                        bothNetworkAndUE-Based,
                                        noNetworkAssistedGPS }

NF-BO-AllBusy ::=                   INTEGER (0..31)

NF-BO-NoAICH ::=                    INTEGER (0..31)

NF-BO-Mismatch ::=                  INTEGER (0..127)

NS-BO-Busy ::=                      INTEGER (0..63)

NS-IP ::=                           INTEGER (0..28)

P-TMSI-and-RAI-GSM-MAP ::=          SEQUENCE {
    p-TMSI                              P-TMSI-GSM-MAP,
    rai                                 RAI
}

PagingCause ::=                     ENUMERATED {
                                        terminatingConversationalCall,
                                        terminatingStreamingCall,
                                        terminatingInteractiveCall,
                                        terminatingBackgroundCall,
                                        terminatingHighPrioritySignalling,
```

```
                                        terminatingLowPrioritySignalling,
                                        terminatingCauseUnknown
 }

PagingRecord ::=                    CHOICE {
    cn-Identity                         SEQUENCE {
        pagingCause                         PagingCause,
        cn-DomainIdentity                   CN-DomainIdentity,
        cn-pagedUE-Identity                 CN-PagedUE-Identity
    },
    utran-Identity                      SEQUENCE {
        u-RNTI                              U-RNTI,
        cn-OriginatedPage-connectedMode-UE  SEQUENCE {
            pagingCause                         PagingCause,
            cn-DomainIdentity                   CN-DomainIdentity,
            pagingRecordTypeID                  PagingRecordTypeID
        }                                                               OPTIONAL
    }
}

PagingRecordList ::=                SEQUENCE (SIZE (1..maxPage1)) OF
                                        PagingRecord

PDCP-Capability ::=                 SEQUENCE {
    losslessSRNS-RelocationSupport      BOOLEAN,
    supportForRfc2507                   CHOICE {
        notSupported                        NULL,
        supported                           MaxHcContextSpace
    }
}

PDCP-Capability-r4ext ::=           SEQUENCE {
    supportForRfc3095               CHOICE {
        notSupported                        NULL,
        supported                           SEQUENCE {
            maxROHC-ContextSessions             MaxROHC-ContextSessions     DEFAULT s16,
            reverseCompressionDepth             INTEGER (0..65535)          DEFAULT 0
        }
    }
}

PhysicalChannelCapability ::=       SEQUENCE {
        fddPhysChCapability                 SEQUENCE {
            downlinkPhysChCapability            DL-PhysChCapabilityFDD,
            uplinkPhysChCapability              UL-PhysChCapabilityFDD
        }                                           OPTIONAL,
-- The following describes the 3.84Mcps TDD physical channel capability
        tddPhysChCapability                 SEQUENCE {
            downlinkPhysChCapability            DL-PhysChCapabilityTDD,
            uplinkPhysChCapability              UL-PhysChCapabilityTDD
        }                                           OPTIONAL
}

-- The following describes the 1.28Mcps TDD physical channel capability
PhysicalChannelCapability-LCR ::=   SEQUENCE {
        tdd128-PhysChCapability             SEQUENCE {
            downlinkPhysChCapability            DL-PhysChCapabilityTDD-LCR,
            uplinkPhysChCapability              UL-PhysChCapabilityTDD-LCR
        }                                           OPTIONAL
}

PNBSCH-Allocation-r4 ::=            SEQUENCE {
        numberOfRepetitionsPerSFNPeriod ENUMERATED {
                                        c2, c3, c4, c5, c6, c7, c8, c9, c10,
                                        c12, c14, c16, c18, c20, c24, c28, c32,
                                        c36, c40, c48, c56, c64, c72, c80  }
}

ProtocolErrorCause ::=              ENUMERATED {
                                        asn1-ViolationOrEncodingError,
                                        messageTypeNonexistent,
                                        messageNotCompatibleWithReceiverState,
                                        ie-ValueNotComprehended,
                                        conditionalInformationElementError,
                                        messageExtensionNotComprehended,
                                        spare1, spare2 }

ProtocolErrorIndicator ::=          ENUMERATED {
```

```
                                        noError, errorOccurred }

ProtocolErrorIndicatorWithMoreInfo ::=
                                    CHOICE {
    noError                             NULL,
    errorOccurred                       SEQUENCE {
        rrc-TransactionIdentifier           RRC-TransactionIdentifier,
        protocolErrorInformation            ProtocolErrorInformation
    }
}

ProtocolErrorMoreInformation ::=    SEQUENCE {
    diagnosticsType                     CHOICE {
        type1                               CHOICE {
            asn1-ViolationOrEncodingError       NULL,
            messageTypeNonexistent              NULL,
            messageNotCompatibleWithReceiverState
                                                IdentificationOfReveivedMessage,
            ie-ValueNotComprehended             IdentificationOfReveivedMessage,
            conditionalInformationElementError  IdentificationOfReveivedMessage,
            messageExtensionNotComprehended     IdentificationOfReveivedMessage,
            spare1                              NULL,
            spare2                              NULL
        },
        spare                               NULL
    }
}

RadioFrequencyBandFDD ::=           ENUMERATED {
                                        fdd2100,
                                        fdd1900,
                                        spare1, spare2, spare3, spare4, spare5, spare6}

RadioFrequencyBandTDDList ::=       ————————ENUMERATED {
                                        a, b, c, ab, ac, bc, abc }

RadioFrequencyBandTDD ::=           ENUMERATED (a, b, c, spare)

RadioFrequencyBandGSM ::=           ENUMERATED {
                                        gsm450,
                                        gsm480,
                                        gsm850,
                                        gsm900P,
                                        gsm900E,
                                        gsm1800,
                                        gsm1900,
                                        spare1, spare2, spare3, spare4, spare5,
                                        spare6, spare7, spare8, spare9}

Rb-timer-indicator ::=              SEQUENCE {
    t314-expired                        BOOLEAN,
    t315-expired                        BOOLEAN }

Re-EstablishmentTimer ::=           ENUMERATED {
                                        useT314, useT315
}

RedirectionInfo ::=                 CHOICE {
    frequencyInfo                       FrequencyInfo,
    interRATInfo                        InterRATInfo
}

RejectionCause ::=                  ENUMERATED {
                                        congestion,
                                        unspecified }

ReleaseCause ::=                    ENUMERATED {
                                        normalEvent,
                                        unspecified,
                                        pre-emptiveRelease,
                                        congestion,
                                        re-establishmentReject,
                                        directedsignallingconnectionre-establishment,
                                        userInactivity }

RF-Capability ::=                   SEQUENCE {
        fddRF-Capability                SEQUENCE {
            ue-PowerClass                   UE-PowerClass,
```

```
            txRxFrequencySeparation         TxRxFrequencySeparation
        }                                   OPTIONAL,
        tddRF-Capability                            SEQUENCE {
            ue-PowerClass               UE-PowerClass,
            radioFrequencyTDDBandList   ---RadioFrequencyTDDBandList,
            chipRateCapability          ChipRateCapability
        }                                   OPTIONAL

}

RF-Capability-r4Ext ::=             SEQUENCE {
        tddRF-Capability                            SEQUENCE {
            ue-PowerClass               UE-PowerClass,
            radioFrequencyBandList      RadioFrequencyBand,
            chipRateCapability          ChipRateCapability
        }                                   OPTIONAL
}

RLC-Capability ::=                  SEQUENCE {
    totalRLC-AM-BufferSize              TotalRLC-AM-BufferSize,
    maximumRLC-WindowSize               MaximumRLC-WindowSize,
    maximumAM-EntityNumber              MaximumAM-EntityNumberRLC-Cap
}

RRC-MessageSequenceNumber ::=       INTEGER (0..15)


RRC-MessageSequenceNumberList ::=   SEQUENCE (SIZE (4..5)) OF
                                        RRC-MessageSequenceNumber

RRC-StateIndicator ::=              ENUMERATED {
                                        cell-DCH, cell-FACH, cell-PCH, ura-PCH }

RRC-TransactionIdentifier ::=       INTEGER (0..3)

S-RNTI ::=                          BIT STRING (SIZE (20))

S-RNTI-2 ::=                        BIT STRING (SIZE (10))

SecurityCapability ::=              SEQUENCE {
    cipheringAlgorithmCap                   BIT STRING (SIZE (16)),
    integrityProtectionAlgorithmCap     BIT STRING (SIZE (16))
}

SimultaneousSCCPCH-DPCH-Reception ::= CHOICE {
    notSupported                        NULL,
    supported                           SEQUENCE {
        maxNoSCCPCH-RL                      MaxNoSCCPCH-RL,
        simultaneousSCCPCH-DPCH-DPDCH-Reception
                                            BOOLEAN
        -- The IE above is applicable only if IE Support of PDSCH = TRUE
    }
}

SRNC-Identity ::=                   BIT STRING (SIZE (12))


START-Value ::=                     BIT STRING (SIZE (20))

STARTList ::=                       SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        STARTSingle

STARTSingle ::=                     SEQUENCE {
    cn-DomainIdentity                   CN-DomainIdentity,
    start-Value                         START-Value
}

SystemSpecificCapUpdateReq ::=      ENUMERATED {
                                        gsm }

SystemSpecificCapUpdateReqList ::= SEQUENCE (SIZE (1..maxSystemCapability)) OF
                                        SystemSpecificCapUpdateReq


T-300 ::=                           ENUMERATED {
                                        ms100, ms200, ms400, ms600, ms800,
                                        ms1000, ms1200, ms1400, ms1600,
                                        ms1800, ms2000, ms3000, ms4000,
```

```
                                    ms6000, ms8000 }

T-301 ::=                           ENUMERATED {
                                    ms100, ms200, ms400, ms600, ms800,
                                    ms1000, ms1200, ms1400, ms1600,
                                    ms1800, ms2000, ms3000, ms4000,
                                    ms6000, ms8000 }

T-302 ::=                           ENUMERATED {
                                    ms100, ms200, ms400, ms600, ms800,
                                    ms1000, ms1200, ms1400, ms1600,
                                    ms1800, ms2000, ms3000, ms4000,
                                    ms6000, ms8000 }

T-304 ::=                           ENUMERATED {
                                    ms100, ms200, ms400,
                                    ms1000, ms2000, spare1, spare2, spare3 }

T-305 ::=                           ENUMERATED {
                                    noUpdate, m5, m10, m30,
                                    m60, m120, m360, m720 }

T-307 ::=                           ENUMERATED {
                                    s5, s10, s15, s20,
                                    s30, s40, s50 }

T-308 ::=                           ENUMERATED {
                                    ms40, ms80, ms160, ms320 }

T-309 ::=                           INTEGER (1..8)

T-310 ::=                           ENUMERATED {
                                    ms40, ms80, ms120, ms160,
                                    ms200, ms240, ms280, ms320 }

T-311 ::=                           ENUMERATED {
                                    ms250, ms500, ms750, ms1000,
                                    ms1250, ms1500, ms1750, ms2000 }

T-312 ::=                           INTEGER (0..15)

T-313 ::=                           INTEGER (0..15)

T-314 ::=                           ENUMERATED {
                                    s0, s2, s4, s6, s8,
                                    s12, s16, s20 }

T-315 ::=                           ENUMERATED {
                                    s0, s10, s30, s60, s180,
                                    s600, s1200, s1800 }

T-316 ::=                           ENUMERATED {
                                    s0, s10, s20, s30, s40,
                                    s50, s-inf }

T-317 ::=                           ENUMERATED {
                                    s0, s10, s30, s60, s180,
                                    s600, s1200, s1800 }

T-CPCH ::=                          ENUMERATED {
                                    ct0, ct1 }

TMSI-and-LAI-GSM-MAP ::=            SEQUENCE {
    tmsi                                TMSI-GSM-MAP,
    lai                                 LAI
}

TMSI-DS-41 ::=                      OCTET STRING (SIZE (2..12))

TotalRLC-AM-BufferSize ::=          ENUMERATED {
                                    kb2, kb10, kb50, kb100,
                                    kb150, kb500, kb1000 }

-- Actual value = IE value * 0.125
TransmissionProbability ::=         INTEGER (1..8)

TransportChannelCapability ::=      SEQUENCE {
    dl-TransChCapability                DL-TransChCapability,
```

```
    ul-TransChCapability                UL-TransChCapability
}

TurboSupport ::=                        CHOICE {
    notSupported                            NULL,
    supported                               MaxNoBits
}

TxRxFrequencySeparation ::=             ENUMERATED {
                                            mhz190, mhz174-8-205-2,
                                            mhz134-8-245-2 }

U-RNTI ::=                              SEQUENCE {
    srnc-Identity                           SRNC-Identity,
    s-RNTI                                  S-RNTI
}

U-RNTI-Short ::=                        SEQUENCE {
    srnc-Identity                           SRNC-Identity,
    s-RNTI-2                                S-RNTI-2
}

UE-ConnTimersAndConstants ::=           SEQUENCE {
-- Optional is used also for parameters for which the default value is the last one read in SIB1
-- t-301 and n-301 should not be used by the UE in this release of the protocol
    t-301                                   T-301                                   DEFAULT ms2000,
    n-301                                   N-301                                   DEFAULT 2,
    t-302                                   T-302                                   DEFAULT ms4000,
    n-302                                   N-302                                   DEFAULT 3,
    t-304                                   T-304                                   DEFAULT ms2000,
    n-304                                   N-304                                   DEFAULT 2,
    t-305                                   T-305                                   DEFAULT m30,
    t-307                                   T-307                                   DEFAULT s30,
    t-308                                   T-308                                   DEFAULT ms160,
    t-309                                   T-309                                   DEFAULT 5,
    t-310                                   T-310                                   DEFAULT ms160,
    n-310                                   N-310                                   DEFAULT 4,
    t-311                                   T-311                                   DEFAULT ms2000,
    t-312                                   T-312                                   DEFAULT 1,
    n-312                                   N-312                                   DEFAULT s1,
    t-313                                   T-313                                   DEFAULT 3,
    n-313                                   N-313                                   DEFAULT s20,
    t-314                                   T-314                                   DEFAULT s12,
    t-315                                   T-315                                   DEFAULT s180,
    n-315                                   N-315                                   DEFAULT s1,
    t-316                                   T-316                                   DEFAULT s30,
    t-317                                   T-317                                   DEFAULT s180
}

UE-IdleTimersAndConstants ::=           SEQUENCE {
    t-300                                   T-300,
    n-300                                   N-300,
    t-312                                   T-312,
    n-312                                   N-312
}

UE-MultiModeRAT-Capability ::=          SEQUENCE {
    multiRAT-CapabilityList                 MultiRAT-Capability,
    multiModeCapability                     MultiModeCapability
}

UE-PowerClass ::=                       INTEGER (1..4)

UE-PowerClass-v370 ::=                  ENUMERATED(1, 2, 3, 4, spare1, spare2, spare3, spare4)

UE-RadioAccessCapability ::=            SEQUENCE {
    ics-Version                             ICS-Version,
    pdcp-Capability                         PDCP-Capability,
    rlc-Capability                          RLC-Capability,
    transportChannelCapability              TransportChannelCapability,
    rf-Capability                           RF-Capability,
    physicalChannelCapability               PhysicalChannelCapability,
    ue-MultiModeRAT-Capability              UE-MultiModeRAT-Capability,
    securityCapability                      SecurityCapability,
    ue-positioning-Capability                           UE-Positioning-Capability,
    measurementCapability                   MeasurementCapability       OPTIONAL
}
```

```
UE-RadioAccessCapability-v370 ::=   SEQUENCE {
    ue-RadioAccessCapabBandFDDList      UE-RadioAccessCapabBandFDDList
}

UE-RadioAccessCapabBandFDDList ::=  SEQUENCE (SIZE (1..maxFreqBandsFDD)) OF
                                        UE-RadioAccessCapabBandFDD

UE-RadioAccessCapabBandFDD ::=  SEQUENCE{
    radioFrequencyBandFDD               RadioFrequencyBandFDD,
    fddRF-Capability                    SEQUENCE {
        ue-PowerClass                       UE-PowerClass-v370,
        txRxFrequencySeparation             TxRxFrequencySeparation
    }                                                           OPTIONAL,
    measurementCapability               MeasurementCapability-v370
}

UE-RadioAccessCapability-r4ext ::=      SEQUENCE {
    pdcp-Capability-r4ext                   PDCP-Capability-r4ext,
    ics-Version-r4                      ICS-Version-r4,
    rf-Capability                       RF-Capability-r4Ext,
    physicalChannelCapability-LCR       PhysicalChannelCapability-LCR,
    measurementCapability-r4Ext         MeasurementCapability-r4Ext OPTIONAL
}

UL-PhysChCapabilityFDD ::=          SEQUENCE {
    maxNoDPDCH-BitsTransmitted          MaxNoDPDCH-BitsTransmitted,
    supportOfPCPCH                      BOOLEAN
}

UL-PhysChCapabilityTDD ::=          SEQUENCE {
    maxTS-PerFrame                      MaxTS-PerFrame,
    maxPhysChPerTimeslot                MaxPhysChPerTimeslot,
    minimumSF                           MinimumSF-UL,
    supportOfPUSCH                      BOOLEAN
}

UL-PhysChCapabilityTDD-LCR ::=      SEQUENCE {
    maxTS-PerSubFrame                   MaxTS-PerSubFrame,
    maxPhysChPerTimeslot                MaxPhysChPerTimeslot,
    minimumSF                           MinimumSF-UL,
    supportOfPUSCH                      BOOLEAN,
    supportOf8PSK                       BOOLEAN
}

UL-TransChCapability ::=            SEQUENCE {
    maxNoBitsTransmitted                MaxNoBits,
    maxConvCodeBitsTransmitted          MaxNoBits,
    turboDecodingSupport                TurboSupport,
    maxSimultaneousTransChs             MaxSimultaneousTransChsUL,
    modeSpecificInfo                    CHOICE {
        fdd                                 NULL,
        tdd                                 SEQUENCE {
            maxSimultaneousCCTrCH-Count         MaxSimultaneousCCTrCH-Count
        }
    },
    maxTransmittedBlocks                MaxTransportBlocksUL,
    maxNumberOfTFC-InTFCS               MaxNumberOfTFC-InTFCS-UL,
    maxNumberOfTF                       MaxNumberOfTF
}

UE-Positioning-Capability ::=                   SEQUENCE {
    standaloneLocMethodsSupported       BOOLEAN,
    ue-BasedOTDOA-Supported             BOOLEAN,
    networkAssistedGPS-Supported        NetworkAssistedGPS-Supported,
    gps-ReferenceTimeCapable            BOOLEAN,
    supportForIDL                       BOOLEAN
}

URA-UpdateCause ::=                 ENUMERATED {
                                        changeOfURA,
                                        periodicURAUpdate,
                                        re-enteredServiceArea,
                                        spare1 }

UTRAN-DRX-CycleLengthCoefficient ::= INTEGER (3..9)

WaitTime ::=                        INTEGER (0..15)
```

11.4 Constant definitions

```
Constant-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

hiPDSCHidentities           INTEGER ::= 64
hiPUSCHidentities           INTEGER ::= 64
hiRM                        INTEGER ::= 256
maxAC                       INTEGER ::= 16
maxAdditionalMeas           INTEGER ::= 4
maxASC                      INTEGER ::= 8
maxASCmap                   INTEGER ::= 7
maxASCpersist               INTEGER ::= 6
maxCCTrCH                   INTEGER ::= 8
maxCellMeas                 INTEGER ::= 32
maxCellMeas-1               INTEGER ::= 31
maxCNdomains                INTEGER ::= 4
maxCPCHsets                 INTEGER ::= 16
maxDPCH-DLchan              INTEGER ::= 8
maxDPCHcodesPerTS           INTEGER ::= 16
-- **TODO**
maxDPDCH-UL                 INTEGER ::= 6
maxDRACclasses              INTEGER ::= 8
-- **TODO**
maxFACH                     INTEGER ::= 8
maxFreq                     INTEGER ::= 8
maxFrequencybands           INTEGER ::= 4
maxFreqBandsFDD             INTEGER ::= 8
maxFreqBandsTDD             INTEGER ::= 4
maxFreqBandsGSM             INTEGER ::= 16
maxInterSysMessages         INTEGER ::= 4
maxLoCHperRLC               INTEGER ::= 2
maxMeasEvent                INTEGER ::= 8
maxMeasIntervals            INTEGER ::= 3
maxMeasParEvent             INTEGER ::= 2
maxNumCDMA2000Freqs         INTEGER ::=  8
maxNumGSMFreqRanges         INTEGER ::= 32
maxNumFDDFreqs              INTEGER ::=  8
maxNumTDDFreqs              INTEGER ::=  8
maxNoOfMeas                 INTEGER ::= 16
maxOtherRAT                 INTEGER ::= 15
maxPage1                    INTEGER ::= 8
maxPCPCH-APsig              INTEGER ::= 16
maxPCPCH-APsubCh            INTEGER ::= 12
maxPCPCH-CDsig              INTEGER ::= 16
maxPCPCH-CDsubCh            INTEGER ::= 12
maxPCPCH-SF                 INTEGER ::= 7
maxPCPCHs                   INTEGER ::= 64
maxPDCPAlgoType             INTEGER ::= 8
maxPDSCH                    INTEGER ::= 8
maxPDSCH-TFCIgroups         INTEGER ::= 256
maxPRACH                    INTEGER ::= 16
maxPRACH-FPACH              INTEGER ::= 8
maxPredefConfig             INTEGER ::= 16
maxPUSCH                    INTEGER ::= 8
maxRABsetup                 INTEGER ::= 16
maxRAT                      INTEGER ::= 16
maxRB                       INTEGER ::= 32
maxRBallRABs                INTEGER ::= 27
maxRBMuxOptions             INTEGER ::= 8
maxRBperRAB                 INTEGER ::= 8
maxReportedGSMCells         INTEGER ::= 6
maxRL                       INTEGER ::= 8
maxRL-1                     INTEGER ::= 7
maxROHC-PacketSizes         INTEGER ::= 16
maxROHC-Profile             INTEGER ::= 8
maxSat                      INTEGER ::= 16
maxSCCPCH                   INTEGER ::= 16
maxSIB                      INTEGER ::= 32
-- **TODO**
maxSIB-FACH                 INTEGER ::= 8
maxSIBperMsg                INTEGER ::= 16
maxSig                      INTEGER ::= 16
maxSRBsetup                 INTEGER ::= 8
maxSubCh                    INTEGER ::= 12
```

```
maxSystemCapability         INTEGER ::= 16
maxTF                       INTEGER ::= 32
maxTF-CPCH                  INTEGER ::= 16
maxTFC                      INTEGER ::= 1024
maxTFCI-2-Combs             INTEGER ::= 512
maxTGPS                     INTEGER ::= 6
maxTrCH                     INTEGER ::= 32
maxTrCHpreconf              INTEGER ::= 16
maxTS                       INTEGER ::= 14
maxTS-1                     INTEGER ::= 13
maxTS-LCR                   INTEGER ::= 6
maxTS-LCR-1                 INTEGER ::= 5
maxURA                      INTEGER ::= 8

END
```

13.4.28 UE_CAPABILITY_TRANSFERRED

This variable stores information about which UE capabilities that have been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
UE system specific capability	OP	1 to <maxSystemCapability>	Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	

13.4.27g8aUE_CAPABILITY_REQUESTED

This variable stores information about the UE capabilities that have been requested by UTRAN but that have not yet been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
UE system specific capability	OP	1 to <maxSystemCapability>	Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	

3GPP TSG-RAN2 Meeting #21
Busan, Korea, 21 – 25 May 2001

Tdoc R2-011424

CR-Form-v4

CHANGE REQUEST

⌘ **25.331** **CR** **734** ⌘ ev **r2** ⌘ Current version: **3.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Clarification on security mode control
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	5-25-2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘

1. In subclause 8.1.12.3, the UE suspend the DL RBs, which are receiving parts of UE and are not affected by current defined suspend function. In addition, suspending the UL RBs (i.e., the transmitting part of UE) is not described in this subclause.
2. There are errors for the occasion to release the old ciphering configuration.
3. The timing of using a new ciphering key is ambiguous.

~~3.For RB using TM RLC, HFN component of the COUNT-C is not set to zero when CFN is equal to "Ciphering activation time for DPCH" when a new ciphering key is used.~~ /*This point has been taken care by Ericsson in R2-011277. */

Summary of change: ⌘

1. For the UE, UL RBs suspending is added and DL RBs suspending is deleted.
2. The UE behaviour for RLC TM on security configuration is clarified.
3. The conditions to release the old ciphering configuration are clarified.
4. The timing of using a new ciphering key is clarified.

~~4. For RB using TM RLC, HFN component of the COUNT-C is set to zero when CFN is equal to "Ciphering activation time for DPCH" when a new ciphering key is used.~~

5. Some minor editorial corrections are included.

Backwards compatibility analysis:

There is no functionality change in this CR. Proposed correction and clarification would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved: ⌘ There are errors in the specification.

Clauses affected:	⌘	8.1.12.2.1, 8.1.12.3, 8.1.12.5, 8.6.3.4		
Other specs affected:	⌘	Other core specifications Test specifications O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.1.12 Security mode control

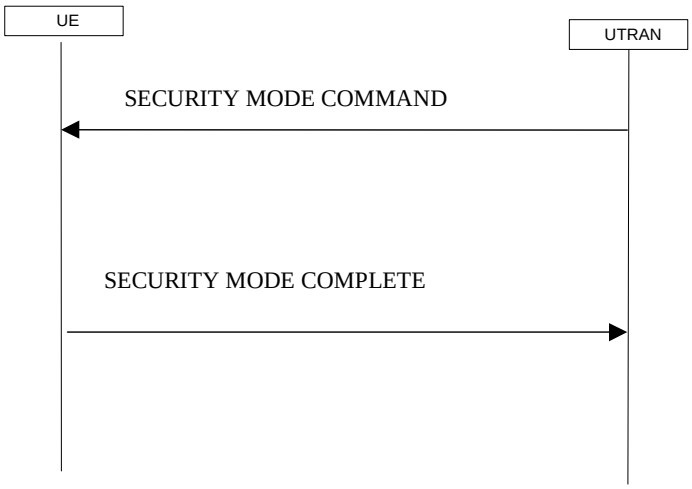

Figure 18: Security mode control procedure

8.1.12.1 General

The purpose of this procedure is to trigger the stop or start of ciphering or to command the restart of the ciphering with a new ciphering configuration, for all radio bearers.

It is also used to start integrity protection or to modify the integrity protection configuration for uplink and downlink signalling.

8.1.12.2 Initiation

8.1.12.2.1 Ciphering configuration change

To stop or start/restart ciphering, UTRAN sends a SECURITY MODE COMMAND message on the downlink DCCH in AM RLC using the most recent ciphering configuration. If no such ciphering configuration exists then the SECURITY MODE COMMAND is not ciphered.

Prior to sending the SECURITY MODE COMMAND, for the CN domain indicated in the IE "CN domain identity" in the SECURITY MODE COMMAND, UTRAN should:

- suspend all radio bearers using RLC-AM and RLC-UM;
- suspend all signalling radio bearers using RLC-AM and RLC-UM, except the signalling radio bearer used to send the SECURITY MODE COMMAND message on the downlink DCCH in RLC-AM;
- set, for the signalling radio bearer used to send the SECURITY MODE COMMAND, the "RLC send sequence number" in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info", at which time the new ciphering configuration shall be applied;
- include "Ciphering activation time for DPCH" in IE "Ciphering mode info" when a DPCH exists for radio bearers using transparent mode RLC, at which time the new ciphering configuration shall be applied;
- set, for each suspended radio bearer and signalling radio bearer, the "RLC send sequence number" in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info", at which time the new ciphering configuration shall be applied.

While suspended, radio bearers and signalling radio bearers shall not deliver RLC PDUs with sequence number greater than or equal to the number in IE "Radio bearer downlink ciphering activation time info".

When the successful delivery of the SECURITY MODE COMMAND has been confirmed by RLC, UTRAN shall:

- resume all the suspended radio bearers and signalling radio bearers. The old ciphering configuration shall be applied for the transmission of RLC PDUs with RLC sequence number less than the number indicated in the IE "Radio bearer downlink ciphering activation time info", as sent to the UE. The new ciphering configuration shall be applied for the transmission of RLC PDUs with RLC sequence number greater than or equal to the number indicated in IE "Radio bearer downlink ciphering activation time info", sent to the UE.

8.1.12.2.2 Integrity protection configuration change

To start or modify integrity protection, UTRAN sends a SECURITY MODE COMMAND message on the downlink DCCH in AM RLC using the new integrity protection configuration.

8.1.12.3 Reception of SECURITY MODE COMMAND message by the UE

Upon reception of the SECURITY MODE COMMAND message, the UE shall perform the actions for the received information elements according to 8.6.

If the IE "Security capability" is the same as indicated by variable UE_CAPABILITY_TRANSFERRED, and the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- suspend all radio bearers and signalling radio bearers (except the signalling radio bearer used to ~~receive~~ transmit the SECURITY MODE ~~COMMAND~~ COMPLETE message on the ~~downlink~~ uplink DCCH in RLC-AM) using RLC-AM or RLC-UM that belong to the CN domain indicated in the IE "CN domain identity".~~,~~ Set the "RLC send sequence number"~~with RLC sequence number greater than or equal to the number~~ in IE "Radio bearer ~~downlink~~ uplink ciphering activation time info" ~~in the IE "Ciphering mode info"~~, at which time the new ciphering configuration shall be applied;

- set the IE "RRC transaction identifier" in the SECURITY MODE COMPLETE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and

- clear that entry;

- if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":

  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO, for the respective radio bearer and signalling radio bearer;

- if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":

  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- for radio bearers using RLC-TM:

  - apply the old ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN less than the number indicated in the IE "Ciphering activation time for DPCH", as sent by the UTRAN;

  - apply the new ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN greater than or equal to the number indicated in IE "Ciphering activation time for DPCH", as sent by the UTRAN;

- when the radio bearers and signalling radio bearers using RLC-AM or RLC-UM have been suspended:

  - send a SECURITY MODE COMPLETE message on the uplink DCCH in AM RLC, using the old ciphering configurations;

  - if the IE "Integrity protection mode info" was present in the SECURITY MODE COMMAND message:

    - start applying the new integrity protection configuration in the uplink for RB#2 from and including the transmitted SECURITY MODE COMPLETE message;

- when the successful delivery of the SECURITY MODE COMPLETE message has been confirmed by RLC:

- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
- if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- The procedure ends. If a RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been confirmed by RLC, but before the activation time for the new ciphering configuration has been reached, then the activation time shall be ignored and the new ciphering configuration shall be applied immediately after the RLC reset or RLC re-establishment;
- notify upper layers upon change of the security configuration.

For radio bearers and signalling radio bearers used by the CN indicated in the IE "CN domain identity", the UE shall:

- if a new integrity protection key has been received or a new ciphering key has been received:
  - set the variable LATEST_CONFIGURED_CN_DOMAIN equal to the IE "CN domain identity";
- if a new integrity protection key has been received:
  - in the downlink:
    - use the new key;
    - set the HFN component of the downlink COUNT-I to zero at the RRC sequence number indicated in IE "Downlink integrity protection activation info" included in the IE "Integrity protection mode info";

    in the uplink:
    - use the new key;
    - set the HFN component of the uplink COUNT-I to zero at the RRC sequence number indicated in IE "Uplink integrity protection activation info";
- if a new ciphering key is available:
  - in the downlink, at and after the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info":
    - use the new key;
    - set the HFN component of the downlink COUNT-C to zero ~~at the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info"~~;
  - in the uplink, at and after the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info":
    - use the new key;
    - set the HFN component of the uplink COUNT-C to zero ~~at the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info"~~.

If the IE "Security capability" is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- release all its radio resources;

- indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- perform actions when entering idle mode as specified in subclause 8.5.2;
- And the procedure ends.

8.1.12.4 Void

8.1.12.4a Incompatible simultaneous security reconfiguration

If the variable INCOMPATIBLE_SECURITY_RECONFIGURATION becomes set to TRUE of the received SECURITY MODE CONTROL message, the UE shall:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "incompatible simultaneous reconfiguration";
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - And the procedure ends.

8.1.12.4b Cell update procedure during security reconfiguration

If:

- a cell update procedure according to subclause 8.3.1 is initiated; and
- the received SECURITY MODE CONTROL message causes either,
  - the IE "Reconfiguration" in the variable CIPHERING_STATUS to be set to TRUE; and/or
  - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to be set to TRUE:

the UE shall:

- abort the ongoing integrity and/or ciphering reconfiguration;
- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and

- clear that entry;
- set the IE "failure cause" to the cause value "cell update occurred";
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info":
    - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
    - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received; and
  - The procedure ends.

8.1.12.5 Reception of SECURITY MODE COMPLETE message by the UTRAN

UTRAN should apply integrity protection on the received SECURITY MODE COMPLETE message and all subsequent messages with the new integrity protection configuration, if changed. When UTRAN has received a SECURITY MODE COMPLETE message and the integrity protection has successfully been applied, UTRAN shall:

- for radio bearers using RLC-AM or RLC-UM:
  - use the old ciphering configuration for received RLC PDUs with RLC sequence number less than the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
  - use the new ciphering configuration for received RLC PDUs with RLC sequence number greater than or equal to the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
  - if an RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been received by UTRAN before the activation time for the new ciphering configuration has been reached, ignore the activation time and apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment;
- for radio bearers using RLC-TM:
  - use the old ciphering configuration for the received RLC PDUs before the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info" as included in the SECURITY MODE COMMAND;
  - use the new ciphering configuration for the received RLC PDUs at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info";
- And the procedure ends.

8.1.12.6 Invalid SECURITY MODE COMMAND message

If the SECURITY MODE COMMAND message contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Rejected transactions" in the variable TRANSACTIONS; and

- clear that entry;
- set the IE "failure cause" to the cause value "protocol error";
- include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION.
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - And the procedure ends.

8.6.3.4 Ciphering mode info

The IE "Ciphering mode info" defines the new ciphering configuration. If the IE "Ciphering mode info" is present and if the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to FALSE, the UE shall check the IE "Ciphering mode command" as part of the IE "Ciphering mode info", and perform the following. The UE shall:

- if the IE "Status" in the variable CIPHERING_STATUS has the value "Not Started", and if the IE "Ciphering mode command" has the value "stop":
  - ignore this attempt to change the ciphering configuration; and
  - set the variable INVALID_CONFIGURATION to TRUE;
- else:
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to TRUE;
  - if IE "Ciphering mode command" has the value "start/restart":
    - start or restart ciphering in lower layers for all established radio bearers in the variable ESTABLISHED_RABS, using the ciphering algorithm (UEA [40]) indicated by the IE "Ciphering algorithm" as part of the new ciphering configuration. For each radio bearer, the value of the IE "RB identity" in the variable ESTABLISHED_RABS minus one shall be used as the value of BEARER in the ciphering algorithm. The new ciphering configuration shall be applied as specified below;
    - set the IE "Status" in the variable CIPHERING_STATUS to "Started";
  - if the IE "Ciphering mode command" has the value "stop", the UE shall:
    - stop ciphering. The new ciphering configuration shall be applied as specified below;
    - set the IE "Status" in the variable CIPHERING_STATUS to "Not started";
  - in case the IE "Ciphering mode command" has the value "start/restart" or "stop", the new ciphering configuration shall be applied as follows:
    - if the IE "Ciphering activation time for DPCH" is present in the IE "Ciphering mode info":
      - apply the new configuration at that time for radio bearers using RLC-TM. If the IE "Ciphering mode info" is present in a message reconfiguring RB, transport channel or physical channel, the indicated time in IE "Activation time for DPCH" corresponds to a CFN after that reconfiguration;
    - if the IE "Radio bearer downlink ciphering activation time info" is present in the IE "Ciphering mode info":
      - apply the following procedure for each radio bearer using RLC-AM and RLC-UM indicated by the IE "RB identity":
      - suspend data transmission on the radio bearer;
      - store the "RLC send sequence number" for that radio bearer in the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO, at which time the new ciphering configuration shall be applied;
      - when the data transmission of that radio bearer is resumed:
        - switch to the new ciphering configuration according to the following:
        - use the old ciphering configuration for the transmitted and received RLC PDUs with RLC sequence numbers smaller than the corresponding RLC sequence numbers indicated in the IE "Radio bearer uplink ciphering activation time info" sent to UTRAN and ~~respectively~~ in the received IE "Radio bearer downlink ciphering activation time info" received from UTRAN, respectively ;
        - use the new ciphering configuration for the transmitted and received RLC PDUs with RLC sequence numbers greater than or equal to the corresponding RLC sequence numbers indicated in

the IE "Radio bearer uplink ciphering activation time info" sent to UTRAN and ~~respectively~~ in the received IE "Radio bearer downlink ciphering activation time info" received from UTRAN, respectively;

- for a radio bearer using RLC-AM, when the RLC sequence number indicated in the IE "Radio bearer downlink ciphering activation time info" ~~is~~ becomes below ~~not included in~~ the RLC receiving ~~transmission~~ window and the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" ~~is~~becomes below the RLC transmission window, the UE may release the old ciphering configuration for that radio bearer;

- if an RLC reset or re-establishment occurs before the activation time for the new ciphering configuration has been reached, ignore the activation time and apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment.

If the IE "Ciphering mode info" is present and if the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE, the UE shall:

- ignore this second attempt to change the ciphering configuration; and

- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.

If the IE "Ciphering mode info" is not present, the UE shall not change the ciphering configuration.

3GPP TSG-RAN2 Meeting #21
Busan, Korea, 21 – 25 May 2001

Tdoc R2-011425

CR-Form-v4

CHANGE REQUEST

⌘ **25.331 CR 735** ⌘ ev **-** ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Clarification on security mode control
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	5-25-2001
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘

1. In subclause 8.1.12.3, the UE suspend the DL RBs, which are receiving parts of UE and are not affected by current defined suspend function. In addition, suspending the UL RBs (i.e., the transmitting part of UE) is not described in this subclause.
2. There are errors for the occasion to release the old ciphering configuration.
3. The timing of using a new ciphering key is ambiguous.

~~3.For RB using TM RLC, HFN component of the COUNT-C is not set to zero when CFN is equal to "Ciphering activation time for DPCH" when a new ciphering key is used.~~ /*This point has been taken care by Ericsson in R2-011277. */

Summary of change: ⌘

1. For the UE, UL RBs suspending is added and DL RBs suspending is deleted.
2. The UE behaviour for RLC TM on security configuration is clarified.
3. The conditions to release the old ciphering configuration are clarified.
4. The timing of using a new ciphering key is clarified.

~~4. For RB using TM RLC, HFN component of the COUNT-C is set to zero when CFN is equal to "Ciphering activation time for DPCH" when a new ciphering key is used.~~

5. Some minor editorial corrections are included.

Consequences if not approved: ⌘ There are errors in the specification.

Clauses affected: ⌘ 8.1.12.2.1, 8.1.12.3, 8.1.12.5, 8.6.3.4

Other specs affected:	⌘	Other core specifications Test specifications O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.1.12 Security mode control

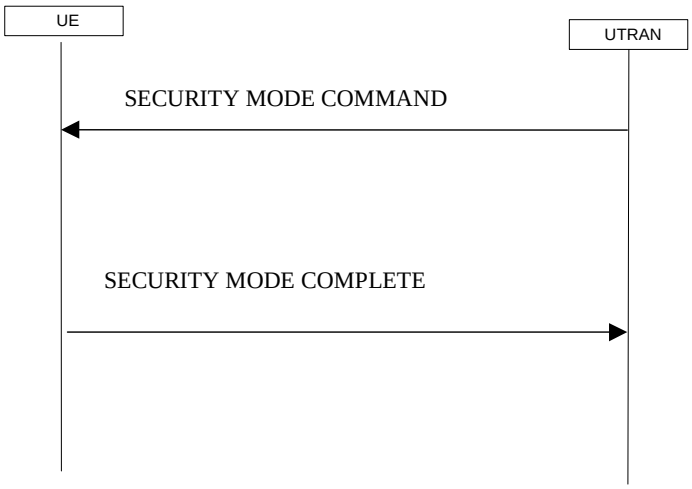

Figure 18: Security mode control procedure

8.1.12.1 General

The purpose of this procedure is to trigger the stop or start of ciphering or to command the restart of the ciphering with a new ciphering configuration, for all radio bearers.

It is also used to start integrity protection or to modify the integrity protection configuration for uplink and downlink signalling.

8.1.12.2 Initiation

8.1.12.2.1 Ciphering configuration change

To stop or start/restart ciphering, UTRAN sends a SECURITY MODE COMMAND message on the downlink DCCH in AM RLC using the most recent ciphering configuration. If no such ciphering configuration exists then the SECURITY MODE COMMAND is not ciphered.

Prior to sending the SECURITY MODE COMMAND, for the CN domain indicated in the IE "CN domain identity" in the SECURITY MODE COMMAND, UTRAN should:

- suspend all radio bearers using RLC-AM and RLC-UM;
- suspend all signalling radio bearers using RLC-AM and RLC-UM, except the signalling radio bearer used to send the SECURITY MODE COMMAND message on the downlink DCCH in RLC-AM;
- set, for the signalling radio bearer used to send the SECURITY MODE COMMAND, the "RLC send sequence number" in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info", at which time the new ciphering configuration shall be applied;
- include "Ciphering activation time for DPCH" in IE "Ciphering mode info" when a DPCH exists for radio bearers using transparent mode RLC, at which time the new ciphering configuration shall be applied;
- set, for each suspended radio bearer and signalling radio bearer, the "RLC send sequence number" in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info", at which time the new ciphering configuration shall be applied.

While suspended, radio bearers and signalling radio bearers shall not deliver RLC PDUs with sequence number greater than or equal to the number in IE "Radio bearer downlink ciphering activation time info".

When the successful delivery of the SECURITY MODE COMMAND has been confirmed by RLC, UTRAN shall:

- resume all the suspended radio bearers and signalling radio bearers. The old ciphering configuration shall be applied for the transmission of RLC PDUs with RLC sequence number less than the number indicated in the IE "Radio bearer downlink ciphering activation time info", as sent to the UE. The new ciphering configuration shall be applied for the transmission of RLC PDUs with RLC sequence number greater than or equal to the number indicated in IE "Radio bearer downlink ciphering activation time info", sent to the UE.

8.1.12.2.2 Integrity protection configuration change

To start or modify integrity protection, UTRAN sends a SECURITY MODE COMMAND message on the downlink DCCH in AM RLC using the new integrity protection configuration.

8.1.12.3 Reception of SECURITY MODE COMMAND message by the UE

Upon reception of the SECURITY MODE COMMAND message, the UE shall perform the actions for the received information elements according to 8.6.

If the IE "Security capability" is the same as indicated by variable UE_CAPABILITY_TRANSFERRED, and the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- suspend all radio bearers and signalling radio bearers (except the signalling radio bearer used to ~~receive~~ transmit the SECURITY MODE ~~COMMAND~~ COMPLETE message on the ~~downlink~~ uplink DCCH in RLC-AM) using RLC-AM or RLC-UM that belong to the CN domain indicated in the IE "CN domain identity".~~,~~ Set the "RLC send sequence number"~~with RLC sequence number greater than or equal to the number~~ in IE "Radio bearer ~~downlink~~ uplink ciphering activation time info"~~ in the IE "Ciphering mode info"~~, at which time the new ciphering configuration shall be applied;

- set the IE "RRC transaction identifier" in the SECURITY MODE COMPLETE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and

- clear that entry;

- if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":

  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO, for the respective radio bearer and signalling radio bearer;

- if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":

  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- for radio bearers using RLC-TM:

  - apply the old ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN less than the number indicated in the IE "Ciphering activation time for DPCH", as sent by the UTRAN;

  - apply the new ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN greater than or equal to the number indicated in IE "Ciphering activation time for DPCH", as sent by the UTRAN;

- when the radio bearers and signalling radio bearers using RLC-AM or RLC-UM have been suspended:

  - send a SECURITY MODE COMPLETE message on the uplink DCCH in AM RLC, using the old ciphering configurations;

  - if the IE "Integrity protection mode info" was present in the SECURITY MODE COMMAND message:

    - start applying the new integrity protection configuration in the uplink for RB#2 from and including the transmitted SECURITY MODE COMPLETE message;

- when the successful delivery of the SECURITY MODE COMPLETE message has been confirmed by RLC:

- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
- if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- The procedure ends. If a RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been confirmed by RLC, but before the activation time for the new ciphering configuration has been reached, then the activation time shall be ignored and the new ciphering configuration shall be applied immediately after the RLC reset or RLC re-establishment;
- notify upper layers upon change of the security configuration.

For radio bearers and signalling radio bearers used by the CN indicated in the IE "CN domain identity", the UE shall:

- if a new integrity protection key has been received or a new ciphering key has been received:
  - set the variable LATEST_CONFIGURED_CN_DOMAIN equal to the IE "CN domain identity";
- if a new integrity protection key has been received:
  - in the downlink:
    - use the new key;
    - set the HFN component of the downlink COUNT-I to zero at the RRC sequence number indicated in IE "Downlink integrity protection activation info" included in the IE "Integrity protection mode info";

    in the uplink:
    - use the new key;
    - set the HFN component of the uplink COUNT-I to zero at the RRC sequence number indicated in IE "Uplink integrity protection activation info";
- if a new ciphering key is available:
  - in the downlink, at and after the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info":
    - use the new key;
    - set the HFN component of the downlink COUNT-C to zero ~~at the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info"~~;
  - in the uplink, at and after the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info":
    - use the new key;
    - set the HFN component of the uplink COUNT-C to zero ~~at the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info"~~.

If the IE "Security capability" is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- release all its radio resources;

- indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- perform actions when entering idle mode as specified in subclause 8.5.2;
- And the procedure ends.

8.1.12.4 Void

8.1.12.4a Incompatible simultaneous security reconfiguration

If the variable INCOMPATIBLE_SECURITY_RECONFIGURATION becomes set to TRUE of the received SECURITY MODE CONTROL message, the UE shall:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "incompatible simultaneous reconfiguration";
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - And the procedure ends.

8.1.12.4b Cell update procedure during security reconfiguration

If:

- a cell update procedure according to subclause 8.3.1 is initiated; and
- the received SECURITY MODE CONTROL message causes either,
  - the IE "Reconfiguration" in the variable CIPHERING_STATUS to be set to TRUE; and/or
  - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to be set to TRUE:

the UE shall:

- abort the ongoing integrity and/or ciphering reconfiguration;
- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and

- clear that entry;
- set the IE "failure cause" to the cause value "cell update occurred";
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info":
    - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
    - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received; and
  - The procedure ends.

8.1.12.5 Reception of SECURITY MODE COMPLETE message by the UTRAN

UTRAN should apply integrity protection on the received SECURITY MODE COMPLETE message and all subsequent messages with the new integrity protection configuration, if changed. When UTRAN has received a SECURITY MODE COMPLETE message and the integrity protection has successfully been applied, UTRAN shall:

- for radio bearers using RLC-AM or RLC-UM:
  - use the old ciphering configuration for received RLC PDUs with RLC sequence number less than the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
  - use the new ciphering configuration for received RLC PDUs with RLC sequence number greater than or equal to the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
  - if an RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been received by UTRAN before the activation time for the new ciphering configuration has been reached, ignore the activation time and apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment;
- for radio bearers using RLC-TM:
  - use the old ciphering configuration for the received RLC PDUs before the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info" as included in the SECURITY MODE COMMAND;
  - use the new ciphering configuration for the received RLC PDUs at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info";
- And the procedure ends.

8.1.12.6 Invalid SECURITY MODE COMMAND message

If the SECURITY MODE COMMAND message contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Rejected transactions" in the variable TRANSACTIONS; and

- clear that entry;
- set the IE "failure cause" to the cause value "protocol error";
- include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION.
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - And the procedure ends.

8.6.3.4 Ciphering mode info

The IE "Ciphering mode info" defines the new ciphering configuration. If the IE "Ciphering mode info" is present and if the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to FALSE, the UE shall check the IE "Ciphering mode command" as part of the IE "Ciphering mode info", and perform the following. The UE shall:

- if the IE "Status" in the variable CIPHERING_STATUS has the value "Not Started", and if the IE "Ciphering mode command" has the value "stop":
  - ignore this attempt to change the ciphering configuration; and
  - set the variable INVALID_CONFIGURATION to TRUE;
- else:
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to TRUE;
  - if IE "Ciphering mode command" has the value "start/restart":
    - start or restart ciphering in lower layers for all established radio bearers in the variable ESTABLISHED_RABS, using the ciphering algorithm (UEA [40]) indicated by the IE "Ciphering algorithm" as part of the new ciphering configuration. For each radio bearer, the value of the IE "RB identity" in the variable ESTABLISHED_RABS minus one shall be used as the value of BEARER in the ciphering algorithm. The new ciphering configuration shall be applied as specified below;
    - set the IE "Status" in the variable CIPHERING_STATUS to "Started";
  - if the IE "Ciphering mode command" has the value "stop", the UE shall:
    - stop ciphering. The new ciphering configuration shall be applied as specified below;
    - set the IE "Status" in the variable CIPHERING_STATUS to "Not started";
  - in case the IE "Ciphering mode command" has the value "start/restart" or "stop", the new ciphering configuration shall be applied as follows:
    - if the IE "Ciphering activation time for DPCH" is present in the IE "Ciphering mode info":
      - apply the new configuration at that time for radio bearers using RLC-TM. If the IE "Ciphering mode info" is present in a message reconfiguring RB, transport channel or physical channel, the indicated time in IE "Activation time for DPCH" corresponds to a CFN after that reconfiguration;
    - if the IE "Radio bearer downlink ciphering activation time info" is present in the IE "Ciphering mode info":
      - apply the following procedure for each radio bearer using RLC-AM and RLC-UM indicated by the IE "RB identity":
      - suspend data transmission on the radio bearer;
      - store the "RLC send sequence number" for that radio bearer in the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO, at which time the new ciphering configuration shall be applied;
      - when the data transmission of that radio bearer is resumed:
        - switch to the new ciphering configuration according to the following:
        - use the old ciphering configuration for the transmitted and received RLC PDUs with RLC sequence numbers smaller than the corresponding RLC sequence numbers indicated in the IE "Radio bearer uplink ciphering activation time info" sent to UTRAN and ~~respectively~~ in the received IE "Radio bearer downlink ciphering activation time info" received from UTRAN, respectively ;
        - use the new ciphering configuration for the transmitted and received RLC PDUs with RLC sequence numbers greater than or equal to the corresponding RLC sequence numbers indicated in

the IE "Radio bearer uplink ciphering activation time info" sent to UTRAN and ~~respectively~~ in the received IE "Radio bearer downlink ciphering activation time info" received from UTRAN, respectively;

- for a radio bearer using RLC-AM, when the RLC sequence number indicated in the IE "Radio bearer downlink ciphering activation time info" ~~is~~ becomes below ~~not included in~~ the RLC receiving ~~transmission~~ window and the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" ~~is~~becomes below the RLC transmission window, the UE may release the old ciphering configuration for that radio bearer;

- if an RLC reset or re-establishment occurs before the activation time for the new ciphering configuration has been reached, ignore the activation time and apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment.

If the IE "Ciphering mode info" is present and if the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE, the UE shall:

- ignore this second attempt to change the ciphering configuration; and

- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.

If the IE "Ciphering mode info" is not present, the UE shall not change the ciphering configuration.

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21th-25th 2001

Tdoc R2-011226

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **737** ⌘ rev **r1** ⌘ Current version: **3.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	Correction of TrCH parameter handling
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-24
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
- ***D*** *(Editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘

TFS
Text in section 8.6.5.1 not correct according to current Tabular format. Text specifying UE behaviour at reception of IE TFS also written in Semantics Description and as notes in the tabular format. Text from Tabular format (semantics description and notes) have been moved into section 8.6

TFCS
Current text on reception of IE "Transport Format Combination Set" states that stored TFCS is always removed. This is incorrect, since an existing TFCS can be modified.

Current text on IE "Transport Format Combination Set" states that a TrCH can be added, removed or replaced. This is not the correct wording, should be removed or added/reconfigured.

UE action at reception of IE "Transport Format Combination Set" and IE "Transport Format Combination Subset" in same message is not correctly described.

In case IE "Transport Format Combination Set" is not included in a message, where TrCHs are added/reconfigured and/or removed, current specification does not state in details how to calculate the TFCS based on the received information.

TFC subset
Ranges to identify TFC Subsets are not stringently specified.
Restriction of specific transport formats of a TrCH not described.

TFCS Reconfiguration/Addition Information
Description of a 'complete reconfiguration not fully specified.
How to insert added TFCs into the TFCS is not fully specified.

TFCS Removal Information
Description and handling of TFCI values at TFC removal is not fully specified.

Section 14.10, CTFC Calculation
The order of transport channels in the CTFC calculation is not clear.

Summary of change: ⌘

TFS
Text from Tabular format (semantics description and notes) have been moved into section 8.6.

TFCS
Clarified that IE "Transport Format Combination Set" can be used to give the UE a completely new TFCS, or modify the existing TFCS stored in the UE. Text is aligned.

In case IE "Transport Format Combination Set" is not included in a message, where TrCHs are added/reconfigured and/or removed, UE shall reject that configuration.

TFC subset
Ranges to identify TFC Subsets clarified.
Description added on UE handling of restriction of specific transport formats of a TrCH.
Indentation error corrected.

TFCS Reconfiguration/Addition Information
At 'complete reconfiguration', any stored TFCS in the UE is removed.
Added that TFCs are inserted into availble positions in ascending TFCI order in the TFCS.

TFCS Removal Information
At TFC removal, it is clarified that there will be vacant TFCS positions.

		TFCS Removal Information Reference corrected.
Consequences if not approved:	⌘	Incomplete specification of UE behaviour. Inter-operability problems. Backwards compatibility: Proposed corrections clarifies UE behaviour. No impact on coding of messages and information elements. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Clauses affected:	⌘	8.6.5.1, 8.6.5.2, 8.6.5.3, 8.6.5.12, 8.6.5.13, 10.3.5.16, 10.3.5.22, 10.3.5.23, 14.10		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6.5.1 Transport Format Set

If ~~the IE "transport channel type", the IE "transport channel identity" (not needed for RACH and FACH) and~~ the IE "Transport format set" ~~are~~ is included, the UE shall, ~~for the indicated transport channel~~:

- if the transport format set is a RACH TFS received in System Information Block type 5 or 6, and CHOICE "Logical Channel List" has the value "Explicit List", ignore that System Information Block;
- if the transport format set for a downlink transport channel is received in a System Information Block, and CHOICE "Logical Channel List" has a value different from 'ALL", ignore that System Information Block;
- if the transport format set for a downlink transport channel is received in a message on a DCCH, and CHOICE "Logical Channel List" has a value different from 'ALL":
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the value (index) of any IE "RB identity" (and "Logical Channel" for RBs using two UL logical channels) in the IE "Logical channel list" does not correspond to a logical channel indicated to be mapped onto this transport channel in any RB multiplexing option (either included in the same message or previously stored and not changed by this message):
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the total number of configured transport formats for the transport channel exceeds maxTF:
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- ~~else:~~

If the IE "Transport format set" is considered as valid according to the rules above, the UE shall:

- remove a previously stored transport format set if this exists for that transport channel;
- store the transport format set for that transport channel;
- consider the first instance of the parameter *Number of TBs and TTI List* within the *Dynamic transport format information* correspond to transport format 0 for this transport channel, the second to transport format 1 and so on;
- if the IE "Transport format Set" has the choice "Transport channel type" set to "Dedicated transport channel":
  - calculate the transport block size for all transport formats in the TFS using the following

    TB size = RLC ~~PDU~~ size + MAC header size,

    where:
    - MAC header size is calculated according to [15] if MAC multiplexing is used. Otherwise it is 0 bits.
      NOTE: 'RLC size' reflects the RLC PDU size.
- if the IE "Transport format Set" has the choice "Transport channel type" set to "Common transport channel":
  - calculate the transport block size for all transport formats in the TFS using the following

    TB size = RLC size
- if the IE "Number of Transport transport blocks" <> 0 and IE "RLC size" = 0, no RLC PDU data exists but only parity bits exist for that transport format;
- if the IE "Number of Transport transport blocks" = 0, neither RLC PDU data nor parity bits exist for that transport format;

For configuration restrictions on Blind Transport Format Detection, see [27].

~~If neither the IE "transport channel type" nor the IE "Transport format set" is included, the UE shall:~~

- ~~consider the stored transport format set as valid information.~~

The UTRAN should not assign transport formats with different "RLC Size" to any logical channel transferring data using AM RLC. If an AM RLC entity is mapped to two logical channels, UTRAN may configure more than one "RLC Size" for the logical channel transferring control PDUs only.

8.6.5.2 Transport format combination set

If the IE "Transport format combination set" is included, the UE shall for that direction (uplink or downlink):

- ~~remove~~ store the new transport format combination set, or (if this exists) modify a previously stored transport format combination set ~~if this exists;~~ according to IEs included in IE "Transport format combination set";
- start to respect those transport format combinations;
- if IE “Transport format combination subset” is received in this message, the UE shall
  - perform the actions as specified in subsection 8.6.5.3,
- if IE “Transport format combination subset” is not received in this message, the UE shall
  - clear the IE "Duration" in the variable TFC_SUBSET; (HANS: Changed indentation)
  - set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC_SUBSET to the value indicating "full transport format combination set";(HANS: Changed indentation)

~~- remove any previous restriction of the transport format combination set;~~

~~- store the new transport format combination set present in the IE "Transport format combination set";~~

~~- start to respect those transport format combinations.~~

If the IE "Transport format combination set" is not included and if there is no addition, ~~/~~removal or reconfiguration~~/replacement~~ of transport channels, the UE shall for that direction (uplink or downlink):

- ~~consider~~ use a previously stored transport format combination set if this exists ~~as valid information~~

If the IE "Transport format combination set" is not included, and

- if no transport format combination set is stored in the UE, or
- if transport channels are added or removed in the message, or
- if any transport channel is reconfigured in the message such that the size of the transport format set is changed, the UE shall
- set the variable INVALID_CONFIGURATION to TRUE..

~~For downlink CCTrCHs if no TFCS is stored in the UE the UE shall consider all possible transport format combinations and calculate the possible TFCI values according to the IE transport format combination set.~~

~~For downlink CCTrCHs if a TFCS is stored in the UE and~~

~~- if the IE "Transport format combination set" is not included and transport channels are deleted in the message, the UE shall:~~

~~- remove the affected transport format combinations from the transport format combination set, recalculate the TFCI values and start to respect those transport format combinations~~

~~- if the IE "Transport format combination set" is not included and transport channels are added in the message, the UE shall:~~

- consider all possible new combinations to be valid and recalculate the TFCI values and start to respect those transport format combinations. In TDD the new transport format combinations are considered to belong to the TFCS with the ID 1 of DCH type.

- if the IE "Transport format combination set" is not included and transport channels are replaced the UE shall:

- consider all possible transport format combinations to be valid and calculate the TFCI values accordingly.

If the IE "Transport format combination set" is not included, the TFCI ordering shall correspond to the CTFC ordering.

The UTRAN should include in the TFCS, for each transport channel, a TFC with one transport block for this transport channel and 0 zero transport blocks for all the others. Similarly, the UTRAN should include, for each AM logical channel, a TFC with a minimum size compatible TF for the corresponding transport channel and 0 zero transport blocks for all other transport channels. Finally, the UTRAN should include, for each TM logical channel and for each SDU size associated with it, a TFC with a minimum size compatible TF for the corresponding transport channel and 0 zero transport blocks for all other transport channels.

For AM-RLC logical channels, the minimum size compatible TF includes one transport block with "Configured RLC Size" equal to the RLC PDU size. For non-segmented mode TM-RLC logical channels, the minimum size compatible TF includes one transport block with "Configured RLC Size" equal to the RLC SDU size considered. For segmented mode TM-RLC, the minimum size compatible TF is any TF such that the number of transport blocks multiplied by the "Configured RLC Size" is equal to the RLC SDU size considered. Note that the "Configured RLC Size" is defined as the transport block size minus the MAC header size.

Finally, UTRAN should include in the TFCS an "empty" TFC (e.g. the TFC with one transport block of zero size for one transport channel and zero transport blocks for all others).

8.6.5.3 Transport format combination subset

If the IE "Transport format combination subset"("TFC subset") is included, the UE shall:

- if the IE "Minimum allowed Transport format combination index" is included; and

  - if the value of the IE "Minimum allowed Transport format combination index" is outside greater than the highest TFCI value the range of transport format combinations in the current transport format combination set:

    - consider the TFC subset to be incompatible with the current transport format combination set;

- if the IE "Allowed transport format combination list" is included; and

  - if the value of any of the IEs "Allowed transport format combination" included in the IE "Allowed transport format combination list" does not match a TFCI value is outside the range of transport format combinations in the current transport format combination set:

    - consider the TFC subset to be incompatible with the current transport format combination set;

  if the IE "Non-allowed transport format combination list" is included; and

  - if the value of any of the IEs "Non-allowed transport format combination" included in the IE "Non-allowed transport format combination list" does not match a TFCI value is outside the range of transport format combinations in the current transport format combination set:

    - consider the TFC subset to be incompatible with the current transport format combination set;

- if the IE "Restricted TrCH information" is included:

  - if the value of any of the IEs "Uplink transport channel type" and "Restricted UL TrCH identity" included in the IE "Restricted TrCH information" do not correspond to any of the transport channels for which the current transport format combination set is valid:

    - consider the TFC subset to be incompatible with the current transport format combination set;

  - if the IE "Allowed TFIs" is included; and

- if the value of ~~any~~ each of the IEs "Allowed TFI" included in the IE "Allowed TFIs" ~~does not~~ correspond to a transport format for that transport channel within the current transport format combination set:
  - allow all transport format combinations that includes these transport formats for the transport channel, and restrict all other transport format combinations;
  - else
    - consider the TFC subset to be incompatible with the current transport format combination set;
- if the IE "Allowed TFIs" is not included:
  - restrict all transport format combinations where the transport channel has a transport format of non-zero rate.

- if the UE considers the TFC subset to be incompatible with the current Transport format combination set according to the above:
  - keep any previous restriction of the transport format combination set;
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the UE does not consider the TFC subset to be incompatible with the current Transport format combination set according to the above:
  - restrict the transport format combination set in the uplink to the value of the IE "Transport format combination subset" (in case of TDD for the uplink CCTrCH specified by the IE "TFCS Id");(HANS: Changed indentation)
  - clear the IE "Duration" in the variable TFC_SUBSET;
- if the transport format combination subset indicates the "full transport format combination set":(HANS: Changed indentation)
  - any restriction on transport format combination set is released and the UE may use the full transport format combination set. (HANS: Changed indentation)

8.6.5.12 TFCS Reconfiguration/Addition Information

If the IE "TFCS Reconfiguration/Addition Information" is included the UE shall:

- store the TFCs to be reconfigured/added indicated in the IE "CTFC information" as specified below;
- if the IE "Power offset information" is included:
  - perform actions as specified in [29].

In order to identify the TFCs included in this IE the UE shall calculate the CTFC as specified in subclause 14.10 and

- if the IE "TFCS Reconfiguration/Addition Information" was included in the IE "TFCI Field 1 Information":
  - ignore for the CTFC calculation any DSCH transport channel that may be assigned;
- if the IE "TFCS Reconfiguration/Addition Information" was included in the IE "TFCI Field 2 Information":
  - ignore for the CTFC calculation any DCH transport channel that may be assigned.

If the IE "TFCS Reconfiguration/Addition Information" is used in case of TFCS "Complete reconfiguration" the UE shall

- remove a previously stored transport format combination set if this exists;
- consider the first instance of the IE "CTFC information" as Transport Format Combination 0 in FDD (TFCI=0) and 1 in TDD (TFCI=1), the second instance as Transport Format Combination 1 in FDD (TFCI=1) and 2 in TDD (TFCI=2) and so on. In TDD the TFCI value = 0 is reserved for physical layer use.

If the IE "TFCS Reconfiguration/Addition Information" is used in case of TFCS "Addition" the UE shall insert the new additional(s) TFC into the first available position(s) in ascending TFCI order in the TFCS.

8.6.5.13 TFCS Removal Information

If the IE "TFCS Removal Information" is included the UE shall:

- remove the TFC indicated by the IE "TFCI" from the current TFCS, and regard this position (TFCI) in the TFCS as vacant..

10.3.5.16 TFCS Removal Information

Information Element/Group name	Need	Multi	IE type and reference	Semantics description
Removal TFCI information	MP	1 to <maxTFC>		
>TFCI	MP		Transport Format Combination (TFC) 10.3.5.19~~Integer(0.. 1023)~~	In TDD 0 is a reserved value

Range Bound	Explanation
MaxDelTFCcount	Maximum number of Transport Format Combinations to be removed.

10.3.5.22 Transport Format Combination Subset

Indicates which Transport format combinations in the already defined Transport format combination set are allowed.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE Subset representation	MP			
>Minimum allowed Transport format combination index			Transport format combination 10.3.5.19	~~The integer number is a reference to the *Transport format combination*, which arrived at that position in the *Transport Format Combination Set*.~~
>Allowed transport format combination list		1 to <maxTFC>		
>>Allowed transport format combination	MP		Transport format combination 10.3.5.19	~~The integer number is a reference to the *Transport format combination*, which arrived at that position in the *Transport Format Combination Set*.~~
>Non-allowed transport format combination list		1 to <maxTFC>		
>>Non-allowed transport format combination	MP		Transport format combination 10.3.5.19	~~The integer number is a reference to the *Transport format combination*, which arrived at that position in the *Transport Format Combination Set*.~~
>Restricted TrCH information		1 to <maxTrCH>		
>>Uplink transport channel type	MP		Enumerated(DCH, USCH)	USCH is TDD only
>>Restricted UL TrCH identity	MP		Transport channel identity 10.3.5.18	~~The integer number(s) is a reference to the transport channel that is restricted.~~
>>Allowed TFIs	OP	1 to <maxTF>		
>>>Allowed TFI	MP		Integer(0..31)	~~The integer number is a reference to the transport format that is allowed. If no elements are given, all transport formats or the TrCH with non-zero rate are restricted.~~
>Full transport format combination set				(No data)

10.3.5.23 Transport Format Set

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *Transport channel type*	MP			
>Dedicated transport channels				The transport channel that is configured with this TFS is of type DCH
>>Dynamic Transport Format Information	MP	1 to <maxTF>		Note 1
>>>RLC Size	MP		Integer(0..4992)	Unit is bits Note 2
>>>Number of TBs and TTI List	MP	1 to <maxTF>		Present for every valid number of TB's (and TTI) for this RLC Size.
>>>>Transmission Time Interval	CV-*dynamicTTI*		Integer(10,20,40,80)	Unit is ms.
>>>>Number of Transport blocks	MP		Integer(0..512)	Note 3
>>>CHOICE *Logical Channel List*	MP			The logical channels that are allowed to use this RLC Size ~~For radio bearers mapped to RACH, the UE shall regard "Explicit list" as an undefined IE value and handle these as specified in clause 9.~~ ~~For the downlink, "ALL" is the only valid choice. The UE shall regard all other choices as undefined IE values and handle these as specified in clause 9.~~
>>>>ALL			Null	All logical channels mapped to this transport channel.
>>>>Configured			Null	The logical channels configured to use this RLC size in the *RB mapping info*. 10.3.4.21 if present in this message or in the previously stored configuration otherwise
>>>>Explicit List		1 to 15		Lists the logical channels that are allowed to use this RLC size.
>>>>>RB Identity	MP		RB identity 10.3.4.16	
>>>>>LogicalChannel	CH-*UL-RLCLogicalChannels*		Integer(0..1)	Indicates the relevant UL logical channel for this RB. "0" corresponds to the first, "1" corresponds to the second UL logical channel configured for this RB in the IE "RB mapping info".
>>Semi-static Transport Format Information	MP		Semi-static Transport Format Information 10.3.5.11	
>Common transport channels				The transport channel that is configured with this TFS is of a type not equal to DCH
>>Dynamic Transport Format Information	MP	1 to <maxTF>		Note
>>>RLC Size	MP		Integer(0..4992)	Unit is bits Note 2

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>>Number of TBs and TTI List	MP	1 to <maxTF>		Present for every valid number of TB's (and TTI) for this RLC Size.
>>>>Number of Transport blocks	MP		Integer(0..512)	Note 3
>>>>CHOICE mode	MP			
>>>>>FDD				(no data)
>>>>>TDD				
>>>>>>Transmission Time Interval	CV-*dynamicTTI*		Integer(10,20,40,80)	Unit is ms.
>>>CHOICE *Logical Channel List*	MP			The logical channels that are allowed to use this RLC Size
>>>>ALL			Null	All logical channels mapped to this transport channel.
>>>>Configured			Null	The logical channels configured to use this RLC size in the *RB mapping info*. 10.3.4.21 if present in this message or in the previously stored configuration otherwise
>>>>Explicit List		1 to 15		Lists the logical channels that are allowed to use this RLC size.
>>>>>RB Identity	MP		RB identity 10.3.4.16	
>>>>>LogicalChannel	CV-*UL-RLCLogicalChannels*		Integer(0..1)	Indicates the relevant UL logical channel for this RB. "0" corresponds to the first, "1" corresponds to the second UL logical channel configured for this RB in the IE "RB mapping info".
>>Semi-static Transport Format Information	MP		Semi-static Transport Format Information 10.3.5.11	

Condition	Explanation
dynamicTTI	This IE is included if dynamic TTI usage is indicated in IE Transmission Time Interval in Semi-static Transport Format Information. Otherwise it is not needed.
UL-RLCLogicalChannels	If "Number of uplink RLC logical channels" in IE "RB mapping info" in this message is 2 or the IE "RB mapping info" is not present in this message and 2 UL logical channels are configured for this RB, then this IE is present. Otherwise this IE is not needed.

NOTE: The parameter "rate matching attribute" is in line with the RAN WG1 specifications. However, it is not currently in line with the description in [34].

~~NOTE 1: The first instance of the parameter *Number of TBs and TTI List* within the *Dynamic transport format information* correspond to transport format 0 for this transport channel, the second to transport format 1 and so on. The total number of configured transport formats for each transport channel does not exceed <maxTF>.~~

~~NOTE 2: For dedicated channels, 'RLC size' reflects RLC PDU size. In FDD for common channels 'RLC size' reflects actual TB size. In TDD for common channels since MAC headers are not octet aligned, to calculate TB size the MAC header bit offset is added to the specified size (similar to the dedicated case). Therefore for TDD DCH TrCHs the 4 bit C/T is added if MAC multiplexing is applied, for FACH the 3 bit TCTF offset is added and for RACH the 2 bit TCTF offset is added.~~

~~NOTE 3: If the number of transport blocks <> 0, and Optional IE "CHOICE RLC mode" or "CHOICE Transport block size is absent, it implies that no RLC PDU data exists but only parity bits exist. If the number of transport blocks = 0, it implies that neither RLC PDU data nor parity bits exist. In order to ensure the possibility of CRC based Blind Transport Format Detection, UTRAN should configure a transport format with number of transport block <> 0, with a zero-size transport block.~~

14.10 Calculated Transport Format Combination

The Calculated Transport Format Combination (CTFC) is a tool for efficient signalling of transport format combinations.

Let *I* be the number of transport channels that are included in the transport format combination. Each transport channel $TrCH_i$, $i = 1, 2, \ldots, I$, has L_i transport formats, i.e. the transport format indicator TFI_i can take L_i values, $TFI_i \in \{0,1,2,...,L_i - 1\}$.

Define $P_i = \prod_{j=0}^{i-1} L_j$ *, where i = 1, 2, …, I, and* $L_0 = 1$.

Let $TFC(TFI_1, TFI_2, \ldots, TFI_I)$ be the transport format combination for which $TrCH_1$ has transport format TFI_1, $TrCH_2$ has transport format TFI_2, etc. The corresponding $CTFC(TFI_1, TFI_2, \ldots, TFI_I)$ is then computed as:

$$CTFC(TFI_1, TFI_2, \ldots, TFI_I) = \sum_{i=1}^{I} TFI_i \cdot P_i .$$

~~For downlink common CH, "TrCHi" is numbered with ascending integer numbers starting from 1 in the order listed in a SYSTEM INFORMATION message.~~

For FACH and PCH transport channels, "$TrCH_1$" corresponds to the transport channel listed at the first position in IE "FACH/PCH information" in IE "Secondary CCPCH System Information", "$TrCH_2$" corresponds to the transport channel listed at the second position in IE "FACH/PCH information" and so on.

~~In all other cases, for each separate TFCI field, "TrCHi" is numbered with ascending integer numbers starting from 1 in the ascending order of transport channel identities of the channels mapped to that TFCI field.~~

For all other transport channels, "$TrCH_1$" corresponds to the transport channel having the lowest transport channel identity in the transport format combination mapped to the TFCI field in FDD, and for all configured transport channels of the transport channel type (i.e DCH, DSCH, USCH) in TDD.~~,~~. "$TrCH_2$" corresponds to the transport channel having the next lowest transport channel identity, and so on.

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21th-25th 2001

Tdoc R2-011227

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **738** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Correction of TrCH parameter handling
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-24
Category:	⌘	**F**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘

TFS
Text in section 8.6.5.1 not correct according to current Tabular format. Text specifying UE behaviour at reception of IE TFS also written in Semantics Description and as notes in the tabular format. Text from Tabular format (semantics description and notes) have been moved into section 8.6

TFCS
Current text on reception of IE "Transport Format Combination Set" states that stored TFCS is always removed. This is incorrect, since an existing TFCS can be modified.

Current text on IE "Transport Format Combination Set" states that a TrCH can be added, removed or replaced. This is not the correct wording, should be removed or added/reconfigured.

UE action at reception of IE "Transport Format Combination Set" and IE "Transport Format Combination Subset" in same message is not correctly described.

In case IE "Transport Format Combination Set" is not included in a message, where TrCHs are added/reconfigured and/or removed, current specification does not state in details how to calculate the TFCS based on the received information.

TFC subset
Ranges to identify TFC Subsets are not stringently specified.
Restriction of specific transport formats of a TrCH not described.

TFCS Reconfiguration/Addition Information
Description of a 'complete reconfiguration not fully specified.
How to insert added TFCs into the TFCS is not fully specified.

TFCS Removal Information
Description and handling of TFCI values at TFC removal is not fully specified.

Section 14.10, CTFC Calculation
The order of transport channels in the CTFC calculation is not clear.

Summary of change: ⌘

TFS
Text from Tabular format (semantics description and notes) have been moved into section 8.6.

TFCS
Clarified that IE "Transport Format Combination Set" can be used to give the UE a completely new TFCS, or modify the existing TFCS stored in the UE. Text is aligned.

In case IE "Transport Format Combination Set" is not included in a message, where TrCHs are added/reconfigured and/or removed, UE shall reject that configuration.

TFC subset
Ranges to identify TFC Subsets clarified.
Description added on UE handling of restriction of specific transport formats of a TrCH.
Indentation error corrected.

TFCS Reconfiguration/Addition Information
At 'complete reconfiguration', any stored TFCS in the UE is removed.
Added that TFCs are inserted into availble positions in ascending TFCI order in the TFCS.

TFCS Removal Information
At TFC removal, it is clarified that there will be vacant TFCS positions.

		TFCS Removal Information Reference corrected.
Consequences if not approved:	⌘	Incomplete specification of UE behaviour. Inter-operability problems. Backwards compatibility: Proposed corrections clarifies UE behaviour. No impact on coding of messages and information elements. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Clauses affected:	⌘	8.6.5.1, 8.6.5.2, 8.6.5.3, 8.6.5.12, 8.6.5.13, 10.3.5.16, 10.3.5.22, 10.3.5.23, 14.10		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6.5.1 Transport Format Set

If ~~the IE "transport channel type", the IE "transport channel identity" (not needed for RACH and FACH) and~~ the IE "Transport format set" ~~are~~ is included, the UE shall, ~~for the indicated transport channel~~:

- if the transport format set is a RACH TFS received in System Information Block type 5 or 6, and CHOICE "Logical Channel List" has the value "Explicit List", ignore that System Information Block;
- if the transport format set for a downlink transport channel is received in a System Information Block, and CHOICE "Logical Channel List" has a value different from 'ALL", ignore that System Information Block;
- if the transport format set for a downlink transport channel is received in a message on a DCCH, and CHOICE "Logical Channel List" has a value different from 'ALL":
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the value (index) of any IE "RB identity" (and "Logical Channel" for RBs using two UL logical channels) in the IE "Logical channel list" does not correspond to a logical channel indicated to be mapped onto this transport channel in any RB multiplexing option (either included in the same message or previously stored and not changed by this message):
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the total number of configured transport formats for the transport channel exceeds maxTF:
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- ~~else:~~

If the IE "Transport format set" is considered as valid according to the rules above, the UE shall:

- remove a previously stored transport format set if this exists for that transport channel;
- store the transport format set for that transport channel;
- consider the first instance of the parameter *Number of TBs and TTI List* within the *Dynamic transport format information* correspond to transport format 0 for this transport channel, the second to transport format 1 and so on;
- if the IE "Transport format Set" has the choice "Transport channel type" set to "Dedicated transport channel":
  - calculate the transport block size for all transport formats in the TFS using the following

    TB size = RLC ~~PDU~~ size + MAC header size,

    where:
    - MAC header size is calculated according to [15] if MAC multiplexing is used. Otherwise it is 0 bits.
      NOTE: 'RLC size' reflects the RLC PDU size.
- if the IE "Transport format Set" has the choice "Transport channel type" set to "Common transport channel":
  - calculate the transport block size for all transport formats in the TFS using the following

    TB size = RLC size
- if the IE "Number of Transport transport blocks" <> 0 and IE "RLC size" = 0, no RLC PDU data exists but only parity bits exist for that transport format;
- if the IE "Number of Transport transport blocks" = 0, neither RLC PDU data nor parity bits exist for that transport format;

For configuration restrictions on Blind Transport Format Detection, see [27].

If neither the IE "transport channel type" nor the IE "Transport format set" is included, the UE shall:

- consider the stored transport format set as valid information.

The UTRAN should not assign transport formats with different "RLC Size" to any logical channel transferring data using AM RLC. If an AM RLC entity is mapped to two logical channels, UTRAN may configure more than one "RLC Size" for the logical channel transferring control PDUs only.

8.6.5.2 Transport format combination set

If the IE "Transport format combination set" is included, the UE shall for that direction (uplink or downlink):

- remove store the new transport format combination set, or (if this exists) modify a previously stored transport format combination set if this exists; according to IEs included in IE "Transport format combination set";
- start to respect those transport format combinations;
- if IE “Transport format combination subset” is received in this message, the UE shall
  - perform the actions as specified in subsection 8.6.5.3,
- if IE “Transport format combination subset” is not received in this message, the UE shall
  - clear the IE "Duration" in the variable TFC_SUBSET; (HANS: Changed indentation)
  - set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC_SUBSET to the value indicating "full transport format combination set";(HANS: Changed indentation)
- remove any previous restriction of the transport format combination set;
- store the new transport format combination set present in the IE "Transport format combination set";
- start to respect those transport format combinations.

If the IE "Transport format combination set" is not included and if there is no addition, /removal or reconfiguration/replacement of transport channels, the UE shall for that direction (uplink or downlink):

- consider use a previously stored transport format combination set if this exists as valid information

If the IE "Transport format combination set" is not included, and

- if no transport format combination set is stored in the UE, or
- if transport channels are added or removed in the message, or
- if any transport channel is reconfigured in the message such that the size of the transport format set is changed, the UE shall
- set the variable INVALID_CONFIGURATION to TRUE..

For downlink CCTrCHs if no TFCS is stored in the UE the UE shall consider all possible transport format combinations and calculate the possible TFCI values according to the IE transport format combination set.

For downlink CCTrCHs if a TFCS is stored in the UE and

- if the IE "Transport format combination set" is not included and transport channels are deleted in the message, the UE shall:
  - remove the affected transport format combinations from the transport format combination set, recalculate the TFCI values and start to respect those transport format combinations
- if the IE "Transport format combination set" is not included and transport channels are added in the message, the UE shall:

~~- consider all possible new combinations to be valid and recalculate the TFCI values and start to respect those transport format combinations. In TDD the new transport format combinations are considered to belong to the TFCS with the ID 1 of DCH type.~~

~~- if the IE "Transport format combination set" is not included and transport channels are replaced the UE shall:~~

~~- consider all possible transport format combinations to be valid and calculate the TFCI values accordingly.~~

~~If the IE "Transport format combination set" is not included, the TFCI ordering shall correspond to the CTFC ordering.~~

The UTRAN should include in the TFCS, for each transport channel, a TFC with one transport block for this transport channel and ~~0~~ zero transport blocks for all the others. Similarly, the UTRAN should include, for each AM logical channel, a TFC with a minimum size compatible TF for the corresponding transport channel and ~~0~~ zero transport blocks for all other transport channels. Finally, the UTRAN should include, for each TM logical channel and for each SDU size associated with it, a TFC with a minimum size compatible TF for the corresponding transport channel and ~~0~~ zero transport blocks for all other transport channels.

For AM-RLC logical channels, the minimum size compatible TF includes one transport block with "Configured RLC Size" equal to the RLC PDU size. For non-segmented mode TM-RLC logical channels, the minimum size compatible TF includes one transport block with "Configured RLC Size" equal to the RLC SDU size considered. For segmented mode TM-RLC, the minimum size compatible TF is any TF such that the number of transport blocks multiplied by the "Configured RLC Size" is equal to the RLC SDU size considered. Note that the "Configured RLC Size" is defined as the transport block size minus the MAC header size.

Finally, UTRAN should include in the TFCS an "empty" TFC (e.g. the TFC with one transport block of zero size for one transport channel and zero transport blocks for all others).

8.6.5.3 Transport format combination subset

If the IE "Transport format combination subset"("TFC subset") is included, the UE shall:

- if the IE "Minimum allowed Transport format combination index" is included; and
  - if the value of the IE "Minimum allowed Transport format combination index" is ~~outside~~ greater than the highest TFCI value ~~the range of transport format combinations in~~ the current transport format combination set:
    - consider the TFC subset to be incompatible with the current transport format combination set;
- if the IE "Allowed transport format combination list" is included; and
  - if the value of any of the IEs "Allowed transport format combination" included in the IE "Allowed transport format combination list" does not match a TFCI value ~~is outside the range of transport format combinations~~ in the current transport format combination set:
    - consider the TFC subset to be incompatible with the current transport format combination set;

  if the IE "Non-allowed transport format combination list" is included; and
  - if the value of any of the IEs "Non-allowed transport format combination" included in the IE "Non-allowed transport format combination list" does not match a TFCI value ~~is outside the range of transport format combinations~~ in the current transport format combination set:
    - consider the TFC subset to be incompatible with the current transport format combination set;
- if the IE "Restricted TrCH information" is included:
  - if the value of any of the IEs "Uplink transport channel type" and "Restricted UL TrCH identity" included in the IE "Restricted TrCH information" do not correspond to any of the transport channels for which the current transport format combination set is valid:
    - consider the TFC subset to be incompatible with the current transport format combination set;
  - if the IE "Allowed TFIs" is included; and

- if the value of ~~any~~ each of the IEs "Allowed TFI" included in the IE "Allowed TFIs" ~~does not~~ correspond to a transport format for that transport channel within the current transport format combination set:
  - allow all transport format combinations that includes these transport formats for the transport channel, and restrict all other transport format combinations;
  - else
    - consider the TFC subset to be incompatible with the current transport format combination set;
- if the IE "Allowed TFIs" is not included:
  - restrict all transport format combinations where the transport channel has a transport format of non-zero rate.

- if the UE considers the TFC subset to be incompatible with the current Transport format combination set according to the above:
  - keep any previous restriction of the transport format combination set;
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the UE does not consider the TFC subset to be incompatible with the current Transport format combination set according to the above:
  - restrict the transport format combination set in the uplink to the value of the IE "Transport format combination subset" (in case of TDD for the uplink CCTrCH specified by the IE "TFCS Id");(HANS: Changed indentation)
  - clear the IE "Duration" in the variable TFC_SUBSET;
- if the transport format combination subset indicates the "full transport format combination set":(HANS: Changed indentation)
  - any restriction on transport format combination set is released and the UE may use the full transport format combination set. (HANS: Changed indentation)

8.6.5.12 TFCS Reconfiguration/Addition Information

If the IE "TFCS Reconfiguration/Addition Information" is included the UE shall:

- store the TFCs to be reconfigured/added indicated in the IE "CTFC information" as specified below;
- if the IE "Power offset information" is included:
  - perform actions as specified in [29].

In order to identify the TFCs included in this IE the UE shall calculate the CTFC as specified in subclause 14.10 and

- if the IE "TFCS Reconfiguration/Addition Information" was included in the IE "TFCI Field 1 Information":
  - ignore for the CTFC calculation any DSCH transport channel that may be assigned;
- if the IE "TFCS Reconfiguration/Addition Information" was included in the IE "TFCI Field 2 Information":
  - ignore for the CTFC calculation any DCH transport channel that may be assigned.

If the IE "TFCS Reconfiguration/Addition Information" is used in case of TFCS "Complete reconfiguration" the UE shall

- remove a previously stored transport format combination set if this exists;
- consider the first instance of the IE "CTFC information" as Transport Format Combination 0 in FDD (TFCI=0) and 1 in TDD (TFCI=1), the second instance as Transport Format Combination 1 in FDD (TFCI=1) and 2 in TDD (TFCI=2) and so on. In TDD the TFCI value = 0 is reserved for physical layer use.

If the IE "TFCS Reconfiguration/Addition Information" is used in case of TFCS "Addition" the UE shall insert the new additional(s) TFC into the first available position(s) in ascending TFCI order in the TFCS.

8.6.5.13 TFCS Removal Information

If the IE "TFCS Removal Information" is included the UE shall:

- remove the TFC indicated by the IE "TFCI" from the current TFCS, and regard this position (TFCI) in the TFCS as vacant..

10.3.5.16 TFCS Removal Information

Information Element/Group name	Need	Multi	IE type and reference	Semantics description
Removal TFCI information	MP	1 to <maxTFC>		
>TFCI	MP		Transport Format Combination (TFC) 10.3.5.19~~Integer(0.. 1023)~~	In TDD 0 is a reserved value

Range Bound	Explanation
MaxDelTFCcount	Maximum number of Transport Format Combinations to be removed.

10.3.5.22 Transport Format Combination Subset

Indicates which Transport format combinations in the already defined Transport format combination set are allowed.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE Subset representation	MP			
>Minimum allowed Transport format combination index			Transport format combination 10.3.5.19	~~The integer number is a reference to the *Transport format combination*, which arrived at that position in the *Transport Format Combination Set*.~~
>Allowed transport format combination list		1 to <maxTFC>		
>>Allowed transport format combination	MP		Transport format combination 10.3.5.19	~~The integer number is a reference to the *Transport format combination*, which arrived at that position in the *Transport Format Combination Set*.~~
>Non-allowed transport format combination list		1 to <maxTFC>		
>>Non-allowed transport format combination	MP		Transport format combination 10.3.5.19	~~The integer number is a reference to the *Transport format combination*, which arrived at that position in the *Transport Format Combination Set*.~~
>Restricted TrCH information		1 to <maxTrCH>		
>>Uplink transport channel type	MP		Enumerated(DCH, USCH)	USCH is TDD only
>>Restricted UL TrCH identity	MP		Transport channel identity 10.3.5.18	~~The integer number(s) is a reference to the transport channel that is restricted.~~
>>Allowed TFIs	OP	1 to <maxTF>		
>>>Allowed TFI	MP		Integer(0..31)	~~The integer number is a reference to the transport format that is allowed. If no elements are given, all transport formats or the TrCH with non-zero rate are restricted.~~
>Full transport format combination set				(No data)

10.3.5.23 Transport Format Set

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *Transport channel type*	MP			
>Dedicated transport channels				The transport channel that is configured with this TFS is of type DCH
>>Dynamic Transport Format Information	MP	1 to <maxTF>		Note 1
>>>RLC Size	MP		Integer(0..4992)	Unit is bits Note 2
>>>Number of TBs and TTI List	MP	1 to <maxTF>		Present for every valid number of TB's (and TTI) for this RLC Size.
>>>>Transmission Time Interval	CV-*dynamicTTI*		Integer(10,20,40,80)	Unit is ms.
>>>>Number of Transport blocks	MP		Integer(0..512)	Note 3
>>>CHOICE *Logical Channel List*	MP			The logical channels that are allowed to use this RLC Size ~~For radio bearers mapped to RACH, the UE shall regard "Explicit list" as an undefined IE value and handle these as specified in clause 9.~~ ~~For the downlink, "ALL" is the only valid choice. The UE shall regard all other choices as undefined IE values and handle these as specified in clause 9.~~
>>>>ALL			Null	All logical channels mapped to this transport channel.
>>>>Configured			Null	The logical channels configured to use this RLC size in the *RB mapping info*. 10.3.4.21 if present in this message or in the previously stored configuration otherwise
>>>>Explicit List		1 to 15		Lists the logical channels that are allowed to use this RLC size.
>>>>>RB Identity	MP		RB identity 10.3.4.16	
>>>>>LogicalChannel	CH-*UL-RLCLogicalChannels*		Integer(0..1)	Indicates the relevant UL logical channel for this RB. "0" corresponds to the first, "1" corresponds to the second UL logical channel configured for this RB in the IE "RB mapping info".
>>Semi-static Transport Format Information	MP		Semi-static Transport Format Information 10.3.5.11	
>Common transport channels				The transport channel that is configured with this TFS is of a type not equal to DCH
>>Dynamic Transport Format Information	MP	1 to <maxTF>		Note
>>>RLC Size	MP		Integer(0..4992)	Unit is bits Note 2

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>>Number of TBs and TTI List	MP	1 to <maxTF>		Present for every valid number of TB's (and TTI) for this RLC Size.
>>>>Number of Transport blocks	MP		Integer(0..512)	Note 3
>>>>CHOICE mode	MP			
>>>>>FDD				(no data)
>>>>>TDD				
>>>>>>Transmission Time Interval	CV-*dynamicTTI*		Integer(10,20,40,80)	Unit is ms.
>>>CHOICE *Logical Channel List*	MP			The logical channels that are allowed to use this RLC Size
>>>>ALL			Null	All logical channels mapped to this transport channel.
>>>>Configured			Null	The logical channels configured to use this RLC size in the *RB mapping info*. 10.3.4.21 if present in this message or in the previously stored configuration otherwise
>>>>Explicit List		1 to 15		Lists the logical channels that are allowed to use this RLC size.
>>>>>RB Identity	MP		RB identity 10.3.4.16	
>>>>>LogicalChannel	CV-*UL-RLCLogicalChannels*		Integer(0..1)	Indicates the relevant UL logical channel for this RB. "0" corresponds to the first, "1" corresponds to the second UL logical channel configured for this RB in the IE "RB mapping info".
>>Semi-static Transport Format Information	MP		Semi-static Transport Format Information 10.3.5.11	

Condition	Explanation
dynamicTTI	This IE is included if dynamic TTI usage is indicated in IE Transmission Time Interval in Semi-static Transport Format Information. Otherwise it is not needed.
UL-RLCLogicalChannels	If "Number of uplink RLC logical channels" in IE "RB mapping info" in this message is 2 or the IE "RB mapping info" is not present in this message and 2 UL logical channels are configured for this RB, then this IE is present. Otherwise this IE is not needed.

NOTE: The parameter "rate matching attribute" is in line with the RAN WG1 specifications. However, it is not currently in line with the description in [34].

~~NOTE 1: The first instance of the parameter *Number of TBs and TTI List* within the *Dynamic transport format information* correspond to transport format 0 for this transport channel, the second to transport format 1 and so on. The total number of configured transport formats for each transport channel does not exceed <maxTF>.~~

~~NOTE 2: For dedicated channels, 'RLC size' reflects RLC PDU size. In FDD for common channels 'RLC size' reflects actual TB size. In TDD for common channels since MAC headers are not octet aligned, to calculate TB size the MAC header bit offset is added to the specified size (similar to the dedicated case). Therefore for TDD DCH TrCHs the 4 bit C/T is added if MAC multiplexing is applied, for FACH the 3 bit TCTF offset is added and for RACH the 2 bit TCTF offset is added.~~

~~NOTE 3: If the number of transport blocks <> 0, and Optional IE "CHOICE RLC mode" or "CHOICE Transport block size is absent, it implies that no RLC PDU data exists but only parity bits exist. If the number of transport blocks = 0, it implies that neither RLC PDU data nor parity bits exist. In order to ensure the possibility of CRC based Blind Transport Format Detection, UTRAN should configure a transport format with number of transport block <> 0, with a zero-size transport block.~~

14.10 Calculated Transport Format Combination

The Calculated Transport Format Combination (CTFC) is a tool for efficient signalling of transport format combinations.

Let *I* be the number of transport channels that are included in the transport format combination. Each transport channel $TrCH_i$, $i = 1, 2, \ldots, I$, has L_i transport formats, i.e. the transport format indicator TFI_i can take L_i values, $TFI_i \in \{0,1,2,...,L_i - 1\}$.

Define $P_i = \prod_{j=0}^{i-1} L_j$ *, where i = 1, 2, …, I, and* $L_0 = 1$.

Let $TFC(TFI_1, TFI_2, \ldots, TFI_I)$ be the transport format combination for which $TrCH_1$ has transport format TFI_1, $TrCH_2$ has transport format TFI_2, etc. The corresponding $CTFC(TFI_1, TFI_2, \ldots, TFI_I)$ is then computed as:

$$CTFC(TFI_1, TFI_2, \ldots, TFI_I) = \sum_{i=1}^{I} TFI_i \cdot P_i .$$

~~For downlink common CH, "TrCHi" is numbered with ascending integer numbers starting from 1 in the order listed in a SYSTEM INFORMATION message.~~

For FACH and PCH transport channels, "$TrCH_1$" corresponds to the transport channel listed at the first position in IE "FACH/PCH information" in IE "Secondary CCPCH System Information", "$TrCH_2$" corresponds to the transport channel listed at the second position in IE "FACH/PCH information" and so on.

~~In all other cases, for each separate TFCI field, "TrCHi" is numbered with ascending integer numbers starting from 1 in the ascending order of transport channel identities of the channels mapped to that TFCI field.~~

For all other transport channels, "$TrCH_1$" corresponds to the transport channel having the lowest transport channel identity in the transport format combination mapped to the TFCI field in FDD, and for all configured transport channels of the transport channel type (i.e DCH, DSCH, USCH) in TDD.~~,~~. "$TrCH_2$" corresponds to the transport channel having the next lowest transport channel identity, and so on.

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, 21st – 25th May 2001

R2-011228

CR-Form-v4

CHANGE REQUEST

⌘ **25.331** **CR** **739** ⌘ rev **r1** ⌘ Current version: **3.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	TFC Subsets in TDD
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	22-5-01
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	In TDD multiple CCTrCH's may exist. It is necessary that TFC Subset's are signalled independently for each.
Summary of change:	⌘	The default of the existing TFC Subset (for all CCTrCH in TDD) is the complete set for each. Therefore the existing IE can be maintained to allow for backward compatibility in FDD and just not used in TDD. Then TFC Subsets for each CCTrCH in TDD can be indicated in the TDD Individual UL CCTrCH information.
Consequences if not approved:	⌘	TFC Subset signalling can not be applied in TDD CCTrCH establishment when more then one CCTrCH exists. Backward compatibility: Backward compatibility is only achieved for FDD.

Clauses affected:	⌘	10.3.5.24, 11
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

10.3.5.24 UL Transport channel information common for all transport channels

Information Element/Group name	Need	Multi	Type and reference	Semantics description
~~TFC subset~~	~~MD~~		~~Transport Format Combination Subset 10.3.5.22~~	~~Default value is the complete existing set of transport format combinations~~
PRACH TFCS	OP		Transport format combination set 10.3.5.20	This IE should be absent within IE "Predefined RB configuration"
CHOICE *mode*	OP			
>FDD				
>>TFC subset	MD		Transport Format Combination Subset 10.3.5.22	Default value is the complete existing set of transport format combinations
>>UL DCH TFCS	MP		Transport formation combination set 10.3.5.20	
>TDD				
>>Individual UL CCTrCH information	OP	1 to <maxCCTrCH>		
>>>UL TFCS Identity	MP		Transport format combination set identity 10.3.5.21	Identifies a special CCTrCH for shared or dedicated channels.
>>>UL TFCS	MP		Transport format combination set 10.3.5.20	
>>>TFC subset	MD		Transport Format Combination Subset 10.3.5.22	Default value is the complete existing set of transport format combinations

11.3 Information element definitions

```
-- **************************************************
--
--     TRANSPORT CHANNEL INFORMATION ELEMENTS (10.3.5)
--
-- **************************************************

IndividualDL-CCTrCH-InfoList ::=    SEQUENCE (SIZE (1..maxCCTrCH)) OF
                                        IndividualDL-CCTrCH-Info

IndividualUL-CCTrCH-Info ::=        SEQUENCE {
    ul-TFCS-Identity                    TFCS-Identity,
    ul-TFCS                             TFCS,
    tfc-Subset                          TFC-Subset
}



UL-CommonTransChInfo ::=            SEQUENCE {
    tfc-Subset                          TFC-Subset                          OPTIONAL,
    -- TABULAR: this tfc-subset IE is applicable to FDD only, TDD specifies tfc-subset in individual
    -- CCTrCH Info.
```

```
    prach-TFCS                          TFCS                                OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            ul-TFCS                         TFCS
        },
        tdd                                 SEQUENCE {

            individualUL-CCTrCH-InfoList        IndividualUL-CCTrCH-InfoList
                                                                            OPTIONAL,
            ul-TFCS                             TFCS
        }
    }                                                                       OPTIONAL
}
```

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, 21st – 25th May 2001

R2-011229

CR-Form-v4

CHANGE REQUEST

⌘ **25.331** **CR** **740** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	TFC Subsets in TDD
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	22-5-01
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	In TDD multiple CCTrCH's may exist. It is necessary that TFC Subset's are signalled independently for each.
Summary of change:	⌘	The default of the existing TFC Subset (for all CCTrCH in TDD) is the complete set for each. Therefore the existing IE can be maintained to allow for backward compatibility in FDD and just not used in TDD. Then TFC Subsets for each CCTrCH in TDD can be indicated in the TDD Individual UL CCTrCH information.
Consequences if not approved:	⌘	TFC Subset signalling can not be applied in TDD CCTrCH establishment when more then one CCTrCH exists. Backward compatibility: Backward compatibility is only achieved for FDD.

Clauses affected:	⌘	10.3.5.24, 11
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

10.3.5.24 UL Transport channel information common for all transport channels

Information Element/Group name	Need	Multi	Type and reference	Semantics description
~~TFC subset~~	~~MD~~		~~Transport Format Combination Subset 10.3.5.22~~	~~Default value is the complete existing set of transport format combinations~~
PRACH TFCS	OP		Transport format combination set 10.3.5.20	This IE should be absent within IE "Predefined RB configuration"
CHOICE *mode*	OP			
>FDD				
>>TFC subset	MD		Transport Format Combination Subset 10.3.5.22	Default value is the complete existing set of transport format combinations
>>UL DCH TFCS	MP		Transport formation combination set 10.3.5.20	
>TDD				
>>Individual UL CCTrCH information	OP	1 to <maxCCTrCH>		
>>>UL TFCS Identity	MP		Transport format combination set identity 10.3.5.21	Identifies a special CCTrCH for shared or dedicated channels.
>>>UL TFCS	MP		Transport format combination set 10.3.5.20	
>>>TFC subset	MD		Transport Format Combination Subset 10.3.5.22	Default value is the complete existing set of transport format combinations

11.3 Information element definitions

```
-- **************************************************
--
--     TRANSPORT CHANNEL INFORMATION ELEMENTS (10.3.5)
--
-- **************************************************

IndividualDL-CCTrCH-InfoList ::=    SEQUENCE (SIZE (1..maxCCTrCH)) OF
                                        IndividualDL-CCTrCH-Info

IndividualUL-CCTrCH-Info ::=        SEQUENCE {
    ul-TFCS-Identity                    TFCS-Identity,
    ul-TFCS                             TFCS,
    tfc-Subset                          TFC-Subset
}



UL-CommonTransChInfo ::=            SEQUENCE {
    tfc-Subset                          TFC-Subset                          OPTIONAL,
    -- TABULAR: this tfc-subset IE is applicable to FDD only, TDD specifies tfc-subset in individual
    -- CCTrCH Info.
```

```
    prach-TFCS                          TFCS                                OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            ul-TFCS                         TFCS
        },
        tdd                                 SEQUENCE {

            individualUL-CCTrCH-InfoList        IndividualUL-CCTrCH-InfoList
                                                                            OPTIONAL,
            ul-TFCS                             TFCS
        }
    }                                                                       OPTIONAL
}
```

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21st-25th 2001

Tdoc R2-011426

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **745** ⌘ rev **r2** ⌘ Current version: **3.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network ☐

Title:	⌘	RRC containers
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-25
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘ Rationale for original version of this CR:

- The extension of RRC information carried in containers was incomplete and inconsistent
- Inconsistencies between tabular and ASN.1 and/ or with other parts of the specification

Summary of change: ⌘ The following changes are proposed in the original version of this CR:

- The extension of RRC information carried in containers has been clarified and been added for cases where it was missing. A statement has been added that for the RRC information carried in transparent containers the same extension mechanism applies as defined for RRC messages and that both critical and non- critical extensions may be added. Also, clarification is added that the error handling is the same e.g. a procedure shall be rejected upon receiving non critical information.
- An RRC INFORMATION CONTAINER FAILURE INFO message has been introduced, which is used to notify the originator that the receiver of the RRC information carried in containers was not comprehended by the receiver. This message may be carried in transparent containers within failure messages if supported by the network interface protocols
- The RRC information has been restructured to align with the manner regular RRC messages are specified. This has been done both for the tabular and the ASN.1 definitions
- CN DRX cycle information has been added to the SRNS relocation info

The changes in r1 as compared to the original version of this CR are as follows:

- The extended UE capabilities are added to the container transferred across network interfaces
- The statement that requirements concerning the handling of the RRC messages that are carried within RRC information containers are specified in

		ch. 8, 9 is changed into an note (informative) • The ASN.1 for the information transferred between UE and other RAT's is added and the information has been aligned with 04.18 The changes in r2 as compared to the previous version of this CR are as follows: • A statement about backwards compatibility has been added <u>Backwards compatibility</u> The CR adds extensibility, generic error handling and some missing parameters (UE capability, CN DRX cycle length) to the transfer of RRC information across other interfaces • <u>Affected functions</u>: The inter RAT mobility (handover, cell change order) as well as for SRNS- relocation are affected • <u>Affected implementations</u>: it is unlikely that some implementations have assumed the missing behaviour to be as specified in the CR • <u>Rationale</u>: The specification was incomplete, procedural text and signalling parameters were missing
Consequences if not approved:	⌘	The following main problems are foreseen: • Insufficient facilities for extending RRC information in containers • Inconsistencies between tabular and ASN.1 and/ or other parts of the specification

Clauses affected:	⌘	11.5, 11.6 (new), 14.12, 14.12.1, 14.12.2, 14.12.3, 14.12.4 (new), 14.13, 14.13.1.1, 14.13.2.1, 14.13.2.2, 14.13.2.3, 14.13.2.4		
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <u>ftp://www.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

14.12 Provision and reception of RRC information between network nodes

14.12.a General

In certain cases, e.g., when performing handover to UTRAN or when performing SRNC relocation, RRC information may need to be transferred between other RATs and UTRAN or between UTRAN nodes within UTRAN. In the following, the details of the RRC information to be transferred are specified per direction.

In the following the RRC information exchanged between network nodes is sometimes referred to as RRC information containers. This term is used for information which handling resembles that of RRC messages rather than of RRC information elements.

In future versions of this specification, it is possible to extend the RRC information transferred between network nodes. For RRC information containers the same extension mechanism applies as defined for RRC messages, which is specified in 10.1. For RRC information containers specified in the following, both critical and non-critical extensions may be added.

Like for the Uu interface, the transfer syntax for RRC transferred between UTRAN network nodes and/or between UTRAN and other RATs is derived from their ASN.1 definitions by use of Packed Encoding Rules, unaligned (X.691). It should be noted that the encoder adds final padding to achieve octet alignment. The resulting octet string is, carried in a container, transferred between the network nodes.

14.12.b General error handling for RRC information containers

The handling of RRC messages that are terminated in the UE and transferred using RRC information containers is covered by clause 8 and 9 of this specification.

The error handling for RRC information containers that are terminated in network nodes applies the same principles as defined for RRC messages, as specified in the following.

Although the same principles apply for network nodes receiving unknown, unforeseen and erroneous RRC information containers, although the notification of the error should be done in a different manner, as specified in the following:

The network node receiving an invalid RRC information container from another network node should:

- if the received RRC information container was unknown, unforeseen or erroneous:
  - prepare an RRC INFORMATION CONTAINER FAILURE INFO message, including the IE "Failure cause" set to “Protocol error” and the IE "Protocol error information" including an IE "Protocol error cause" which should be set as follows:
    - to "ASN.1 violation or encoding error" upon receiving an RRC information container for which the encoded message does not result in any valid abstract syntax value;
    - to " Message type non-existent or not implemented" upon receiving an uknown RRC information container type;
    - to "Message extension not comprehended" upon receiving an RRC information container including an undefined critical message extension;
    - to "Information element value not comprehended" upon receiving an RRC information container including an mandatory IE for which no default value is defined and for which either the value is set to spare or for which the encoded IE does not result in a valid transfer syntax. The same applies for conditional IEs, for which the conditions for presence are met, the IE is present but has a value set to spare or for which the encoded IE does not result in a valid transfer syntax;
    - to "Conditional information element error" upon receiving an RRC information container with an absent conditional IE for which the conditions for presence are met;

- if there was another failure to perform the operation requested by the received RRC information container:
  - prepare an RRC INFORMATION CONTAINER FAILURE INFO message, including the IE "Failure cause" set to a value that reflects the failure cause;
- send the RRC INFORMATION CONTAINER FAILURE INFO information container to the network node from which the invalid RRC protocol information was received.

NOTE: The RRC information container may be transferred across the network interfaces by means of a transparent container, if available.

14.12.1 RRC Information to target RNC

RRC Information to target RNC may either be sent from source RNC or from another RAT. In case of handover to UTRAN, this information originates from another RAT, while in case of SRNC relocation the RRC information originates from the source RNC. In case of SRNC information, the RRC information transferred specifies the configuration of RRC and the lower layers it controls, e.g., including the radio bearer and transport channel configuration. It is used by the target RNC to initialise RRC and the lower layer protocols to facilitate SRNC relocation in a manner transparent to the UE.

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
CHOICE case	MP			At least one spare choice, Criticality: Reject, is needed
>Handover to UTRAN			HANDOVER TO UTRAN INFO 14.12.4.1	
>SRNC relocation			SRNS RELOCATION INFO14.12.4.2	

HANS – Please note that the followin section is not in the right place

14.12.4 RRC information containers exchanged between network nodes

14.12.4.1 HANDOVER TO UTRAN INFO

This RRC information container is sent between network nodes when preparing for an inter RAT handover to UTRAN.

Direction: source RAT→target RNC

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
UE Information elements				
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
Non RRC IEs				
UE system specific capability	OP		UE system specific capability 14.13.2.4	
UE security information	OP		UE security information 14.13.2.2	
Pre-defined configuration status information	OP		Pre-defined configuration status information 14.13.2.3	

14.12.4.1 SRNS RELOCATION INFO

This RRC information container is sent between network nodes when preparing for an SRNS relocation.

Direction: source RAT→target RNC

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
Non RRC IEs				
~~CHOICE case~~	~~MP~~			
~~>Handover to UTRAN~~				
~~>>UE radio access capability~~	~~OP~~		~~UE radio access capability 10.3.3.42~~	
~~>>UE system specific capability~~	~~OP~~		~~UE system specific capability 14.13.2.4~~	
~~>>UE security information~~	~~OP~~		~~UE security information 14.13.2.2~~	
~~>>Pre-defined configuration status information~~	~~OP~~		~~Pre-defined configuration status information 14.13.2.3~~	
~~>SRNC relocation~~				
>>State of RRC	MP		~~Enumerated (CELL_DCH, CELL_FACH,CELL_PCH, URA_PCH)~~RRC state indicator, 10.3.3.10	
>>State of RRC procedure	MP		Enumerated (await no RRC message, Complete, await RB Setup Complete, await RB Reconfiguration Complete, await RB Release Complete, await Transport CH Reconfiguration Complete, await Physical CH Reconfiguration Complete, await Active Set Update Complete, await Handover Complete, send Cell Update Confirm, send URA Update Confirm, , others)	
Ciphering related information				
>>Ciphering status	MP		Enumerated(Not started, Started)	
>>Calculation time for ciphering related information	CV *Ciphering*			Time when the ciphering information of the message were calculated, relative to a cell of the target RNC
>>>Cell Identity	MP		Cell Identity 10.3.2.2	Identity of one of the cells under the target RNC and included in the active set of the current call
>>>SFN	MP		Integer(0..4095)	
>>COUNT-C list	CV *Ciphering*	1 to <maxCN domains >		COUNT-C values for radio bearers using transparent mode RLC
>>>CN domain identity	MP		CN domain identity 10.3.1.1	
>>>COUNT-C	MP		Bitstring(32)	
>>Ciphering info per radio bearer	OP	1 to <maxRB >		For signalling radio bearers this IE is mandatory.

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
>>>RB identity	MP		RB identity 10.3.4.16	
>>>Downlink HFN	MP		Bitstring(20..25)	This IE is either RLC AM HFN (20 bits) or RLC UM HFN (25 bits)
>>>Uplink HFN	MP		Bitstring(20..25)	This IE is either RLC AM HFN (20 bits) or RLC UM HFN (25 bits)
Integrity protection related information				
>>Integrity protection status	MP		Enumerated(Not started, Started)	
>>Signalling radio bearer specific integrity protection information	CV *IP*	4 to <maxSRBsetup>		
>>>Uplink RRC HFN	MP		Bitstring (28)	
>>>Downlink RRC HFN	MP		Bitstring (28)	
>>>Uplink RRC Message sequence number	MP		Integer (0..15)	
>>>Downlink RRC Message sequence number	MP		Integer (0..15)	
>>Implementation specific parameters	OP		Bitstring (1..512)	
RRC IEs				
UE Information elements				
>>U-RNTI	MP		U-RNTI 10.3.3.47	
>>C-RNTI	OP		C-RNTI 10.3.3.8	
>>UE radio access Capability	MP		UE radio access capability 10.3.3.42	
>UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
Other Information elements				
>UE system specific capability	**OP**	**1 to <maxSystemCapability>**		
>>Inter-RAT UE radio access capability	**MP**		**Inter-RAT UE radio access capability 10.3.8.7**	
~~>>Inter System message (inter system classmark)~~	~~OP~~		~~Inter-RAT message 10.3.8.8~~	
UTRAN Mobility Information elements				
>>URA Identifier	OP		URA identity 10.3.2.6	
CN Information Elements				
>>CN common GSM-MAP NAS system information	MP		NAS system information (GSM-MAP) 10.3.1.9	
>>CN domain related information	OP	1 to <MaxCN domains>		CN related information to be provided for each CN domain
>>>CN domain identity	MP			
>>>CN domain specific GSM-MAP NAS system info	MP		NAS system information (GSM-MAP) 10.3.1.9	

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
>>CN domain specific DRX cycle length coefficient	MP		CN domain specific DRX cycle length coefficient, 10.3.3.6	
Measurement Related Information elements				
>>For each ongoing measurement reporting	OP	1 to <MaxNo OfMeas>		
>>>Measurement Identity	MP		Measurement identity 10.3.7.48	
>>>Measurement Command	MP		Measurement command 10.3.7.46	
>>>Measurement Type	CV Setup		Measurement type 10.3.7.50	
>>>Measurement Reporting Mode	OP		Measurement reporting mode 10.3.7.49	
>>>Additional Measurements list	OP		Additional measurements list 10.3.7.1	
>>>CHOICE Measurement	OP			
>>>>Intra-frequency				
>>>>>Intra-frequency cell info	OP		Intra-frequency cell info list 10.3.7.33	
>>>>>Intra-frequency measurement quantity	OP		Intra-frequency measurement quantity 10.3.7.38	
>>>>>Intra-frequency reporting quantity	OP		Intra-frequency reporting quantity 10.3.7.41	
>>>>>Reporting cell status	OP		Reporting cell status 10.3.7.61	
>>>>>Measurement validity	OP		Measurement validity 10.3.7.51	
>>>>>CHOICE report criteria	OP			
>>>>>>Intra-frequency measurement reporting criteria			Intra-frequency measurement reporting criteria 10.3.7.39	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>Inter-frequency				
>>>>>Inter-frequency cell info	OP		Inter-frequency cell info list 10.3.7.13	
>>>>>Inter-frequency measurement quantity	OP		Inter-frequency measurement quantity 10.3.7.18	
>>>>>Inter-frequency reporting quantity	OP		Inter-frequency reporting quantity 10.3.7.21	
>>>>>Reporting cell status	OP		Reporting cell status 10.3.7.61	
>>>>>Measurement validity	OP		Measurement validity 10.3.7.51	
>>>>>CHOICE report criteria	OP			
>>>>>>Inter-frequency measurement reporting criteria			Inter-frequency measurement reporting criteria 10.3.7.19	
>>>>>>Periodical reporting			Periodical reporting	

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
			criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>Inter-RAT				
>>>>>Inter-RAT cell info	OP		Inter-RAT cell info list 10.3.7.23	
>>>>>Inter-RAT measurement quantity	OP		Inter-RAT measurement quantity 10.3.7.29	
>>>>>Inter-RAT reporting quantity	OP		Inter-RAT reporting quantity 10.3.7.32	
>>>>>Reporting cell status	OP		Reporting cell status 10.3.7.61	
>>>>>Measurement validity	OP		Measurement validity 10.3.7.51	
>>>>>CHOICE report criteria	OP			
>>>>>>Inter-RAT measurement reporting criteria			Inter-RAT measurement reporting criteria 10.3.7.30	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>Traffic Volume				
>>>>>Traffic volume measurement Object	OP		Traffic volume measurement object 10.3.7.70	
>>>>>Traffic volume measurement quantity	OP		Traffic volume measurement quantity 10.3.7.71	
>>>>>Traffic volume reporting quantity	OP		Traffic volume reporting quantity 10.3.7.74	
>>>>>CHOICE report criteria	OP			
>>>>>>Traffic volume measurement reporting criteria			Traffic volume measurement reporting criteria 10.3.7.72	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>Quality				
>>>>>Quality measurement Object	OP		Quality measurement object	
>>>>>CHOICE report criteria	OP			
>>>>>>Quality measurement reporting criteria			Quality measurement reporting criteria 10.3.7.58	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>UE internal				
>>>>>UE internal measurement quantity	OP		UE internal measurement quantity 10.3.7.79	
>>>>>UE internal reporting quantity	OP		UE internal reporting quantity 10.3.7.82	
>>>>>CHOICE report criteria	OP			
>>>>>>UE internal measurement reporting criteria			UE internal measurement reporting	

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
			criteria 10.3.7.80	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>UE positioning				
>>>>>LCS reporting quantity	OP		LCS reporting quantity 10.3.7.111	
>>>>>CHOICE report criteria	OP			
>>>>>>LCS reporting criteria			LCS reporting criteria 10.3.7.110	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting				
Radio Bearer Information Elements				
>>Pre-defined configuration status information	OP		Pre-defined configuration status information 14.13.2.3	
>>Signalling RB information list	MP	1 to <maxSRBsetup>		For each signalling radio bearer
>>>Signalling RB information	MP		Signalling RB information to setup 10.3.4.24	
>>RAB information list	OP	1 to <maxRABsetup>		Information for each RAB
>>>RAB information	MP		RAB information to setup 10.3.4.10	
Transport Channel Information Elements				
Uplink transport channels				
>>UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24	
>>UL transport channel information list	OP	1 to <MaxTrCH>		
>>>UL transport channel information	MP		Added or reconfigured UL TrCH information 10.3.5.2	
>>CHOICE mode	OP			
>>>FDD				
>>>>CPCH set ID	OP		CPCH set ID 10.3.5.5	
>>>>Transport channel information for DRAC list	OP	1 to <MaxTrCH>		
>>>>>DRAC static information	MP		DRAC static information 10.3.5.7	
>>>TDD				(no data)
Downlink transport channels				
>>DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6	
>>DL transport channel information list	OP	1 to <MaxTrCH>		
>>>DL transport channel	MP		Added or reconfigured	

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
information			DL TrCH information 10.3.5.1	
>>Measurement report	OP		MEASUREMENT REPORT 10.2.17	
~~>spare~~				~~(no data) Criticality: reject~~

Multi Bound	Explanation
MaxNoOfMeas	Maximum number of active measurements, upper limit 16

Condition	Explanation
Setup	The IE is mandatory when the IE Measurement command has the value "Setup", otherwise the IE is not needed.
Ciphering	The IE is mandatory when the IE Ciphering Status has the value "started" and the ciphering counters need not be reinitialised, otherwise the IE is not needed.
IP	The IE is mandatory when the IE Integrity protection status has the value "started" and the integrity protection counters need not be reinitialised, otherwise the IE is not needed.
PDCP	The IE is mandatory when the PDCP Info IE is present, otherwise the IE is not needed.

14.12.4.3 RRC INFORMATION CONTAINER FAILURE INFO

This RRC information container is sent between network nodes to provide information about the cause for failure to perform the requested operation.

Direction: target RNC→source RNC, source RAT

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
Other Information elements				
Failure cause	MP		Failure cause 10.3.3.13	
Protocol error information	CV-*ProtErr*		Protocol error information 10.3.8.12	

Condition	Explanation
ProtErr	Presence is mandatory if the IE "Failure cause" has the value "Protocol error"; otherwise the element is not needed in the message.

14.12.2 RRC information, target RNC to source RNC

There are 2 possible cases for RNC relocation:

1. The UE is already under control of target RNC; and
2. The SRNC Relocation with Hard Handover (UE still under control of SRNC), but UE is moving to a location controlled by the target RNC (based on measurement information).

In case 1 the relocation is transparent to the UE and there is no "reverse" direction container. The SRNC just assigns the 'serving' function to the target RNC, which then becomes the Serving RNC.

In case 2 the relocation is initiated by SRNC, which also provides the RRC Initialisation Information to the target RNC. Base on this information, the target RNC prepares the Hard Handover Message ("Physical channel reconfiguration" (subclause 8.2.6), "radio bearer establishment" (subclause 8.2.1), "Radio bearer reconfiguration" (subclause 8.2.2), "Radio bearer release" (subclause 8.2.3) or "Transport channel reconfiguration" (subclause 8.2.4).

The source RNC then transmits the Handover Message to the UE, which then performs the handover.

In the successful case, the UE transmits an XXX COMPLETE message, using the new configuration, to the target RNC.

In case of failure, the UE transmits an XXX FAILURE, using the old configuration, to the source RNC and the RRC context remains unchanged (has to be confirmed and checked with the SRNS relocation procedure).

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *RRC message*	MP			At least one spare choice, Criticality: Reject, is needed
>RADIO BEARER SETUP			RADIO BEARER SETUP 10.2.31	
>RADIO BEARER RECONFIGURATION			RADIO BEARER RECONFIGURATION 10.2.25	
>RADIO BEARER RELEASE			RADIO BEARER RELEASE 10.2.28	
>TRANSPORT CHANNEL RECONFIGURATION			TRANSPORT CHANNEL RECONFIGURATION 10.2.51	
>PHYSICAL CHANNEL RECONFIGURATION			PHYSICAL CHANNEL RECONFIGURATION 10.2.20	
>RRC INFORMATION CONTAINER FAILURE INFO			RRC INFORMATION CONTAINER FAILURE INFO 14.12.4.3	

14.12.3 RRC information, target RNC to source system

The RRC information, target RNC to source system is used to transfer information to another RAT, e.g., in case of handover to UTRAN. In this case, the RRC information concerns the "Handover To UTRAN Command" that is compiled by the target RNC but transferred via another RAT towards the UE, as specified in 8.3.6.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *case*	MP			At least one spare choice, Criticality: Reject, is needed
>handover to UTRAN			HANDOVER TO UTRAN COMMAND 10.2.10	
> RRC INFORMATION CONTAINER FAILURE INFO ~~spare~~			RRC INFORMATION CONTAINER FAILURE INFO 14.12.4.3	~~(no data) Criticality: reject~~

14.13 RRC information transferred between UE and other systems

14.13.0 General

This subclause specifies RRC information that is exchanged between other systems and the UE. This information is transferred via another RAT in accordance with the specifications applicable for those systems. This subclause specifies the UTRAN RRC information applicable for the different information flows.

NOTE Currently RRC information containers, using the RRC protocol extension mechanism, are not used for information transferred between UE and another RAT

Like for the Uu interface, the transfer syntax for RRC transferred between UE and other RATs is derived from their ASN.1 definitions by use of Packed Encoding Rules, unaligned (X.691). It should be noted that the encoder adds final padding to achieve octet alignment. The resulting octet string is transferred across the other RAT as defined in the specifications applicable for that RAT.

14.13.1 RRC information, another RAT to UE

14.13.1.1 ~~Pre-defined configuration information~~(Void)

~~Another system may provide the UE with one or more pre- defined UTRAN configurations, comprising of radio bearer, transport channel and physical channel parameters. The UE shall store the information, and use it upon handover to UTRAN if requested to do so within the HANDOVER TO UTRAN COMMAND message. The pre- defined configuration information includes the following RRC information.~~

~~Information Element/Group name~~	~~Need~~	~~Multi~~	~~Type and reference~~	~~Semantics description~~
~~RB information elements~~				
~~Predefined radio configurations~~		~~1 to <maxPredefConfigCount>~~		
~~>Predefined configuration identity~~	~~MP~~		~~Predefined configuration identity 10.3.4.5~~	
~~>Predefined configuration value tag~~	~~OP~~		~~Predefined configuration value tag 10.3.4.6~~	
~~UE information elements~~				
~~Re-establishment timer~~	~~MP~~		~~Re-establishment timer 10.3.3.30~~	
~~RB information elements~~				
~~>Predefined RB configuration~~	~~MP~~		~~Predefined RB configuration 10.3.4.7~~	
~~TrCH Information Elements~~				
~~>Predefined TrCH configuration~~	~~MP~~		~~Predefined TrCH configuration 10.3.5.9~~	
~~PhyCH Information Elements~~				
~~>Predefined PhCH configuration~~	~~MP~~		~~Predefined PhyCH configuration 10.3.6.56~~	

Multi Bound	Explanation
MaxPredefConfigCount	Maximum number of predefined configurations

14.13.2 RRC information, UE to another RAT

14.13.2.1 UE capability information

Upon receiving a UE information request from another system, the UE shall indicate the requested capabilities. The UE capability information includes the following RRC information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE information elements				
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	

14.13.2.2 UE security information

Upon receiving a UE information request from another system, the UE shall indicate the requested security information. The UE security information includes the following RRC information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE information elements				
START list	MP	1 to <MaxCNdomains>		START values for all CN domains
>CN domain identity	MP		CN domain identity 10.3.1.1	
>START-CS	MP		START 10.3.3.38	START values to be used in this CN domain.

14.13.2.3 Pre-defined configuration status information

Another system may provide the UE with one or more pre- defined UTRAN configurations, comprising of radio bearer, transport channel and physical channel parameters. If requested, the UE shall indicate the configurations it has stored. The pre-defined configuration status information should include the following RRC information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB information elements				
Predefined configurations		1 to <maxPredefConfigCount>		The list is in order of preconfiguration identity
>Predefined configuration value tag	OP		Predefined configuration value tag 10.3.4.6	The UE shall include the value tag if it has stored the concerned configuration

Multi Bound	Explanation
MaxPredefConfigCount	Maximum number of predefined configurations

14.13.2.4 ~~UE system specific capability~~(Void)

~~This Information Element contains capability information concerning other Radio Access Technologies.~~

~~Information Element/Group name~~	~~Need~~	~~Multi~~	~~Type and reference~~	~~Semantics description~~
~~UE system specific capability~~	~~OP~~	~~1 to <maxSystemCapability>~~		
~~>Inter-RAT UE radio access capability~~	~~MP~~		~~Inter-RAT UE radio access capability 10.3.8.7~~	

11.5 RRC information between network nodes

```
Internode-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

    HandoverToUTRANCommand-r3,
    MeasurementReport,
    PhysicalChannelReconfiguration-r3,
    RadioBearerReconfiguration-r3,
    RadioBearerRelease-r3,
    RadioBearerSetup-r3,
    TransportChannelReconfiguration-r3,
    UECapabilityInformation
FROM PDU-definitions

-- Core Network IEs :
    CN-DomainIdentity,
    CN-DomainInformationList,
    NAS-SystemInformationGSM-MAP,
-- UTRAN Mobility IEs :
    CellIdentity,
    URA-Identity,
-- User Equipment IEs :
    C-RNTI,
    FailureCauseWithProtErr,
    RRC-MessageSequenceNumber,
    U-RNTI,
    UE-RadioAccessCapability,
-- Radio Bearer IEs :
    PDCP-InfoReconfig,
    PredefinedConfigValueTag,
    RAB-InformationSetupList,
    RB-Identity,
    RB-MappingInfo,
    RLC-Info,
    SRB-InformationSetupList,
-- Transport Channel IEs :
    CPCH-SetID,
    DL-CommonTransChInfo,
    DL-AddReconfTransChInfoList,
    DRAC-StaticInformationList,
    UL-CommonTransChInfo,
    UL-AddReconfTransChInfoList,
-- Measurement IEs :
    MeasurementIdentity,
    MeasurementReportingMode,
    MeasurementType,
    AdditionalMeasurementID-List,
-- Other IEs :
    InterRAT-UE-RadioAccessCapabilityListInterRATMessage
FROM InformationElements

    maxCNdomains,
    maxNoOfMeas,
    maxPredefConfig,
    maxRABsetup,
    maxRB,
    maxSRBsetup,
    maxTrCH
FROM Constant-definitions;

-- Part 1: Class definitions similar to what has been defined in 11.1 for RRC messages
-- Information that is tranferred in the same direction and across the same path is grouped
-- RRC information transferred between network nodes,
-- per group of information transfers having same endpoint
-- Alike class definitions for RRC PDUs

-- **************************************************
--
-- RRC information, to target RNC
--
-- **************************************************
-- RRC Information to target RNC sent either from source RNC or from another RAT
```

```
ToTargetRNC-Container ::= CHOICE {
    handoverToUTRAN                     HandoverToUTRANInfo-r3,
    srncRelocation                      SRNC-RelocationInfo-r3,
    extension                           NULL
}

-- **************************************************
--
-- RRC information, target RNC to source RNC
--
-- **************************************************

T-RNC-ToSRNC-Container ::= SEQUENCE {
    message             T-RNC-ToSRNC-ContainerType
}

TargetT-RNC-ToSourceRNC-ContainerType::= CHOICE {
    radioBearerSetup                    RadioBearerSetup-r3,
    radioBearerReconfiguration          RadioBearerReconfiguration-r3,
    radioBearerRelease                  RadioBearerRelease-r3,
    transportChannelReconfiguration     TransportChannelReconfiguration-r3,
    physicalChannelReconfiguration      PhysicalChannelReconfiguration-r3,
    rrc-InformationContainerFailureInfo RRC-InformationContainerFailureInfo-r3
    extension                           NULL
}

-- **************************************************
--
-- RRC information, target RNC to source RAT
--
-- **************************************************

TargetRNC-ToSourceRAT-Container::= CHOICE {
    handoverToUTRAN                     HandoverToUTRANCommand-r3,
    rrc-InformationContainerFailureInfo RRC-InformationContainerFailureInfo-r3
    extension                           NULL
}

-- Part 2: Container definitions, similar to alike the PDU definitions in 11.2 for RRC messages
-- RRC Container definition, to target RNCIn alphabetical order


-- **************************************************
--
-- Handover to UTRAN information
--
-- **************************************************

HandoverToUTRANInfo-r3 ::= CHOICE {
    r3                                  SEQUENCE {
        handoverToUTRANInfo-r3          HandoverToUTRANInfo-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    criticalExtensions              SEQUENCE {}
}

HandoverToUTRANInfo-r3-IEs::=       SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability        UE-RadioAccessCapability                OPTIONAL,
        startList                       STARTList                               OPTIONAL,
    --  Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
        predefinedConfigStatusList      PredefinedConfigStatusList              OPTIONAL
}

-- **************************************************
--
-- RRC information container failure info
--
-- **************************************************

RRC-InformationContainerFailureInfo-r3 ::= CHOICE {
    r3                                      SEQUENCE {
        rRC-InformationContainerFailureInfo-r3      RRC-InformationContainerFailureInfo-r3-IEs,
        nonCriticalExtensions                       SEQUENCE {} OPTIONAL
    },
    criticalExtensions                      SEQUENCE {}
```

```
}

RRC-InformationContainerFailureInfo-r3-IEs ::=      SEQUENCE {
    -- Non-RRC IEs
        failureCauseWithProtErr         FailureCauseWithProtErr
}

-- **************************************************
--
-- SRNC Relocation information
--
-- **************************************************

SRNC-RelocationInfo-r3 ::= CHOICE {
    r3                              SEQUENCE {
        sRNC-RelocationInfo-r3          SRNC-RelocationInfo-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    criticalExtensions              SEQUENCE {}
}

SRNC-RelocationInfo-r3-IEs ::=              SEQUENCE {
    -- Non-RRC IEs
        stateOfRRC                      StateOfRRC,
        stateOfRRC-Procedure            StateOfRRC-Procedure,
        cipheringStatus                 CipheringStatus,
        calculationTimeForCiphering     CalculationTimeForCiphering         OPTIONAL,
        cipheringInfoPerRB-List         CipheringInfoPerRB-List             OPTIONAL,
        count-C-List                    COUNT-C-List                        OPTIONAL,
        integrityProtectionStatus       IntegrityProtectionStatus,
        srb-SpecificIntegrityProtInfo   SRB-SpecificIntegrityProtInfoList,
        implementationSpecificParams    ImplementationSpecificParams        OPTIONAL,
    -- User equipment IEs
        u-RNTI                          U-RNTI,
        c-RNTI                          C-RNTI                              OPTIONAL,
        ue-RadioAccessCapability        UE-RadioAccessCapability,
    -- Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
        interRATMessage             InterRATMessage                 OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Core network IEs
        cn-CommonGSM-MAP-NAS-SysInfo    NAS-SystemInformationGSM-MAP,
        cn-DomainInformationList        CN-DomainInformationList            OPTIONAL,
    -- Measurement IEs
        ongoingMeasRepList              OngoingMeasRepList                  OPTIONAL,
    -- Radio bearer IEs
        predefinedConfigStatusListpreConfigStatusInfo
PredefinedConfigStatusListPreConfigStatusInfo,
        srb-InformationList             SRB-InformationSetupList,
        rab-InformationList             RAB-InformationSetupList            OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-TransChInfoList              UL-AddReconfTransChInfoList         OPTIONAL,
        modeSpecificInfo                CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                  OPTIONAL,
                transChDRAC-Info                DRAC-StaticInformationList  OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonTransChInfo            DL-CommonTransChInfo                OPTIONAL,
        dl-TransChInfoList              DL-AddReconfTransChInfoList         OPTIONAL,
    -- Measurement report
        measurementReport               MeasurementReport                   OPTIONAL
}

-- RRC Container definition, target RNC to source RNC
-- Nothing new, only re-using RRC PDUs
--
-- RRC Container definition, target RNC to source system
-- Nothing new, re-using RRC PDUs (HandoverToUTRANCommand)

-- IE definitions

CalculationTimeForCiphering ::=     SEQUENCE {
    cell-Id                             CellIdentity,
    sfn                                 INTEGER (0..4095)
```

```
}

CipheringInfoPerRB ::=              SEQUENCE {
    dl-HFN                              BIT STRING (SIZE (20..25)),
    ul-HFN                              BIT STRING (SIZE (20..25))
}

-- TABULAR: Multiplicity value numberOfRadioBearers has been replaced
-- with maxRB.
CipheringInfoPerRB-List ::=         SEQUENCE (SIZE (1..maxRB)) OF
                                        CipheringInfoPerRB

CipheringStatus ::=                 ENUMERATED {
                                        started, notStarted }

COUNT-C-List ::=                        SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        COUNT-CSingle

COUNT-CSingle ::=                       SEQUENCE {
    cn-DomainIdentity                   CN-DomainIdentity,
    count-C                             BIT STRING (SIZE (32))
}

ImplementationSpecificParams ::=    BIT STRING (SIZE (1..512))


IntegrityProtectionStatus ::=       ENUMERATED {
                                        started, notStarted }

MeasurementCommandWithType ::=      CHOICE {
    setup                               MeasurementType,
    modify                              NULL,
    release                             NULL
}

OngoingMeasRep ::=                  SEQUENCE {
    measurementIdentity         MeasurementIdentity,
    measurementCommandWithType          MeasurementCommandWithType,
    -- TABULAR: The CHOICE Measurement in the tabular description is included
    -- in the IE above.
    measurementReportingMode            MeasurementReportingMode            OPTIONAL,
    additionalMeasurementID-List        AdditionalMeasurementID-List        OPTIONAL
}

OngoingMeasRepList ::=              SEQUENCE (SIZE (1..maxNoOfMeas)) OF
                                        OngoingMeasRep

PreConfigStatusInfo ::=             SEQUENCE (SIZE (1..maxPredefConfig)) OF
                PredefinedConfigValueTag

PredefinedConfigStatusList ::=              SEQUENCE (SIZE (16)) OF
                                            PredefinedConfigStatusInfo

PredefinedConfigStatusInfo::=       SEQUENCE {
    predefinedConfigValueTag                PredefinedConfigValueTag    OPTIONAL
    -- Absence of the IE indicates that the UE has not stored the corresponding preconfiguration
}

SRB-SpecificIntegrityProtInfo ::=   SEQUENCE {
    ul-RRC-HFN                          BIT STRING (SIZE (28)),
    dl-RRC-HFN                          BIT STRING (SIZE (28)),
    ul-RRC-SequenceNumber               RRC-MessageSequenceNumber,
    dl-RRC-SequenceNumber               RRC-MessageSequenceNumber
}

SRB-SpecificIntegrityProtInfoList ::= SEQUENCE (SIZE (4..maxSRBsetup)) OF
                                        SRB-SpecificIntegrityProtInfo

StateOfRRC ::=                      ENUMERATED {
                                        cell-DCH, cell-FACH,
                                        cell-PCH, ura-PCH }

StateOfRRC-Procedure ::=            ENUMERATED {
                                        awaitNoRRC-Message,
                                        awaitRRC-ConnectionRe-establishmentComplete,
                                        awaitRB-SetupComplete,
                                        awaitRB-ReconfigurationComplete,
                                        awaitTransportCH-ReconfigurationComplete,
```

```
                                    awaitPhysicalCH-ReconfigurationComplete,
                                    awaitActiveSetUpdateComplete,
                                    awaitHandoverComplete,
                                    sendCellUpdateConfirm,
                                    sendUraUpdateConfirm,
                                    sendRrcConnectionReestablishment,
                                    otherStates
}

END
```

11.6 RRC information between UE and other RATs

```
UEtoOtherRAT-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

-- User Equipment IEs :
    START-Value,
    UE-RadioAccessCapability,
    UE-RadioAccessCapability-v370ext,
-- Radio Bearer IEs :
    PredefinedConfigValueTag
FROM InformationElements

    maxPredefConfigCount
FROM Constant-definitions;

-- Part 1: Class definitions similar to what has been defined in 11.1 for RRC messages
-- Information that is tranferred in the same direction and across the same path is grouped

-- **************************************************
--
-- RRC information, to target RNC
--
-- **************************************************
-- RRC Information to target RNC sent either from source RNC or from another RAT

-- Currently not used

-- **************************************************
--
-- RRC information, target RNC to source RNC
--
-- **************************************************

-- Currently not used

-- **************************************************
--
-- RRC information, target RNC to source RAT
--
-- **************************************************

-- Currently not used

-- Part 2: Container definitions, similar to the PDU definitions in 11.2 for RRC messages
-- In alphabetical order


-- Currently not used

-- Part 3: Non- extensible IE definitions
-- In alphabetical order

PredefConfigStatusInfo ::=      SEQUENCE {
    predefinedConfigValueTag                PredefinedConfigValueTag
}

PredefConfigStatusInfoList ::=      SEQUENCE (SIZE (maxPredefConfigCount)) OF
                                        PredefConfigStatusInfo
}

UE-CapabilityInformation ::=            SEQUENCE {
    ue-RadioAccessCapability            UE-RadioAccessCapability,
    ue-RadioAccessCapabilityExt1        UE-RadioAccessCapability-v370ext
}

UE-SequrityInformation ::=          SEQUENCE {
    start-CS                            START-Value
}

END
```

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21st-25th 2001

Tdoc R2-011427

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **746** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network ☐

Title:	⌘	RRC containers
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-28
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘ Rationale for original version of this CR:

- The extension of RRC information carried in containers was incomplete and inconsistent
- Inconsistencies between tabular and ASN.1 and/ or with other parts of the specification

Summary of change: ⌘ The following changes are proposed in the original version of this CR:

- The extension of RRC information carried in containers has been clarified and been added for cases where it was missing. A statement has been added that for the RRC information carried in transparent containers the same extension mechanism applies as defined for RRC messages and that both critical and non- critical extensions may be added. Also, clarification is added that the error handling is the same e.g. a procedure shall be rejected upon receiving non critical information.
- An RRC INFORMATION CONTAINER FAILURE INFO message has been introduced, which is used to notify the originator that the receiver of the RRC information carried in containers was not comprehended by the receiver. This message may be carried in transparent containers within failure messages if supported by the network interface protocols
- The RRC information has been restructured to align with the manner regular RRC messages are specified. This has been done both for the tabular and the ASN.1 definitions
- CN DRX cycle information has been added to the SRNS relocation info
- The extended UE capabilities are added to the container transferred across network interfaces
- The statement that requirements concerning the handling of the RRC messages that are carried within RRC information containers are specified in ch. 8, 9 is changed into an note (informative)
- The ASN.1 for the information transferred between UE and other RAT's is

		added and the information has been aligned with 04.18 • A statement about backwards compatibility has been added Backwards compatibility The CR adds extensibility, generic error handling and some missing parameters (UE capability, CN DRX cycle length) to the transfer of RRC information across other interfaces • Affected functions: The inter RAT mobility (handover, cell change order) as well as for SRNS- relocation are affected • Affected implementations: it is unlikely that some implementations have assumed the missing behaviour to be as specified in the CR • Rationale: The specification was incomplete, procedural text and signalling parameters were missing
Consequences if not approved:	⌘	The following main problems are foreseen: • Insufficient facilities for extending RRC information in containers • Inconsistencies between tabular and ASN.1 and/ or other parts of the specification

Clauses affected:	⌘	11.5, 11.6 (new), 14.12, 14.12.1, 14.12.2, 14.12.3, 14.12.4 (new), 14.13, 14.13.1.1, 14.13.2.1, 14.13.2.2, 14.13.2.3, 14.13.2.4		
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

14.12 Provision and reception of RRC information between network nodes

14.12.a General

In certain cases, e.g., when performing handover to UTRAN or when performing SRNC relocation, RRC information may need to be transferred between other RATs and UTRAN or between UTRAN nodes within UTRAN. In the following, the details of the RRC information to be transferred are specified per direction.

In the following the RRC information exchanged between network nodes is sometimes referred to as RRC information containers. This term is used for information which handling resembles that of RRC messages rather than of RRC information elements.

In future versions of this specification, it is possible to extend the RRC information transferred between network nodes. For RRC information containers the same extension mechanism applies as defined for RRC messages, which is specified in 10.1. For RRC information containers specified in the following, both critical and non-critical extensions may be added.

Like for the Uu interface, the transfer syntax for RRC transferred between UTRAN network nodes and/or between UTRAN and other RATs is derived from their ASN.1 definitions by use of Packed Encoding Rules, unaligned (X.691). It should be noted that the encoder adds final padding to achieve octet alignment. The resulting octet string is, carried in a container, transferred between the network nodes.

14.12.b General error handling for RRC information containers

The handling of RRC messages that are terminated in the UE and transferred using RRC information containers is covered by clause 8 and 9 of this specification.

The error handling for RRC information containers that are terminated in network nodes applies the same principles as defined for RRC messages, as specified in the following.

Although the same principles apply for network nodes receiving unknown, unforeseen and erroneous RRC information containers, although the notification of the error should be done in a different manner, as specified in the following:

The network node receiving an invalid RRC information container from another network node should:

- if the received RRC information container was unknown, unforeseen or erroneous:
  - prepare an RRC INFORMATION CONTAINER FAILURE INFO message, including the IE "Failure cause" set to “Protocol error” and the IE "Protocol error information" including an IE "Protocol error cause" which should be set as follows:
    - to "ASN.1 violation or encoding error" upon receiving an RRC information container for which the encoded message does not result in any valid abstract syntax value;
    - to " Message type non-existent or not implemented" upon receiving an uknown RRC information container type;
    - to "Message extension not comprehended" upon receiving an RRC information container including an undefined critical message extension;
    - to "Information element value not comprehended" upon receiving an RRC information container including an mandatory IE for which no default value is defined and for which either the value is set to spare or for which the encoded IE does not result in a valid transfer syntax. The same applies for conditional IEs, for which the conditions for presence are met, the IE is present but has a value set to spare or for which the encoded IE does not result in a valid transfer syntax;
    - to "Conditional information element error" upon receiving an RRC information container with an absent conditional IE for which the conditions for presence are met;

- if there was another failure to perform the operation requested by the received RRC information container:
  - prepare an RRC INFORMATION CONTAINER FAILURE INFO message, including the IE "Failure cause" set to a value that reflects the failure cause;
- send the RRC INFORMATION CONTAINER FAILURE INFO information container to the network node from which the invalid RRC protocol information was received.

NOTE: The RRC information container may be transferred across the network interfaces by means of a transparent container, if available.

14.12.1 RRC Information to target RNC

RRC Information to target RNC may either be sent from source RNC or from another RAT. In case of handover to UTRAN, this information originates from another RAT, while in case of SRNC relocation the RRC information originates from the source RNC. In case of SRNC information, the RRC information transferred specifies the configuration of RRC and the lower layers it controls, e.g., including the radio bearer and transport channel configuration. It is used by the target RNC to initialise RRC and the lower layer protocols to facilitate SRNC relocation in a manner transparent to the UE.

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
CHOICE case	MP			At least one spare choice, Criticality: Reject, is needed
>Handover to UTRAN			HANDOVER TO UTRAN INFO 14.12.4.1	
>SRNC relocation			SRNS RELOCATION INFO14.12.4.2	

HANS – Please note that the followin section is not in the right place

14.12.4 RRC information containers exchanged between network nodes

14.12.4.1 HANDOVER TO UTRAN INFO

This RRC information container is sent between network nodes when preparing for an inter RAT handover to UTRAN.

Direction: source RAT→target RNC

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
UE Information elements				
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
Non RRC IEs				
UE system specific capability	OP		UE system specific capability 14.13.2.4	
UE security information	OP		UE security information 14.13.2.2	
Pre-defined configuration status information	OP		Pre-defined configuration status information 14.13.2.3	

14.12.4.1 SRNS RELOCATION INFO

This RRC information container is sent between network nodes when preparing for an SRNS relocation.

Direction: source RAT→target RNC

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
Non RRC IEs				
~~CHOICE case~~	~~MP~~			
~~>Handover to UTRAN~~				
~~>>UE radio access capability~~	~~OP~~		~~UE radio access capability 10.3.3.42~~	
~~>>UE system specific capability~~	~~OP~~		~~UE system specific capability 14.13.2.4~~	
~~>>UE security information~~	~~OP~~		~~UE security information 14.13.2.2~~	
~~>>Pre-defined configuration status information~~	~~OP~~		~~Pre-defined configuration status information 14.13.2.3~~	
~~>SRNC relocation~~				
>>State of RRC	MP		~~Enumerated (CELL_DCH, CELL_FACH,CELL_PCH, URA_PCH)~~RRC state indicator, 10.3.3.10	
>>State of RRC procedure	MP		Enumerated (await no RRC message, Complete, await RB Setup Complete, await RB Reconfiguration Complete, await RB Release Complete, await Transport CH Reconfiguration Complete, await Physical CH Reconfiguration Complete, await Active Set Update Complete, await Handover Complete, send Cell Update Confirm, send URA Update Confirm, , others)	
Ciphering related information				
>>Ciphering status	MP		Enumerated(Not started, Started)	
>>Calculation time for ciphering related information	CV *Ciphering*			Time when the ciphering information of the message were calculated, relative to a cell of the target RNC
>>>Cell Identity	MP		Cell Identity 10.3.2.2	Identity of one of the cells under the target RNC and included in the active set of the current call
>>>SFN	MP		Integer(0..4095)	
>>COUNT-C list	CV *Ciphering*	1 to <maxCN domains >		COUNT-C values for radio bearers using transparent mode RLC
>>>CN domain identity	MP		CN domain identity 10.3.1.1	
>>>COUNT-C	MP		Bitstring(32)	
>>Ciphering info per radio bearer	OP	1 to <maxRB >		For signalling radio bearers this IE is mandatory.

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
~~>>>~~RB identity	MP		RB identity 10.3.4.16	
~~>>>~~Downlink HFN	MP		Bitstring(20..25)	This IE is either RLC AM HFN (20 bits) or RLC UM HFN (25 bits)
~~>>>~~Uplink HFN	MP		Bitstring(20..25)	This IE is either RLC AM HFN (20 bits) or RLC UM HFN (25 bits)
Integrity protection related information				
~~>>~~Integrity protection status	MP		Enumerated(Not started, Started)	
~~>>~~Signalling radio bearer specific integrity protection information	CV *IP*	4 to <maxSRBsetup>		
~~>>>~~Uplink RRC HFN	MP		Bitstring (28)	
~~>>>~~Downlink RRC HFN	MP		Bitstring (28)	
~~>>>~~Uplink RRC Message sequence number	MP		Integer (0..15)	
~~>>>~~Downlink RRC Message sequence number	MP		Integer (0..15)	
~~>>~~Implementation specific parameters	OP		Bitstring (1..512)	
RRC IEs				
UE Information elements				
~~>>~~U-RNTI	MP		U-RNTI 10.3.3.47	
~~>>~~C-RNTI	OP		C-RNTI 10.3.3.8	
~~>>~~UE radio access Capability	MP		UE radio access capability 10.3.3.42	
>UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
Other Information elements				
>UE system specific capability	**OP**	**1 to <maxSystemCapability>**		
>>Inter-RAT UE radio access capability	**MP**		**Inter-RAT UE radio access capability 10.3.8.7**	
~~>>Inter System message (inter system classmark)~~	~~OP~~		~~Inter-RAT message 10.3.8.8~~	
UTRAN Mobility Information elements				
~~>>~~URA Identifier	OP		URA identity 10.3.2.6	
CN Information Elements				
~~>>~~CN common GSM-MAP NAS system information	MP		NAS system information (GSM-MAP) 10.3.1.9	
~~>>~~CN domain related information	OP	1 to <MaxCN domains>		CN related information to be provided for each CN domain
~~>>>~~CN domain identity	MP			
~~>>>~~CN domain specific GSM-MAP NAS system info	MP		NAS system information (GSM-MAP) 10.3.1.9	

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
>>CN domain specific DRX cycle length coefficient	MP		CN domain specific DRX cycle length coefficient, 10.3.3.6	
Measurement Related Information elements				
>>For each ongoing measurement reporting	OP	1 to <MaxNo OfMeas>		
>>>Measurement Identity	MP		Measurement identity 10.3.7.48	
>>>Measurement Command	MP		Measurement command 10.3.7.46	
>>>Measurement Type	CV Setup		Measurement type 10.3.7.50	
>>>Measurement Reporting Mode	OP		Measurement reporting mode 10.3.7.49	
>>>Additional Measurements list	OP		Additional measurements list 10.3.7.1	
>>>CHOICE Measurement	OP			
>>>>Intra-frequency				
>>>>>Intra-frequency cell info	OP		Intra-frequency cell info list 10.3.7.33	
>>>>>Intra-frequency measurement quantity	OP		Intra-frequency measurement quantity 10.3.7.38	
>>>>>Intra-frequency reporting quantity	OP		Intra-frequency reporting quantity 10.3.7.41	
>>>>>Reporting cell status	OP		Reporting cell status 10.3.7.61	
>>>>>Measurement validity	OP		Measurement validity 10.3.7.51	
>>>>>CHOICE report criteria	OP			
>>>>>>Intra-frequency measurement reporting criteria			Intra-frequency measurement reporting criteria 10.3.7.39	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>Inter-frequency				
>>>>>Inter-frequency cell info	OP		Inter-frequency cell info list 10.3.7.13	
>>>>>Inter-frequency measurement quantity	OP		Inter-frequency measurement quantity 10.3.7.18	
>>>>>Inter-frequency reporting quantity	OP		Inter-frequency reporting quantity 10.3.7.21	
>>>>>Reporting cell status	OP		Reporting cell status 10.3.7.61	
>>>>>Measurement validity	OP		Measurement validity 10.3.7.51	
>>>>>CHOICE report criteria	OP			
>>>>>>Inter-frequency measurement reporting criteria			Inter-frequency measurement reporting criteria 10.3.7.19	
>>>>>>Periodical reporting			Periodical reporting	

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
			criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>Inter-RAT				
>>>>>Inter-RAT cell info	OP		Inter-RAT cell info list 10.3.7.23	
>>>>>Inter-RAT measurement quantity	OP		Inter-RAT measurement quantity 10.3.7.29	
>>>>>Inter-RAT reporting quantity	OP		Inter-RAT reporting quantity 10.3.7.32	
>>>>>Reporting cell status	OP		Reporting cell status 10.3.7.61	
>>>>>Measurement validity	OP		Measurement validity 10.3.7.51	
>>>>>CHOICE report criteria	OP			
>>>>>>Inter-RAT measurement reporting criteria			Inter-RAT measurement reporting criteria 10.3.7.30	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>Traffic Volume				
>>>>>Traffic volume measurement Object	OP		Traffic volume measurement object 10.3.7.70	
>>>>>Traffic volume measurement quantity	OP		Traffic volume measurement quantity 10.3.7.71	
>>>>>Traffic volume reporting quantity	OP		Traffic volume reporting quantity 10.3.7.74	
>>>>>CHOICE report criteria	OP			
>>>>>>Traffic volume measurement reporting criteria			Traffic volume measurement reporting criteria 10.3.7.72	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>Quality				
>>>>>Quality measurement Object	OP		Quality measurement object	
>>>>>CHOICE report criteria	OP			
>>>>>>Quality measurement reporting criteria			Quality measurement reporting criteria 10.3.7.58	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>UE internal				
>>>>>UE internal measurement quantity	OP		UE internal measurement quantity 10.3.7.79	
>>>>>UE internal reporting quantity	OP		UE internal reporting quantity 10.3.7.82	
>>>>>CHOICE report criteria	OP			
>>>>>>UE internal measurement reporting criteria			UE internal measurement reporting	

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
			criteria 10.3.7.80	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting			NULL	
>>>>UE positioning				
>>>>>LCS reporting quantity	OP		LCS reporting quantity 10.3.7.111	
>>>>>CHOICE report criteria	OP			
>>>>>>LCS reporting criteria			LCS reporting criteria 10.3.7.110	
>>>>>>Periodical reporting			Periodical reporting criteria 10.3.7.53	
>>>>>>No reporting				
Radio Bearer Information Elements				
>>Pre-defined configuration status information	OP		Pre-defined configuration status information 14.13.2.3	
>>Signalling RB information list	MP	1 to <maxSRBsetup>		For each signalling radio bearer
>>>Signalling RB information	MP		Signalling RB information to setup 10.3.4.24	
>>RAB information list	OP	1 to <maxRABsetup>		Information for each RAB
>>>RAB information	MP		RAB information to setup 10.3.4.10	
Transport Channel Information Elements				
Uplink transport channels				
>>UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24	
>>UL transport channel information list	OP	1 to <MaxTrCH>		
>>>UL transport channel information	MP		Added or reconfigured UL TrCH information 10.3.5.2	
>>CHOICE mode	OP			
>>>FDD				
>>>>CPCH set ID	OP		CPCH set ID 10.3.5.5	
>>>>Transport channel information for DRAC list	OP	1 to <MaxTrCH>		
>>>>>DRAC static information	MP		DRAC static information 10.3.5.7	
>>>TDD				(no data)
Downlink transport channels				
>>DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6	
>>DL transport channel information list	OP	1 to <MaxTrCH>		
>>>DL transport channel	MP		Added or reconfigured	

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
information			DL TrCH information 10.3.5.1	
>>Measurement report	OP		MEASUREMENT REPORT 10.2.17	
~~>spare~~				~~(no data) Criticality: reject~~

Multi Bound	Explanation
MaxNoOfMeas	Maximum number of active measurements, upper limit 16

Condition	Explanation
Setup	The IE is mandatory when the IE Measurement command has the value "Setup", otherwise the IE is not needed.
Ciphering	The IE is mandatory when the IE Ciphering Status has the value "started" and the ciphering counters need not be reinitialised, otherwise the IE is not needed.
IP	The IE is mandatory when the IE Integrity protection status has the value "started" and the integrity protection counters need not be reinitialised, otherwise the IE is not needed.
PDCP	The IE is mandatory when the PDCP Info IE is present, otherwise the IE is not needed.

14.12.4.3 RRC INFORMATION CONTAINER FAILURE INFO

This RRC information container is sent between network nodes to provide information about the cause for failure to perform the requested operation.

Direction: target RNC→source RNC, source RAT

Information Element/Group Name	Need	Multi	Type and reference	Semantics description
Other Information elements				
Failure cause	MP		Failure cause 10.3.3.13	
Protocol error information	CV-*ProtErr*		Protocol error information 10.3.8.12	

Condition	Explanation
ProtErr	Presence is mandatory if the IE "Failure cause" has the value "Protocol error"; otherwise the element is not needed in the message.

14.12.2 RRC information, target RNC to source RNC

There are 2 possible cases for RNC relocation:

1. The UE is already under control of target RNC; and
2. The SRNC Relocation with Hard Handover (UE still under control of SRNC), but UE is moving to a location controlled by the target RNC (based on measurement information).

In case 1 the relocation is transparent to the UE and there is no "reverse" direction container. The SRNC just assigns the 'serving' function to the target RNC, which then becomes the Serving RNC.

In case 2 the relocation is initiated by SRNC, which also provides the RRC Initialisation Information to the target RNC. Base on this information, the target RNC prepares the Hard Handover Message ("Physical channel reconfiguration" (subclause 8.2.6), "radio bearer establishment" (subclause 8.2.1), "Radio bearer reconfiguration" (subclause 8.2.2), "Radio bearer release" (subclause 8.2.3) or "Transport channel reconfiguration" (subclause 8.2.4).

The source RNC then transmits the Handover Message to the UE, which then performs the handover.

In the successful case, the UE transmits an XXX COMPLETE message, using the new configuration, to the target RNC.

In case of failure, the UE transmits an XXX FAILURE, using the old configuration, to the source RNC and the RRC context remains unchanged (has to be confirmed and checked with the SRNS relocation procedure).

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *RRC message*	MP			At least one spare choice, Criticality: Reject, is needed
>RADIO BEARER SETUP			RADIO BEARER SETUP 10.2.31	
>RADIO BEARER RECONFIGURATION			RADIO BEARER RECONFIGURATION 10.2.25	
>RADIO BEARER RELEASE			RADIO BEARER RELEASE 10.2.28	
>TRANSPORT CHANNEL RECONFIGURATION			TRANSPORT CHANNEL RECONFIGURATION 10.2.51	
>PHYSICAL CHANNEL RECONFIGURATION			PHYSICAL CHANNEL RECONFIGURATION 10.2.20	
>RRC INFORMATION CONTAINER FAILURE INFO			RRC INFORMATION CONTAINER FAILURE INFO 14.12.4.3	

14.12.3 RRC information, target RNC to source system

The RRC information, target RNC to source system is used to transfer information to another RAT, e.g., in case of handover to UTRAN. In this case, the RRC information concerns the "Handover To UTRAN Command" that is compiled by the target RNC but transferred via another RAT towards the UE, as specified in 8.3.6.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *case*	MP			At least one spare choice, Criticality: Reject, is needed
>handover to UTRAN			HANDOVER TO UTRAN COMMAND 10.2.10	
> RRC INFORMATION CONTAINER FAILURE INFO ~~spare~~			RRC INFORMATION CONTAINER FAILURE INFO 14.12.4.3	~~(no data) Criticality: reject~~

14.13 RRC information transferred between UE and other systems

14.13.0 General

This subclause specifies RRC information that is exchanged between other systems and the UE. This information is transferred via another RAT in accordance with the specifications applicable for those systems. This subclause specifies the UTRAN RRC information applicable for the different information flows.

NOTE Currently RRC information containers, using the RRC protocol extension mechanism, are not used for information transferred between UE and another RAT

Like for the Uu interface, the transfer syntax for RRC transferred between UE and other RATs is derived from their ASN.1 definitions by use of Packed Encoding Rules, unaligned (X.691). It should be noted that the encoder adds final padding to achieve octet alignment. The resulting octet string is transferred across the other RAT as defined in the specifications applicable for that RAT.

14.13.1 RRC information, another RAT to UE

14.13.1.1 ~~Pre-defined configuration information~~(Void)

~~Another system may provide the UE with one or more pre- defined UTRAN configurations, comprising of radio bearer, transport channel and physical channel parameters. The UE shall store the information, and use it upon handover to UTRAN if requested to do so within the HANDOVER TO UTRAN COMMAND message. The pre- defined configuration information includes the following RRC information.~~

~~Information Element/Group name~~	~~Need~~	~~Multi~~	~~Type and reference~~	~~Semantics description~~
~~**RB information elements**~~				
~~Predefined radio configurations~~		~~1 to <maxPredefConfigCount>~~		
~~>Predefined configuration identity~~	~~MP~~		~~Predefined configuration identity 10.3.4.5~~	
~~>Predefined configuration value tag~~	~~OP~~		~~Predefined configuration value tag 10.3.4.6~~	
~~**UE information elements**~~				
~~Re-establishment timer~~	~~MP~~		~~Re-establishment timer 10.3.3.30~~	
~~**RB information elements**~~				
~~>Predefined RB configuration~~	~~MP~~		~~Predefined RB configuration 10.3.4.7~~	
~~**TrCH Information Elements**~~				
~~>Predefined TrCH configuration~~	~~MP~~		~~Predefined TrCH configuration 10.3.5.9~~	
~~**PhyCH Information Elements**~~				
~~>Predefined PhCH configuration~~	~~MP~~		~~Predefined PhyCH configuration 10.3.6.56~~	

~~Multi Bound~~	~~Explanation~~
~~MaxPredefConfigCount~~	~~Maximum number of predefined configurations~~

14.13.2 RRC information, UE to another RAT

14.13.2.1 UE capability information

Upon receiving a UE information request from another system, the UE shall indicate the requested capabilities. The UE capability information includes the following RRC information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE information elements				
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	

14.13.2.2 UE security information

Upon receiving a UE information request from another system, the UE shall indicate the requested security information. The UE security information includes the following RRC information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE information elements				
~~START list~~	~~MP~~	~~1 to <MaxCNdomains>~~		~~START values for all CN domains~~
~~>CN domain identity~~	~~MP~~		~~CN domain identity 10.3.1.1~~	
~~>~~START-CS	MP		START 10.3.3.38	START values to be used in this CN domain.

14.13.2.3 Pre-defined configuration status information

Another system may provide the UE with one or more pre- defined UTRAN configurations, comprising of radio bearer, transport channel and physical channel parameters. If requested, the UE shall indicate the configurations it has stored. The pre-defined configuration status information should include the following RRC information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB information elements				
Predefined configurations		~~1 to~~ <maxPredefConfigCount>		The list is in order of preconfiguration identity
>Predefined configuration value tag	OP		Predefined configuration value tag 10.3.4.6	The UE shall include the value tag if it has stored the concerned configuration

Multi Bound	Explanation
MaxPredefConfigCount	Maximum number of predefined configurations

14.13.2.4 ~~UE system specific capability~~(Void)

~~This Information Element contains capability information concerning other Radio Access Technologies.~~

~~Information Element/Group name~~	~~Need~~	~~Multi~~	~~Type and reference~~	~~Semantics description~~
~~UE system specific capability~~	~~OP~~	~~1 to <maxSystemCapability>~~		
~~>Inter-RAT UE radio access capability~~	~~MP~~		~~Inter-RAT UE radio access capability 10.3.8.7~~	

11.5 RRC information between network nodes

```
Internode-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

    HandoverToUTRANCommand-r3,
    MeasurementReport,
    PhysicalChannelReconfiguration-r3,
    RadioBearerReconfiguration-r3,
    RadioBearerRelease-r3,
    RadioBearerSetup-r3,
    TransportChannelReconfiguration-r3,
    UECapabilityInformation
FROM PDU-definitions

-- Core Network IEs :
    CN-DomainIdentity,
    CN-DomainInformationList,
    NAS-SystemInformationGSM-MAP,
-- UTRAN Mobility IEs :
    CellIdentity,
    URA-Identity,
-- User Equipment IEs :
    C-RNTI,
    FailureCauseWithProtErr,
    RRC-MessageSequenceNumber,
    U-RNTI,
    UE-RadioAccessCapability,
-- Radio Bearer IEs :
    PDCP-InfoReconfig,
    PredefinedConfigValueTag,
    RAB-InformationSetupList,
    RB-Identity,
    RB-MappingInfo,
    RLC-Info,
    SRB-InformationSetupList,
-- Transport Channel IEs :
    CPCH-SetID,
    DL-CommonTransChInfo,
    DL-AddReconfTransChInfoList,
    DRAC-StaticInformationList,
    UL-CommonTransChInfo,
    UL-AddReconfTransChInfoList,
-- Measurement IEs :
    MeasurementIdentity,
    MeasurementReportingMode,
    MeasurementType,
    AdditionalMeasurementID-List,
-- Other IEs :
    InterRAT-UE-RadioAccessCapabilityListInterRATMessage
FROM InformationElements

    maxCNdomains,
    maxNoOfMeas,
    maxPredefConfig,
    maxRABsetup,
    maxRB,
    maxSRBsetup,
    maxTrCH
FROM Constant-definitions;

-- Part 1: Class definitions similar to what has been defined in 11.1 for RRC messages
-- Information that is tranferred in the same direction and across the same path is grouped
-- RRC information transferred between network nodes,
-- per group of information transfers having same endpoint
-- Alike class definitions for RRC PDUs

-- **************************************************
--
-- RRC information, to target RNC
--
-- **************************************************
-- RRC Information to target RNC sent either from source RNC or from another RAT
```

```
ToTargetRNC-Container ::= CHOICE {
    handoverToUTRAN                     HandoverToUTRANInfo-r3,
    srncRelocation                      SRNC-RelocationInfo-r3,
    extension                           NULL
}

-- **************************************************
--
-- RRC information, target RNC to source RNC
--
-- **************************************************

T-RNC-ToSRNC-Container ::= SEQUENCE {
    message             T-RNC-ToSRNC-ContainerType
}

TargetT-RNC-ToSourceRNC-ContainerType::= CHOICE {
    radioBearerSetup                    RadioBearerSetup-r3,
    radioBearerReconfiguration          RadioBearerReconfiguration-r3,
    radioBearerRelease                  RadioBearerRelease-r3,
    transportChannelReconfiguration     TransportChannelReconfiguration-r3,
    physicalChannelReconfiguration      PhysicalChannelReconfiguration-r3,
    rrc-InformationContainerFailureInfo RRC-InformationContainerFailureInfo-r3
    extension                           NULL
}

-- **************************************************
--
-- RRC information, target RNC to source RAT
--
-- **************************************************

TargetRNC-ToSourceRAT-Container::= CHOICE {
    handoverToUTRAN                     HandoverToUTRANCommand-r3,
    rrc-InformationContainerFailureInfo RRC-InformationContainerFailureInfo-r3
    extension                           NULL
}

-- Part 2: Container definitions, similar to alike the PDU definitions in 11.2 for RRC messages
-- RRC Container definition, to target RNCIn alphabetical order


-- **************************************************
--
-- Handover to UTRAN information
--
-- **************************************************

HandoverToUTRANInfo-r3 ::= CHOICE {
    r3                                  SEQUENCE {
        handoverToUTRANInfo-r3          HandoverToUTRANInfo-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    criticalExtensions              SEQUENCE {}
}

HandoverToUTRANInfo-r3-IEs::=       SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability        UE-RadioAccessCapability                OPTIONAL,
        startList                       STARTList                               OPTIONAL,
    --  Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
        predefinedConfigStatusList      PredefinedConfigStatusList              OPTIONAL
}

-- **************************************************
--
-- RRC information container failure info
--
-- **************************************************

RRC-InformationContainerFailureInfo-r3 ::= CHOICE {
    r3                                      SEQUENCE {
        rRC-InformationContainerFailureInfo-r3      RRC-InformationContainerFailureInfo-r3-IEs,
        nonCriticalExtensions                       SEQUENCE {} OPTIONAL
    },
    criticalExtensions                      SEQUENCE {}
```

```
}

RRC-InformationContainerFailureInfo-r3-IEs ::=      SEQUENCE {
    -- Non-RRC IEs
        failureCauseWithProtErr         FailureCauseWithProtErr
}

-- **************************************************
--
-- SRNC Relocation information
--
-- **************************************************

SRNC-RelocationInfo-r3 ::= CHOICE {
    r3                              SEQUENCE {
        sRNC-RelocationInfo-r3          SRNC-RelocationInfo-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    criticalExtensions              SEQUENCE {}
}

SRNC-RelocationInfo-r3-IEs ::=              SEQUENCE {
    -- Non-RRC IEs
        stateOfRRC                      StateOfRRC,
        stateOfRRC-Procedure            StateOfRRC-Procedure,
        cipheringStatus                 CipheringStatus,
        calculationTimeForCiphering     CalculationTimeForCiphering         OPTIONAL,
        cipheringInfoPerRB-List         CipheringInfoPerRB-List             OPTIONAL,
        count-C-List                    COUNT-C-List                        OPTIONAL,
        integrityProtectionStatus       IntegrityProtectionStatus,
        srb-SpecificIntegrityProtInfo   SRB-SpecificIntegrityProtInfoList,
        implementationSpecificParams    ImplementationSpecificParams        OPTIONAL,
    -- User equipment IEs
        u-RNTI                          U-RNTI,
        c-RNTI                          C-RNTI                              OPTIONAL,
        ue-RadioAccessCapability        UE-RadioAccessCapability,
    -- Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
        interRATMessage             InterRATMessage                 OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Core network IEs
        cn-CommonGSM-MAP-NAS-SysInfo    NAS-SystemInformationGSM-MAP,
        cn-DomainInformationList        CN-DomainInformationList            OPTIONAL,
    -- Measurement IEs
        ongoingMeasRepList              OngoingMeasRepList                  OPTIONAL,
    -- Radio bearer IEs
        predefinedConfigStatusListpreConfigStatusInfo
PredefinedConfigStatusListPreConfigStatusInfo,
        srb-InformationList             SRB-InformationSetupList,
        rab-InformationList             RAB-InformationSetupList            OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-TransChInfoList              UL-AddReconfTransChInfoList         OPTIONAL,
        modeSpecificInfo                CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                  OPTIONAL,
                transChDRAC-Info                DRAC-StaticInformationList  OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonTransChInfo            DL-CommonTransChInfo                OPTIONAL,
        dl-TransChInfoList              DL-AddReconfTransChInfoList         OPTIONAL,
    -- Measurement report
        measurementReport               MeasurementReport                   OPTIONAL
}

-- RRC Container definition, target RNC to source RNC
-- Nothing new, only re-using RRC PDUs
--
-- RRC Container definition, target RNC to source system
-- Nothing new, re-using RRC PDUs (HandoverToUTRANCommand)

-- IE definitions

CalculationTimeForCiphering ::=     SEQUENCE {
    cell-Id                             CellIdentity,
    sfn                                 INTEGER (0..4095)
```

```
}

CipheringInfoPerRB ::=              SEQUENCE {
    dl-HFN                              BIT STRING (SIZE (20..25)),
    ul-HFN                              BIT STRING (SIZE (20..25))
}

-- TABULAR: Multiplicity value numberOfRadioBearers has been replaced
-- with maxRB.
CipheringInfoPerRB-List ::=         SEQUENCE (SIZE (1..maxRB)) OF
                                        CipheringInfoPerRB

CipheringStatus ::=                 ENUMERATED {
                                        started, notStarted }

COUNT-C-List ::=                        SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        COUNT-CSingle

COUNT-CSingle ::=                       SEQUENCE {
    cn-DomainIdentity                   CN-DomainIdentity,
    count-C                             BIT STRING (SIZE (32))
}

ImplementationSpecificParams ::=    BIT STRING (SIZE (1..512))


IntegrityProtectionStatus ::=       ENUMERATED {
                                        started, notStarted }

MeasurementCommandWithType ::=      CHOICE {
    setup                               MeasurementType,
    modify                              NULL,
    release                             NULL
}

OngoingMeasRep ::=                  SEQUENCE {
    measurementIdentity         MeasurementIdentity,
    measurementCommandWithType          MeasurementCommandWithType,
    -- TABULAR: The CHOICE Measurement in the tabular description is included
    -- in the IE above.
    measurementReportingMode            MeasurementReportingMode            OPTIONAL,
    additionalMeasurementID-List        AdditionalMeasurementID-List        OPTIONAL
}

OngoingMeasRepList ::=              SEQUENCE (SIZE (1..maxNoOfMeas)) OF
                                        OngoingMeasRep

PreConfigStatusInfo ::=             SEQUENCE (SIZE (1..maxPredefConfig)) OF
                PredefinedConfigValueTag

PredefinedConfigStatusList ::=              SEQUENCE (SIZE (16)) OF
                                            PredefinedConfigStatusInfo

PredefinedConfigStatusInfo::=       SEQUENCE {
    predefinedConfigValueTag                PredefinedConfigValueTag    OPTIONAL
    -- Absence of the IE indicates that the UE has not stored the corresponding preconfiguration
}

SRB-SpecificIntegrityProtInfo ::=   SEQUENCE {
    ul-RRC-HFN                          BIT STRING (SIZE (28)),
    dl-RRC-HFN                          BIT STRING (SIZE (28)),
    ul-RRC-SequenceNumber               RRC-MessageSequenceNumber,
    dl-RRC-SequenceNumber               RRC-MessageSequenceNumber
}

SRB-SpecificIntegrityProtInfoList ::= SEQUENCE (SIZE (4..maxSRBsetup)) OF
                                        SRB-SpecificIntegrityProtInfo

StateOfRRC ::=                      ENUMERATED {
                                        cell-DCH, cell-FACH,
                                        cell-PCH, ura-PCH }

StateOfRRC-Procedure ::=            ENUMERATED {
                                        awaitNoRRC-Message,
                                        awaitRRC-ConnectionRe-establishmentComplete,
                                        awaitRB-SetupComplete,
                                        awaitRB-ReconfigurationComplete,
                                        awaitTransportCH-ReconfigurationComplete,
```

```
                                    awaitPhysicalCH-ReconfigurationComplete,
                                    awaitActiveSetUpdateComplete,
                                    awaitHandoverComplete,
                                    sendCellUpdateConfirm,
                                    sendUraUpdateConfirm,
                                    sendRrcConnectionReestablishment,
                                    otherStates
}

END
```

11.6 RRC information between UE and other RATs

```
UEtoOtherRAT-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

-- User Equipment IEs :
    START-Value,
    UE-RadioAccessCapability,
    UE-RadioAccessCapability-v370ext,
-- Radio Bearer IEs :
    PredefinedConfigValueTag
FROM InformationElements

    maxPredefConfigCount
FROM Constant-definitions;

-- Part 1: Class definitions similar to what has been defined in 11.1 for RRC messages
-- Information that is tranferred in the same direction and across the same path is grouped

-- **************************************************
--
-- RRC information, to target RNC
--
-- **************************************************
-- RRC Information to target RNC sent either from source RNC or from another RAT

-- Currently not used

-- **************************************************
--
-- RRC information, target RNC to source RNC
--
-- **************************************************

-- Currently not used

-- **************************************************
--
-- RRC information, target RNC to source RAT
--
-- **************************************************

-- Currently not used

-- Part 2: Container definitions, similar to the PDU definitions in 11.2 for RRC messages
-- In alphabetical order


-- Currently not used

-- Part 3: Non- extensible IE definitions
-- In alphabetical order

PredefConfigStatusInfo ::=      SEQUENCE {
    predefinedConfigValueTag                PredefinedConfigValueTag
}

PredefConfigStatusInfoList ::=      SEQUENCE (SIZE (maxPredefConfigCount)) OF
                                        PredefConfigStatusInfo
}

UE-CapabilityInformation ::=            SEQUENCE {
    ue-RadioAccessCapability            UE-RadioAccessCapability,
    ue-RadioAccessCapabilityExt1        UE-RadioAccessCapability-v370ext
}

UE-SequrityInformation ::=          SEQUENCE {
    start-CS                            START-Value
}

END
```

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21st-25th, 2001

Tdoc R2-011232

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **747** ⌘ rev **r1** ⌘ Current version: **3.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Various corrections
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-23
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘

The specification contains some ambiguities and minor errors. For more details, see "Summary of change".

Backwards compatibility analysis:
This CR contains corrections to functions where the specification was either:
- ambiguous or not sufficiently explicit, or;
- containing some contradictions.

The changes would not affect implementations behaving like indicated in the CR, but would affect implementations supporting the corrected functionality otherwise.

Summary of change: ⌘

- New subclause summarizing the protocol specification notation and principles added as 4.3.
- Clarification of the term "signalling radio bearer" added in 6.3.
- Clarification on the introduction of the term "signalling connection" in 5.2. A clarification that RRC supports upper layer data transfer discriminated between two classes – "high priority" and "low priority" – added in 5.2.
- Clarifications on the UE processes used in different states including the usage of the name "UTRA RRC Connected mode"
- Added figures showing the messages involved in modification of system information (SYSTEM INFORMATION CHANGE INDICATION and PAGING TYPE 1)
- In the procedure Transmission of UE capability information, it is said in 8.1.6.6 "assume that radio link failure has occurred". This statement doesn't add any meaning, is confusing and is thus proposed to be removed.
- Clarification that the UE shall select a suitable UTRA cell at radio link failure where it is not specified already.
- Renamed the subclause "Radio link failure criteria" to "Radio link failure criteria and actions upon radio link failure" to reflect the content of the subclause and clarified the text.

- Corrected reference to URA update cause “change of URA” in 8.1.3, where it is named as “URA reselection” which is not in line with the value of the IE.
- Storage of the establishment cause in the variable ESTABLISHMENT_CAUSE added in the procedure Inter-RAT cell reselection and Inter-RAT cell change order to UTRAN at the point where a call is made to the RRC connection establishment procedure.
- The text on protocol extensions in 10.1.1 is clarified. “Revision” is changed to “version of this protocol”. The text about lack of extension possibilities in the SYSTEM INFORMATION message is confusing and is removed (no replacement text is proposed at this point, since no proposal exist on whether and how extensions to that message can be done).
- Corrections to “needed” tabular columns in a number of places where “Needed” is empty or included when it shall be empty (alignment with ASN.1).
- Corrections to the tabular on the IE “Downlink DPCH info common for all RL” 10.3.6.18:
  1) The IE “Downlink DPCH power control information” is present in ASN.1 (DL-DPCH-InfoCommon) but not in tabular. It is proposed to add it in the tabular.
  2) “CHOICE mode” and “>FDD” missing (the “>TDD” is already present). Mistake in CR implementation?
- Clarification of the purpose with the variable CIPHERING_STATUS: Scope is only a ciphering reconfiguration procedure ongoing in the RRC layer. So, the IE “Reconfiguration” variable could be set to FALSE, even if the reconfiguration in RLC is not ready yet.
- “system” is corrected to “Radio access technology” in a few locations.
- Correction on incorrect statement that the UE enters idle mode at radio link failure in subclause B.3.5.
- Which RLC modes possible to use for the ACTIVE SET UPDATE message is specified as RLC-AM or RLC-UM in 8.3.4 but only RLC-AM is mentioned in the message definition in 10.2.2. Since now any interactions between the active setup update procedure and other procedures should be specified, it is proposed that the correction is made by adding RLC-UM in 10.2.2.
- Alignment of subclauses 8.5.5, 8.3.1 and 13.1 to have a consistent specification regarding the behaviour in when detecting “out of service area” and “in service area”.
- The variable CONFIGURATION_INCOMPLETE is misspelled in a few places.
- In case a critical extension was present in a received message the transaction identifier could not be interpreted from the received message. In those cases, the message RRC STATUS and in numerous “FAILURE” type of messages, it is not defined how to set the IE “RRC transaction identifier”. To avoid a non-backward compatible change at this stage, it is proposed that the UE sets the “RRC transaction identifier” to zero in those cases. UTRAN will then know by the value of the IE “Protocol error cause” whether the IE “RRC transaction identifier” has a relevant value or not. The change is made in subclause 9.3b, where the message is included in the variable TRANSACTIONS as a rejected transaction entry for which the transaction identifier is set to zero.
- Definition of constant N302 corrected to also include URA UPDATE
- Initialisation of the variable UE_CAPABILITIES_TRANSFERRED added at inter-RAT handover to UTRAN. It is proposed that the variable is initialised to “which UE capabilities that have transferred to the network up to the point prior to the handover (if any)”. This goes for both the IE “UE radio access capability” and the IE “UE system specific capability”.
- Presence of the variable LATEST_CONFIGURED_CN_DOMAIN changed from “MP” to “OP” since the information is not always available (if no security reconfiguration has taken place yet).
- Initialisation of the variable CONFIGURATION_INCOMPLETE added at RRC connection establishment and inter-RAT handover to UTRAN.
- It is clarified further how to deal with timers and constants when entering

UTRA RRC connected mode and when receving updates of the values during connected mode. A new variable, TIMERS_AND_CONSTANTS has been added to facilitate this. For timers, the new values will be applied next time the timer is started (the value update will not affect already started timers).

- References updated due to change of location on the subclauses:
  8.6.1.1 -> 8.6.3.1a
  8.6.6.2 -> 8.5.17
  8.6.6.3 -> 8.5.18
  8.6.6.5 -> 8.5.19
- In the Reconfiguration procedures (8.2.2), the statement about that the UE may release the current physical channel configuration have been moved since the word “may” inside a “shall” is confusing. Also, the sentence about establishing the new physical channel configuration is misplaced and is removed since it is already covered elsewhere.
- The terms “PSTN/ISDN domain” and “IP domain” have been corrected into “CS domain” and “PS domain” in clause 7 and Annex B.
- Use of SRB delay and PC preamble (8.6.6.30): When the preamble period starts has been clarified (after the establishment of the uplink physical channel).
- State transition while still remaining in the same state (8.2.2.3): If the UE remains in CELL_DCH state after state transition, the UE shall" is a confusing statement.
- Indentation error (8.2.2.3): "- ignore that IE and stop using DRX;" is indented one more step.
- The UE actions on reception of the IE “Primary CPICH Info” may contradict the procedure text on cell selection upon transition to CELL_FACH. Since the intention is not to mandate the UE to select a particular cell, it is proposed that the current text in 8.6.6.18 on this IE is rewritten. Instead a general sentence is added about the usage of this IE as a cell identifier by means of the primary scrambling code for the downlink radio link.
- The text in 8.6.6.4 on the IE “Downlink information for each radio link” is corrected. It is clarified that the actions on the sub-IEs shall be applied on this radio link. Also, there is a missing statement that the UE shall act on the sub-IEs also in the non-CELL_DCH-case, and this has now been added.
- Downlink information for each radio link Post (10.3.6.28): IE "Downlink DPCH info for each RL" refers to 10.3.6.19, but it shall be 10.3.6.22
- Editorial (10.3.3.25): The ">" should be removed before the "FDD uplink physical channel capability"
- Editorial (14.12.3): Reference to 10.2.10 shall be 10.2.12
- Measurement capability (10.3.3.21):
  In the condition table, in the explanation field for Gsm900_sup it is stated "Presence is mandatory if IE Support of GSM900 has the value TRUE. Otherwise this field is not needed in the message." But there exists no IE "Support of GSM900". It is the same for GSM1800_sup and GSM1900_sup. The following change of text is suggested in the condition table: "Presence is needed if the IE “Inter-RAT UE radio access capability” indicates support for GSM900. Absence is needed if the IE “Inter-RAT UE radio access capability” indicates no support for GSM900." Corresponding changes are proposed for GSM1800 and GSM1900.
- PAGING TYPE 1 with BCCH modification info (8.1.2.3): The text says “If the IE "BCCH modification info" is included, any UE in idle mode, CELL_PCH or URA_PCH state shall perform the actions as specified in subclause 8.1.1 irrespective of IE "Paging record" occurrences in the message.” There is a risk of misinterpretation causing some UEs to ignore page at updated system information. The UE shall of course act on both the page and the updated system information as there is no risk for interactions.
- Editorial (12.1.3 / Fig 62a): In figure 62a, not all parts of the figure is visible
- An explaination added in the beginning of clause 8 about parallel procedures, since the UE shall be able to process several parallel RRC procedures. Since the subclause 8.6.3.11 (RRC transaction identifier) is the key chapter for the

specification acceptance or rejection of parallel procedures a reference to that chapter has been added as well as a clarification in that chapter itself.

- The error case “invalid configuration” is added in the Security Mode Control procedure. Checks are already made of information elements that would trigger this error case but what to do has not been specified. The new text is aligned to what happens in similar cases so there is no contradiction with other error cases.
- The term “SRB” is not defined and the occurences are replaced with a combination of “Signalling radio bearer” and “RB”.
- The abbreviation “RB” is present twice in the list of abbreviations (3.2) and one is therefore removed.
- The text in 8.6.8 “UE positioning GPS real-time integrity information” is moved to be a subclase of 8.6.7 since it is classified as a measurement information element.
- Editorial corrections from R2-010914:
  8.4.1.9.3: " is deleted: "inter-RAT cell info" instead of "inter-RAT" cell info"
  9.1 Format "Headline2" instead of "Headline1"
  10.3.7.11 Sign "-" is deleted: "0" instead of "-0"
  10.3.7.19 nomal e instead of small e
  10.3.7.38 "d" is added: "and" instead of "an"
  Blanks are inserted in 10.2.17, 10.3.7.3, 13.4.12
  11.3.7 CellSelectReselectInfoSIB-11-12-HCS-RSCP: "-RSCP" should be written in black instead of red color
  13.4.0 "0" instead of "("
  14.11 "an" instead of "a"
  "MEASUREMENT_IDENTITY" corrected into "MEASUREMENT IDENTITY" throughout the document.
- Correction from R2-010924: Currently section 8 states: “The RRC entity in the UE shall consider PDUs to have been transmitted when they are submitted to the lower layers”. Moreover, the sentence “when the successful transmission of the nnn COMPLETE message has been confirmed by the lower layers” is used for all the procedure when reconfiguration and state changes can be performed. On the other end, for most other procedures, it is stated: “When the nnn message has been submitted to lower layers for transmission the procedure ends” (e.g. for Uplink Direct Transfer and all the Failure messages). It is not completely clear what “successful transmission” means. A literal interpretation would be “successfully submitted to the lower layers”. This interpretation is wrong and we can list an example when this would not work. If UTRAN instructs the UE to transition to CELL_PCH/URA_PCH, the UE will send the complete message on the old configuration and terminate the procedure immediately after without waiting for Layer 2 ACK; RLC will try to send it again and it will cause the transition to CELL_FACH; then the problem will represent itself endlessly. Similar catastrophic scenarios can happen for the change of security parameters.In the beginning of clause 8, it is clearly stated that “successful transmission” is equivalent to “acknowledged by RLC” to avoid misinterpretations.
- Correction from R2-010924: In section 8.2.2.4 “Transmission of a response message by the UE, normal case” (Reconfiguration Procedures) it is stated: “If the new state is CELL_PCH or URA_PCH, the response message shall be transmitted using the old configuration before the state transition …”. It is clarified that, nevertheless, the new C-RNTI should always be used, if available.
- Correction from R2-010924: “**dcph**-FrameOffset” is corrected to “**dpch**-FrameOffset” in ASN.1 description. The correction results from the erroneous implementation of CR 385 (R2-001071)
- Correction from R2-010935: There are references to non-existing failure causes, so they are replaced with appropriate failure causes. Failure causes “cell selection”, “configuration unacceptable”, “incomplete configuration” are replaced with “cell update occurred”, “configuration unsupported”, “configuration incomplete”, respectively.
- Correction from R2-010935: Indentation missing from “Inter-RAT security

		capability" and is added to SECURITY MODE COMMAND. • Correction from R2-010935: In R2#19, the range of Qqualmin is changed in ASN.1 description, but it was not changed in tabular description. This CR proposes to align the range to ASN.1, in order to keep consistency with v.3.6.0. The range of Qualmin in tabular is therefore changed from –20..0 to –24..0. • Paging cause "Terminating - cause unknown": The UTRAN text on when this cause is set should be clarified. Currently it says when "no cause for paging is available", which is unclear. It should be when "UTRAN does not receive the cause from upper layers" to align with RANAP (paging cause is optional in RANAP). • Correction on the semantics for the IE Timer_RST, part of the IE "RLC Info" in 10.3.4.23. • Missing indentation added in the IE "UE positioning OTDOA assistance data" 10.3.7.103. • In the cell update procedure, "T315 elapsed" has replaced by "T314 elapsed" in 8.3.1.12 and vice versa, since this contradicts the similar cases in other subclauses in this procedure which are considered as correct. • Clarifications on T316 expiry in 8.5.5.3 and making the text consistent with the desciption in the cell update procedure. • Clarification on T305, T316 and T317 in 13.1 to making the rules consistent with the rest of the specification. • In the ASN.1, Ec-No has been changed into Ec-N0, and Ec-NO (letter "O") into Ec-N0.
Consequences if not approved:	⌘	Risk of wrong interpretation causing inter-operability problems.

Clauses affected:	⌘	3.2, 4.3 (new), 5.2, 6.3, 7.1, 7.2.2.1, 7.2.2.2, 7.2.2.3, 8, 8.1.1, 8.1.1.6.1, 8.1.2.2, 8.1.2.3, 8.1.3.6, 8.1.4.5, 8.1.4.6, 8.1.6.6, 8.1.8.2, 8.1.9.2, 8.1.10.2, 8.1.11.2, 8.1.12.3, 8.1.12.4c (new), 8.1.15.3, 8.2.2.2, 8.2.2.3, 8.2.2.4, 8.2.2.7, 8.3.1.2, 8.3.1.3, 8.3.1.6, 8.3.1.7a, 8.3.1.12, 8.3.3.3, 8.3.3.5, 8.3.4.3, 8.3.4.4, 8.3.6.2, 8.3.6.3, 8.3.8.2, 8.3.10.2, 8.4.1.4a, 8.5.5.2.2, 8.5.5.3, 8.5.6, 8.5.8, 8.5.10.1, 8.5.10.2, 8.5.10.3, 8.5.17, 8.5.18, 8.6.3.2, 8.6.3.5, 8.6.3.11, 8.6.6.4, 8.6.6.18, 8.6.6.30, 8.6.7.1, 8.6.7.4, 8.6.7.5, 8.6.7.10, 8.6.7.13, 8.6.7.14, 8.6.7.15, 8.6.7.16, 8.6.7.17, 8.6.7.18, 8.6.7.19 (new), 8.6.8, 9.1, 9.3b, 10.1.1, 10.1.1.1.1, 10.1.1.1.2, 10.1.1.2.1, 10.1.1.2.2, 10.2.1, 10.2.5, 10.2.6, 10.2.9, 10.2.12, 10.2.17, 10.2.26, 10.2.38, 10.2.43, 10.2.48, 10.3.2.3, 10.3.2.4, 10.3.3.1, 10.3.3.21, 10.3.3.25, 10.3.4.23, 10.3.5.8, 10.3.6.6, 10.3.6.18, 10.3.6.24, 10.3.6.28, 10.3.6.33, 10.3.6.34, 10.3.6.48, 10.3.6.56, 10.3.7.3, 10.3.7.11, 10.3.7.19, 10.3.7.26, 10.3.7.28, 10.3.7.38, 10.3.7.55, 10.3.7.59, 10.3.7.61, 10.3.7.88, 10.3.7.103, 10.3.7.105, 10.3.7.106, 10.3.7.108, 10.3.7.110, 11.3 12.1.3, 13.1, 13.3, 13.4.0, 13.4.1, 13.4.11a, 13.4.12, 13.4.26a (new), 13.6, 13.7, 14.11, 14.12.3, B.3.3, B.3.4, B.3.5, B.4, B.5, B.6, B.6.1, B.6.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	Changes compared to the draft CR with the same title submitted to RAN2#20 (R2-010891) are highlighted in yellow. Corrections from ther RAN2#20 draft CRs R2-010914, R2-010924 and R2-010935 are also merged into this CR. Changes made in revision 1 compared to the unrevised version highlighted in green.

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Abbreviations

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

ACK	Acknowledgement
AICH	Acquisition Indicator CHannel
AM	Acknowledged Mode
AS	Access Stratum
ASC	Access Service Class
ASN.1	Abstract Syntax Notation.1
BCCH	Broadcast Control Channel
BCFE	Broadcast Control Functional Entity
BER	Bit Error Rate
BLER	BLock Error Rate
BSS	Base Station Sub-system
CH	Conditional on history
CV	Conditional on value
CCPCH	Common Control Physical CHannel
CCCH	Common Control Channel
CN	Core Network
CM	Connection Management
CPCH	Common Packet CHannel
C-RNTI	Cell RNTI
CTCH	Common Traffic CHannel
CTFC	Calculated Transport Format Combination
DCA	Dynamic Channel Allocation
DCCH	Dedicated Control Channel
DCFE	Dedicated Control Functional Entity
DCH	Dedicated Channel
DC-SAP	Dedicated Control SAP
DGPS	Differential Global Positioning System
DL	Downlink
DRAC	Dynamic Resource Allocation Control
DSCH	Downlink Shared Channel
DTCH	Dedicated Traffic Channel
FACH	Forward Access Channel
FDD	Frequency Division Duplex
FFS	For Further Study
GC-SAP	General Control SAP
HCS	Hierarchical Cell Structure
HFN	Hyper Frame Number
ID	Identifier
IETF	Internet Engineering Task Force
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IE	Information element
IP	Internet Protocol
ISCP	Interference on Signal Code Power
LAI	Location Area Identity
L1	Layer 1
L2	Layer 2
L3	Layer 3
MD	Mandatory default
MP	Mandatory present
MAC	Media Access Control
MCC	Mobile Country Code
MM	Mobility Management
MNC	Mobile Network Code
NAS	Non Access Stratum
Nt-SAP	Notification SAP
NW	Network

OP	Optional
PCCH	Paging Control Channel
PCH	Paging Channel
PDCP	Packet Data Convergence Protocol
PDSCH	Physical Downlink Shared Channel
PDU	Protocol Data Unit
PLMN	Public Land Mobile Network
PNFE	Paging and Notification Control Functional Entity
PRACH	Physical Random Access CHannel
P-TMSI	Packet Temporary Mobile Subscriber Identity
PUSCH	Physical Uplink Shared Channel
QoS	Quality of Service
RAB	Radio access bearer
RAT	Radio Access Technology
~~RB~~	~~Radio Bearer~~
RAI	Routing Area Identity
RACH	Random Access CHannel
RB	Radio Bearer
RFE	Routing Functional Entity
RL	Radio Link
RLC	Radio Link Control
RNTI	Radio Network Temporary Identifier
RNC	Radio Network Controller
RRC	Radio Resource Control
RSCP	Received Signal Code Power
RSSI	Received Signal Strength Indicator
SAP	Service Access Point
SCFE	Shared Control Function Entity
SF	Spreading Factor
SHCCH	Shared Control Channel
SIR	Signal to Interference Ratio
SSDT	Site Selection Diversity Transmission
S-RNTI	SRNC - RNTI
TDD	Time Division Duplex
TF	Transport Format
TFCS	Transport Format Combination Set
TFS	Transport Format Set
TM	Transparent Mode
TME	Transfer Mode Entity
TMSI	Temporary Mobile Subscriber Identity
Tr	Transparent
Tx	Transmission
UE	User Equipment
UL	Uplink
UM	Unacknowledged Mode
URA	UTRAN Registration Area
U-RNTI	UTRAN-RNTI
USCH	Uplink Shared Channel
UTRAN	Universal Terrestrial Radio Access Network

4.2 RRC Layer Model

The functional entities of the RRC layer are described below:

- Routing of higher layer messages to different MM/CM entities (UE side) or different core network domains (UTRAN side) is handled by the Routing Function Entity (**RFE**)

- Broadcast functions are handled in the broadcast control function entity (**BCFE**). The BCFE is used to deliver the RRC services, which are required at the GC-SAP. The BCFE can use the lower layer services provided by the Tr-SAP and UM-SAP.

- Paging of UEs that do not have an RRC connection is controlled by the paging and notification control function entity (**PNFE**). The PNFE is used to deliver the RRC services that are required at the Nt-SAP. The PNFE can use the lower layer services provided by the Tr-SAP and UM-SAP.

- The Dedicated Control Function Entity (**DCFE**) handles all functions specific to one UE. The DCFE is used to deliver the RRC services that are required at the DC-SAP and can use lower layer services of UM/AM-SAP and Tr-SAP depending on the message to be sent and on the current UE service state.

- In TDD mode, the DCFE is assisted by the Shared Control Function Entity (SCFE) location in the C-RNC, which controls the allocation of the PDSCH and PUSCH using lower layers services of UM-SAP and Tr-SAP.

- The Transfer Mode Entity (TME) handles the mapping between the different entities inside the RRC layer and the SAPs provided by RLC.

NOTE: Logical information exchange is necessary also between the RRC sublayer functional entities. Most of that is implementation dependent and not necessary to present in detail in a specification.

Figure 2 shows the RRC model for the UE and Figure 3 and Figure 4 show the RRC model for the UTRAN.

NOTE: The figure shows only the types of SAPs that are used. Multiple instances of Tr-SAP, UM-SAP and AM-SAP are possible. Especially, different functional entities usually use different instances of SAP types.

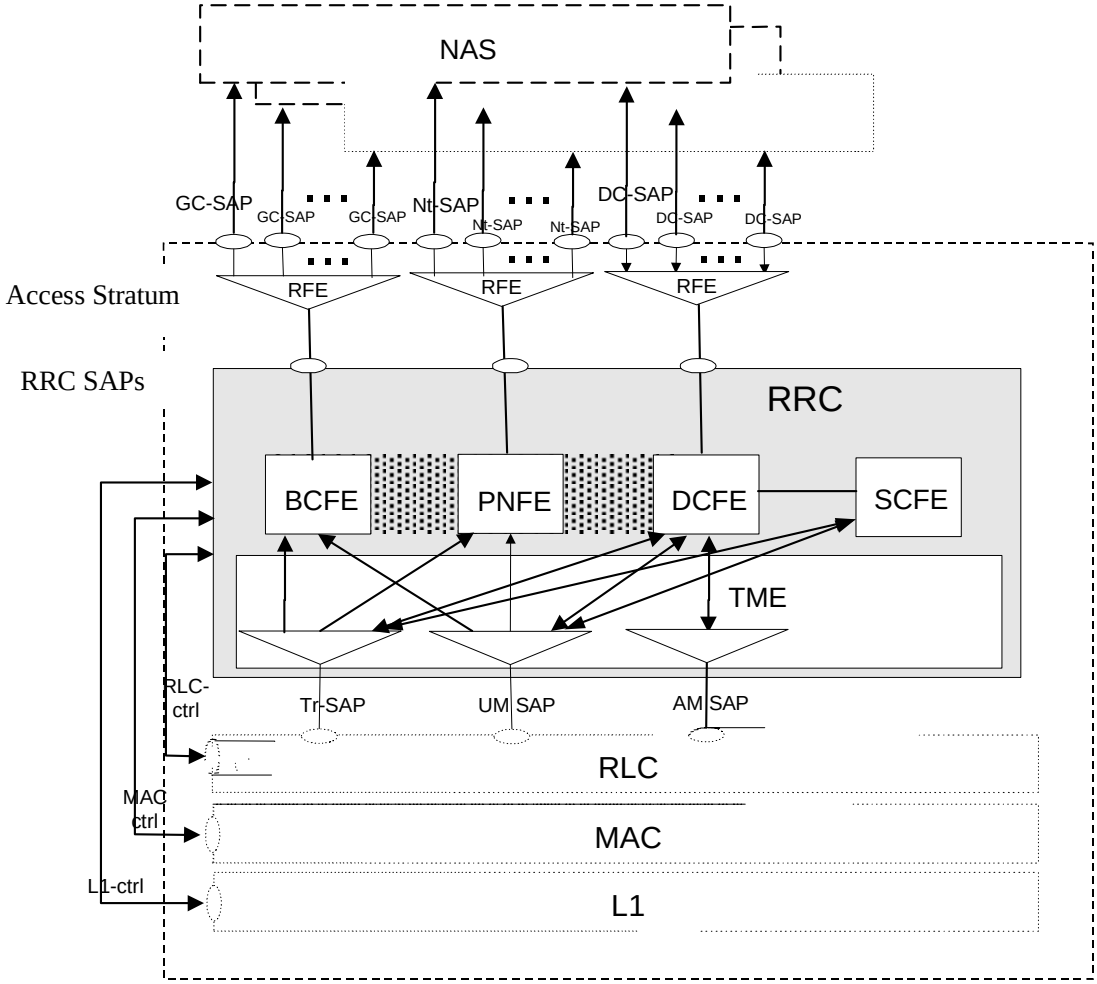

Figure 2: UE side model of RRC

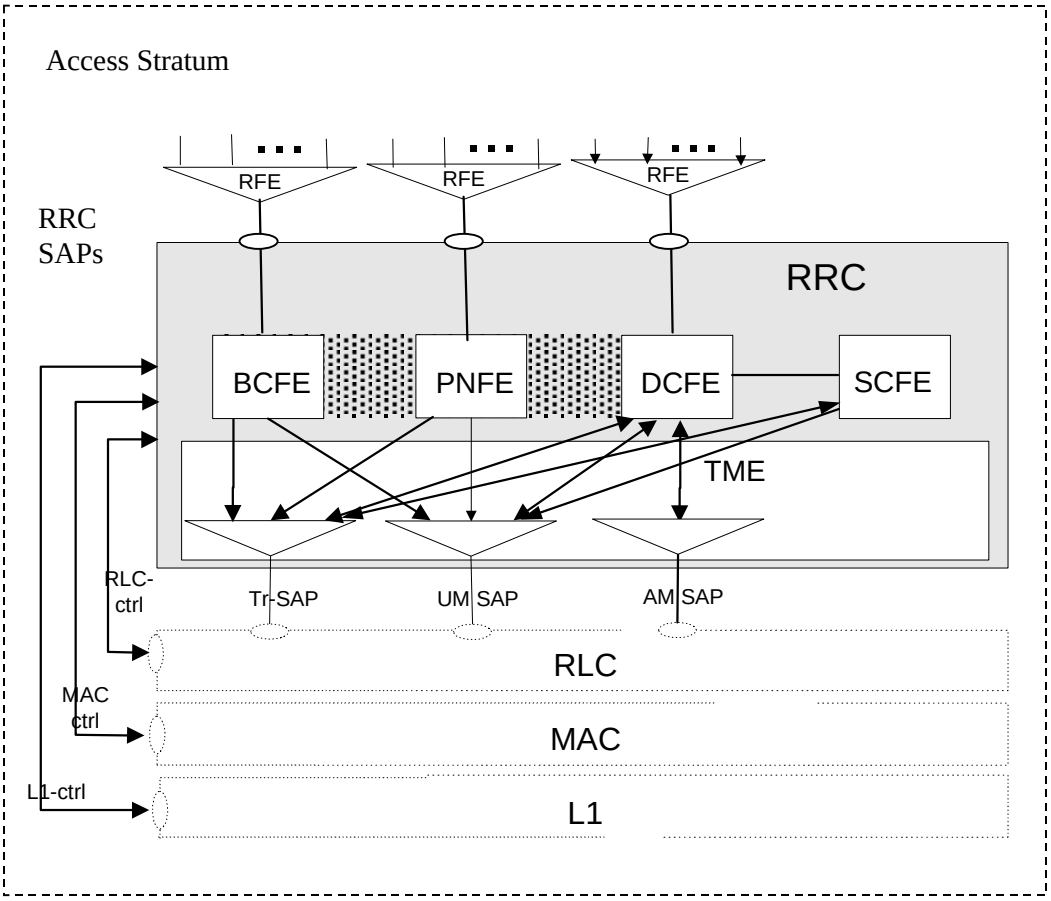

Figure 3: UTRAN side RRC model (DS-MAP system)

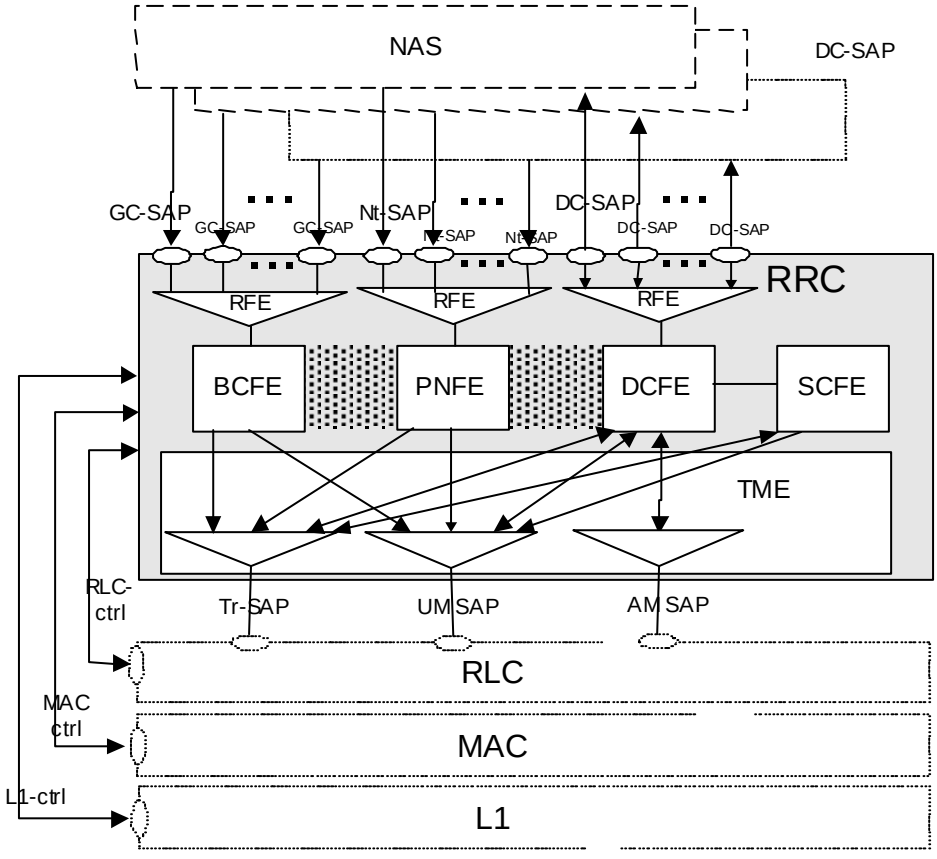

Figure 4: UTRAN side RRC model (DS-41 System)

4.3 Protocol specification principles

This protocol specification is based on the applicable general guidelines given in [14].

In this specification, a notation of variables is used. The variables are defined in subclause 13.4. Variables are typically used to represent a status or a result of an action, such as reception of an information element in a message, which is used to specify a behaviour somewhere else in the specification, such as when setting the value of an information element in a transmitted message. The variables serve only the purpose of specifying the protocol, and do therefore not impose any particular implementation.

When specifying the UE behaviour at reception of messages, the behaviour that is tied to reception or non-reception of individual information elements, and in some cases combinations of information elements, is specified in one location (subclause 8.6).

5 RRC Functions and Services provided to upper layers

5.1 RRC Functions

The RRC performs the functions listed below. A more detailed description of these functions is provided in [2]:

- Broadcast of information related to the non-access stratum (Core Network);
- Broadcast of information related to the access stratum;
- Establishment, maintenance and release of an RRC connection between the UE and UTRAN;
- Establishment, reconfiguration and release of Radio Bearers;
- Assignment, reconfiguration and release of radio resources for the RRC connection;
- RRC connection mobility functions;
- Control of requested QoS;
- UE measurement reporting and control of the reporting;
- Outer loop power control;
- Control of ciphering;
- Slow DCA (TDD mode);
- Paging;
- Initial cell selection and cell re-selection;
- Arbitration of radio resources on uplink DCH;
- RRC message integrity protection;
- Timing advance (TDD mode);
- CBS control.

5.2 RRC Services provided to upper layers

The RRC offers the following services to upper layers, a description and primitives of these services are provided in [2], [17].

- General Control;

- Notification;
- Dedicated control.

The RRC layer provides the UE-UTRAN portion of signalling connections to the upper layers to support the exchange of upper layer's information flow. The signalling connection is ~~an acknowledged mode link~~ used between the user equipment and the core network to transfer upper layer information. For each core network domain, at most one signalling connection may exist at the same time. The RRC layer maps the signalling connections for one UE on a single RRC connection. For the upper layer data transfer on signalling connections, the RRC layer supports the discrimination between two different classes, named "High priority" (corresponding to "SAPI 0" for a GSM-MAP based core network) and "Low priority" (corresponding to "SAPI 3" for a GSM-MAP based core network).

5.3 Primitives between RRC and upper layers

The primitives between RRC and the upper layers are described in [17].

6 Services expected from lower layers

6.1 Services expected from Layer 2

The services provided by layer 2 are described in [2], [15] and [16].

6.2 Services expected from Layer 1

The services provided by layer 1 are described in [2].

6.3 Signalling Radio Bearers

The Radio Bearers (RB) available for ~~usage by~~ transmission of RRC messages ~~using RLC-TM, RLC-UM and RLC-AM on the DCCH and CCCH~~ are defined as "signalling radio bearers" and are specified in the following. The UE and UTRAN shall select the signalling radio bearers for RRC messages using RLC-TM, RLC-UM or RLC-AM on the DCCH and CCCH, according to the following:

- Signalling radio bearer RB 0 shall be used for all messages sent on the CCCH (UL: RLC-TM, DL: RLC-UM).
- Signalling radio bearer RB 1 shall be used for all messages sent on the DCCH, when using RLC unacknowledged mode (RLC-UM).
- Signalling radio bearer RB 2 shall be used for all messages sent on the DCCH, when using RLC acknowledged mode (RLC-AM), except for except for the RRC messages carrying higher layer (NAS) signalling.
- Signalling radio bearer RB 3 and optionally signalling radio bearer RB 4 shall be used for the RRC messages carrying higher layer (NAS) signalling and sent on the DCCH in RLC acknowledged mode (RLC-AM), as specified in subclause 8.1.8., 8.1.9 and 8.1.10.
- Additionally, RBs whose identities shall be set between 5 and 31 may be used as signalling radio bearer for the RRC messages on the DCCH sent in RLC transparent mode (RLC-TM).
- RRC messages on the SHCCH are mapped either on RACH or on the USCH with the lowest assigned Transport Channel Id in the uplink and either on FACH or on the DSCH with the lowest assigned Transport Channel Id using RLC-TM.
  These messages are only specified for TDD mode.

The Radio Bearer configuration for signalling radio bearer ~~S~~RB0 is specified in 13.6.

When an RRC message is transmitted in DL on CCCH or SHCCH using RLC UM, RRC should indicate to RLC that a special RLC length indicator should be used [16]. The UE shall assume that this indication has been given. The special length indicator indicates that an RLC SDU begins in the beginning of an RLC PDU.

7 Protocol states

7.1 Overview of RRC States and State Transitions including GSM

Figure 5 shows the RRC states in UTRA RRC Connected Mode, including transitions between UTRA RRC connected mode and GSM connected mode for ~~PSTN/ISDN~~CS domain services, and between UTRA RRC connected mode and GSM/GPRS packet modes for ~~IP~~ PS domain services. It also shows the transitions between Idle Mode and UTRA RRC Connected Mode and further the transitions within UTRA RRC connected Mode.

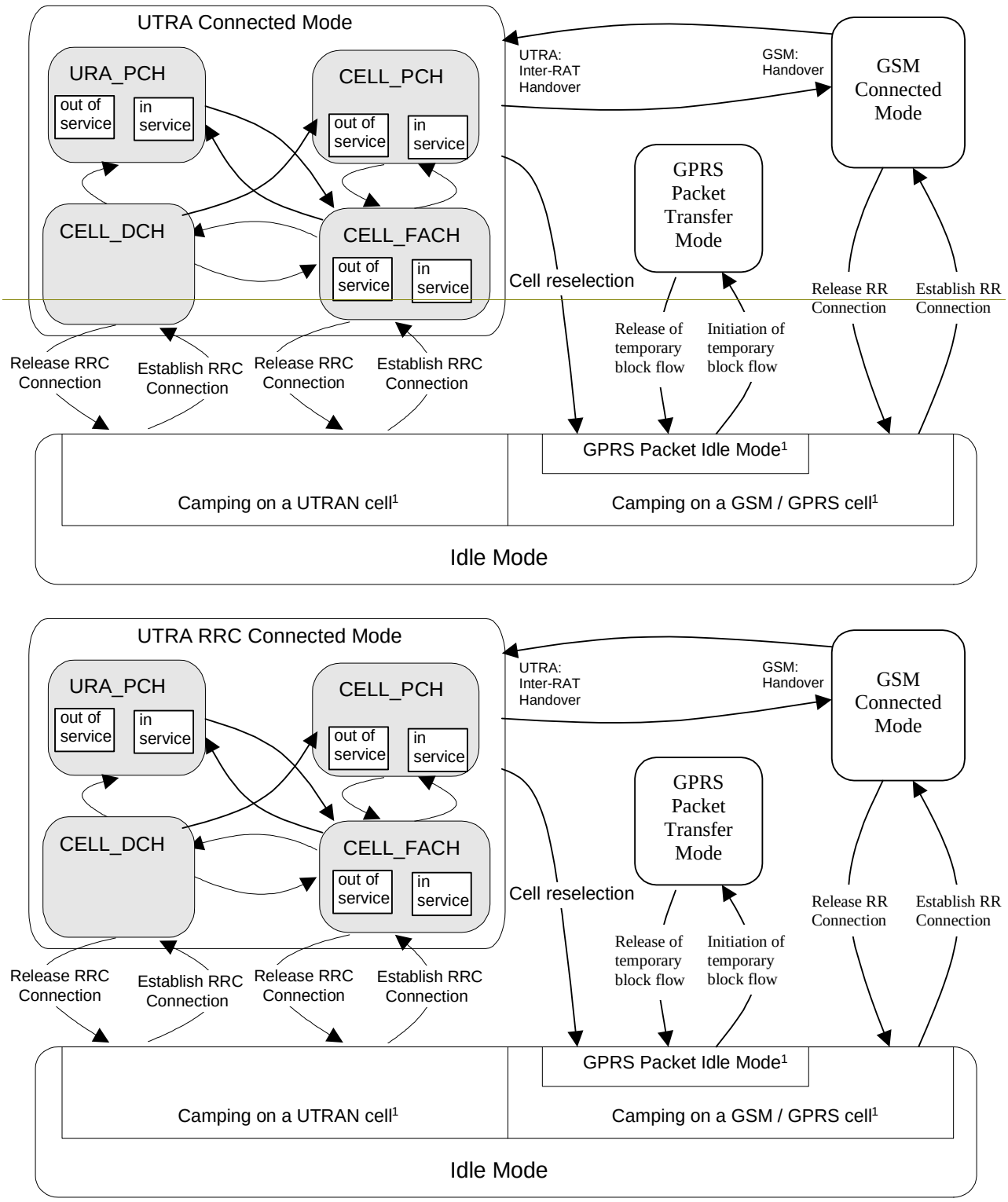

Figure 5: RRC States and State Transitions including GSM
[1: The indicated division within Idle Mode is only included for clarification and shall not be interpreted as states.]

The RRC connection is defined as a point-to-point bi-directional connection between RRC peer entities in the UE and the UTRAN characterised by the allocation of a U-RNTI. A UE has either zero or one RRC connection.

NOTE: The state transitions are specified in ~~sub~~clause 8.

7.2 Processes in UE modes/states

NOTE: This subclause specifies what processes shall be active in the UE in the different RRC modes/states. The related procedures and the conditions on which they are triggered are specified either in clause 8 or elsewhere in the relevant process definition.

7.2.1 UE Idle mode

UE processes that are active in UE Idle mode are specified in [4].

The UE shall perform a periodic search for higher priority PLMNs as specified in [25]

7.2.2 UTRA RRC Connected mode

In this specification unless otherwise mentioned "connected mode" shall refer to "UTRA RRC connected mode".

7.2.2.1 URA_PCH or CELL_PCH state

In the URA_PCH or CELL_PCH state the UE shall perform the following actions:

- if the UE is "in service area":
  - maintain up-to-date system information as broadcast by the serving cell as specified in the sub-clause 8.1.1;
  - perform cell reselection process as specified in [4];
  - perform a periodic search for higher priority PLMNs as specified in [25];
  - monitor the paging occasions and PICH monitoring occasions ~~according to the DRX cycle~~determined according to subclause 8.6.3.1a and 8.6.3.2 and receive paging information on the PCHmapped on the S-CCPCH selected by the UE according to the procedure in subclause 8.5.19;
  - perform measurements process according to measurement control information as specified in subclause 8.4 and in subclause 14.4;
  - maintain up-to-date BMC data if it supports Cell Broadcast Service (CBS) as specified in [37];
  - run timer T305 for periodical URA update if the UE is in URA_PCH or for periodical cell update if the UE is in CELL_PCH;
- if the UE is "out of service area":
  - perform cell reselection process as specified in [4];
  - run timer T316;
  - run timer T305

7.2.2.2 CELL_FACH state

In the CELL_FACH state the UE shall perform the following actions:

- if the UE is "in service area":
  - DCCH and DTCH are available;
  - perform cell reselection process as specified in [4];
  - perform measurements process according to measurement control information as specified in subclause 8.4 and in subclause 14.4;
  - run timer T305 (periodical cell update);

- listen to all FACH transport channels mapped on the S-CCPCH ~~assigned to this UE~~ selected by the UE according to the procedure in subclause 8.5.19;

- if the UE is "out of service area":

  - perform cell reselection process as specified in [4];

  - run timers T305 (periodical cell update), and T317 (cell update when re-entering "in service") or T307 (transition to Idle mode)

7.2.2.3 CELL_DCH state

In the CELL_DCH state the UE shall perform the following actions:

- if DCCH and DTCH are available:

  - read system information broadcast on FACH as specified in subclause 8.1.1.3 (applicable only to UEs with certain capabilities and ~~camping on~~in FDD ~~cells~~mode);

  - read the system information as specified in subclause 8.1.1 (for UEs ~~camping on~~in TDD ~~cells~~mode);

  - perform measurements process according to measurement control information as specified in subclause 8.4 and in clause 14;

8 RRC procedures

The UE shall be able to process several simultaneous RRC procedures. After the reception of a message which invoked a procedure, the UE shall be prepared to receive and act on another message which may invoke a second procedure. Whether this second invokation of a procedure (transaction) is accepted or rejected by the UE is specified in the subclauses of this clause, and in particular in subclause 8.6.3.11 (RRC transaction identifier).

On receiving a message the UE shall first apply integrity check as appropriate and then proceed with error handling as specified in clause 9 before continuing on with the procedure as specified in the relevant subclause. The RRC entity in the UE shall consider PDUs to have been transmitted when they are submitted to the lower layers. If the RRC entity in the UE submits a message for transmission using AM RLC, it shall consider the message successfully transmitted when UTRAN reception of all relevant PDUs is acknowledged by RLC. In the UE, timers are started when the PDUs are sent on the radio interface in the case of the transmission using the CCCH.

8.1 RRC Connection Management Procedures

8.1.1 Broadcast of system information

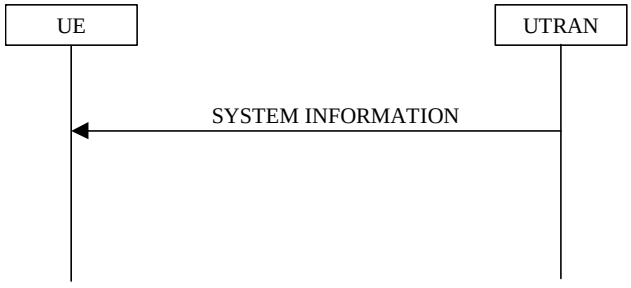

Figure 6: Broadcast of system information

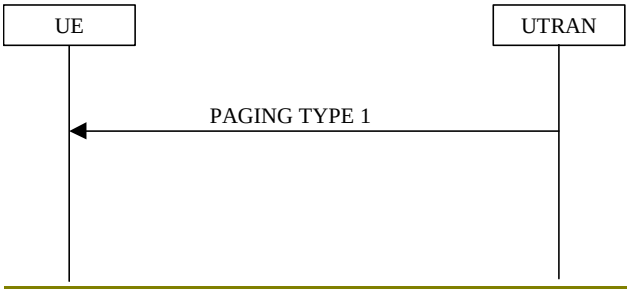

Figure 6a: Notification of system information modification for UEs in idle mode, CELL_PCH state and URA_PCH state

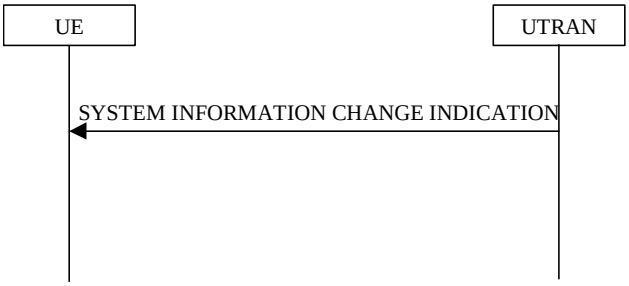

Figure 6b: Notification of system information modification for UEs in CELL_FACH state

8.1.1.6.1 System Information Block type 1

If in idle mode, the UE should store all relevant IEs included in this system information block if the "PLMN Type" in the variable SELECTED_PLMN has the value "GSM-MAP" and the IE "PLMN type" in the Master Information Block has the value "GSM-MAP" or "GSM-MAP and ANSI-41". The UE shall also:

- forward the content of the IE "CN common GSM-MAP NAS system information" to upper layers;
- for the IE "CN domain system information list":
  - for each IE "CN domain system information" that is present:
    - forward the content of the IE "CN domain specific NAS system information" and the IE "CN domain identity" to upper layers;
    - use the IE "CN domain specific DRX cycle length coefficient" to calculate frame number for the Paging Occasions and Page indicator as specified in [4];
  - if an IE "CN domain system information" is not present for a particular CN domain:
    - indicate to upper layers that no CN system information is available for that CN domain;
- use the values in the IE "UE Timers and constants in idle mode" for the relevant timers and ~~counters~~constants.
- store the values of the IE "UE Timers and constants in idle mode" in the variable TIMERS_AND_CONSTANTS;

If in connected mode the UE shall not use the values of the IEs in this system information block except for the timers and constant values given by the IE "UE timers and constants in connected mode".

If in idle mode and system information block type 1 is not scheduled on BCH, and system information block type 13 is not scheduled on BCH the UE shall:

- consider the cell to be barred according to [4]. The UE shall consider the barred cell as using the value "allowed" in the IE "Intra-frequency cell re-selection indicator", and the maximum value in the IE "T_{barred}".

If in idle mode and if

- system information block type 1 is not scheduled on BCH; and
- the "PLMN Type" in the variable SELECTED_PLMN has the value "GSM-MAP"; and
- the IE "PLMN type" in the Master Information Block has the value "GSM-MAP" or "GSM-MAP and ANSI-41":

the UE shall:

- indicate to upper layers that no CN system information is available.

8.1.2.2 Initiation

UTRAN initiates the paging procedure by transmitting a PAGING TYPE 1 message on an appropriate paging occasion on the PCCH.

UTRAN may repeat transmission of a PAGING TYPE 1 message to a UE in several paging occasions to increase the probability of proper reception of a page.

UTRAN may page several UEs in the same paging occasion by including one IE "Paging record" for each UE in the PAGING TYPE 1 message.

For CN originated paging, UTRAN should set the IE "Paging cause" to the cause for paging received from upper layers. If no cause for paging is ~~available~~received from upper layers, UTRAN should set the value "Terminating – cause unknown".

UTRAN may also indicate that system information has been updated, by including the value tag of the master information block in the IE "BCCH modification information" in the PAGING TYPE 1 message. In this case, UTRAN may omit the IEs "Paging record".

8.1.2.3 Reception of a PAGING TYPE 1 message by the UE

A UE in idle mode, CELL_PCH state or URA_PCH state shall receive the paging information for all its monitored paging occasions. For an UE in idle mode, the paging occasions are specified in [4] and depend on the IE "CN domain specific DRX cycle length coefficient", as specified in subclause ~~8.6.1.1~~8.6.3.1a. For a UE in CELL_PCH state or URA_PCH state, the paging occasions depend also on the IE "UTRAN DRX cycle length coefficient" and the IE "RRC State Indicator", as specified in subclauses 8.6.3.2 and 8.6.3.3 respectively.

When the UE receives a PAGING TYPE 1 message, it shall perform the actions as specified below.

If the UE is in idle mode, for each occurrence of the IE "Paging record" included in the message the UE shall:

- if the IE "Used paging identity" is a CN identity:
  - compare the IE "UE identity" with all of its allocated CN UE identities:
  - if one match is found:
    - indicate reception of paging; and
    - forward the IE "CN domain identity", the IE "UE identity" and the IE "Paging cause" to the upper layers;
- otherwise:
  - ignore that paging record.

If the UE is in connected mode, for each occurrence of the IE "Paging record" included in the message the UE shall:

- if the IE "Used paging identity" is a UTRAN identity and if this U-RNTI is the same as the U-RNTI allocated to the UE:
  - if the optional IE "CN originated page to connected mode UE" is included:
    - indicate reception of paging; and
    - forward the IE "CN domain identity", the IE "Paging cause" and the IE "Paging record type identifier" to the upper layers;
  - perform a cell update procedure with cause "paging response" as specified in subclause 8.3.1.2;
  - ignore any other remaining IE "Paging record" that may be present in the message;
- otherwise:
  - ignore that paging record.

If the IE "BCCH modification info" is included, any UE in idle mode, CELL_PCH or URA_PCH state shall perform the actions as specified in subclause 8.1.1 ~~irrespective of~~ in addition to any actions caused by the IE "Paging record" occurrences in the message as specified above.

8.1.3.6 Reception of an RRC CONNECTION SETUP message by the UE

The UE shall compare the value of the IE "Initial UE identity" in the received RRC CONNECTION SETUP message with the value of the variable INITIAL_UE_IDENTITY.

If the values are different, the UE shall:

- ignore the rest of the message;

If the values are identical, the UE shall:

- stop timer T300, and act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following;
  - if the UE will be in the CELL_FACH state at the conclusion of this procedure:
    - if the IE "Frequency info" is included:
      - select a suitable UTRA cell according to [4] on that frequency;
    - select PRACH according to subclause ~~8.6.6.2~~8.5.17;
    - select Secondary CCPCH according to subclause ~~8.6.6.5~~8.5.19;
- enter a state according to subclause 8.6.3.3;
- submit an RRC CONNECTION SETUP COMPLETE message to the lower layers on the uplink DCCH after successful state transition per subclause 8.6.3.3, with the contents set as specified below:
  - set the IE "RRC transaction identifier" to
    - the value of "RRC transaction identifier" in the entry for the RRC CONNECTION SETUP message in the table "Accepted transactions" in the variable TRANSACTIONS; and
    - clear that entry.
  - calculate START values for each CN domain according to subclause 8.5.9 and include the result in the IE "START list";
  - if the IE "UE radio access FDD capability update requirement" included in the RRC CONNECTION SETUP message has the value TRUE:

    include its UTRAN-specific FDD capabilities and its UTRAN –specific capabilities common to FDD and TDD in the IE "UE radio access capability";
- if the IE "UE radio access TDD capability update requirement" included in the RRC CONNECTION SETUP message has the value TRUE:

  include its UTRAN-specific TDD capabilities and its UTRAN –specific capabilities common to FDD and TDD in the IE "UE radio access capability";
- if the IE "System specific capability update requirement list" is present in the RRC CONNECTION SETUP message:
  - include its inter-RAT capabilities for the requested systems in the IE "UE system specific capability".

When of the RRC CONNECTION SETUP COMPLETE message has been submitted to lower layers for transmission the UE shall:

- if the UE has entered CELL_FACH state:
  - start timer T305 using its initial value if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- update its variable UE_CAPABILITY_TRANSFERRED which UE capabilities it has transmitted to the UTRAN;

- if the IE "Transport format combination subset" was not included in the RRC CONNECTION SETUP message:
  - set the IE "Current TFC subset" in the variable TFS_SUBSET to "Full transport format combination set";
- set the "Status" in the variable CIPHERING_STATUS to "Not started";
- set the "Reconfiguration" in the variable CIPHERING_STATUS to FALSE;
- set the "Status" in the variable INTEGRITY_PROTECTION_INFO to "Not started";
- set the "Historical status" in the variable INTEGRITY_PROTECTION_INFO to "Never been active";
- set the "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE;
- set the variable CELL_UPDATE_STARTED to FALSE;
- set the variable CONFIGURATION_INCOMPLETE to FALSE;
- set the variable ORDERED_RECONFIGURATION to FALSE;
- set the variable FAILURE_INDICATOR to FALSE;
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
- set the variable INVALID_CONFIGURATION to FALSE;
- set the variable PROTOCOL_ERROR_INDICATOR to FALSE;
- set the variable PROTOCOL_ERROR_REJECT to FALSE;
- set the variable TGSN_REPORTED to FALSE;
- set the variable UNSUPPORTED_CONFIGURATION to FALSE;
- clear all optional IEs in all variables, except those optional IEs that are set in this procedure;
- consider the procedure to be successful;

And the procedure ends.

8.1.4.5 Cell re-selection or radio link failure

If the UE performs cell re-selection or the radio link failure criteria in subclause 8.5.6 is met at any time during the RRC connection release procedure and the UE has not yet entered idle mode, the UE shall

- if cell re-selection occurred (CELL_FACH state), perform a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
- if radio link failure occurred (CELL_DCH state):
  - select a suitable UTRA cell according to [4];
  - perform a cell update procedure according to subclause 8.3.1 using the cause "radio link failure".

8.1.4.6 Expiry of timer T308, unacknowledged mode transmission

When in state CELL_DCH and the timer T308 expires, the UE shall:

- increment V308 by one;
- if V308 is equal to or smaller than N308:
  - retransmit the RRC CONNECTION RELEASE COMPLETE message, without incrementing "Uplink RRC Message sequence number" for signalling radio bearer RB#1 in the variable INTEGRITY_PROTECTION_INFO;
- if V308 is greater than N308:
  - release all its radio resources;
  - indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode;
  - perform the actions specified in subclause 8.5.2 when entering idle mode;
  - And the procedure ends.

8.1.6.6 T304 timeout

Upon expiry of timer T304, the UE shall check the value of V304 and:

- if V304 is smaller than or equal to N304:
  - retransmit a UE CAPABILITY INFORMATION message with the IEs as set in the last unsuccessful attempt, without incrementing "Uplink RRC Message sequence number" for signalling radio bearer RB#2 in the variable INTEGRITY_PROTECTION_INFO;
  - restart timer T304;
  - increment counter V304;
- if V304 is greater than N304:
  - ~~assume that radio link failure has occurred;~~
  - initiate the Cell update procedure as specified in subclause 8.3.1, using the cause "Radio link failure".

8.1.8.2 Initiation of Initial direct transfer procedure in the UE

In the UE, the initial direct transfer procedure shall be initiated, when the upper layers request establishment of a signalling connection. This request also includes a request for the transfer of a NAS message.

Upon initiation of the initial direct transfer procedure when the UE is in idle mode, the UE shall

- set the variable ESTABLISHMENT_CAUSE to the cause for establishment indicated by upper layers;
- perform an RRC connection establishment procedure, according to subclause 8.1.3;
- if the RRC connection establishment procedure was not successful:
  - indicate failure to establish the signalling connection to upper layers and end the procedure;
- when the RRC connection establishment procedure is completed successfully:
  - continue with the initial direct transfer procedure as below;

Upon initiation of the initial direct transfer procedure when the UE is in CELL_PCH or URA_PCH state, the UE shall:

- perform a cell update procedure, according to subclause 8.3.1, using the cause "uplink data transmission";
- when the cell update procedure completed successfully:
  - continue with the initial direct transfer procedure as below.

The UE shall, in the INITIAL DIRECT TRANSFER message:

- set the IE "NAS message" as received from upper layers; and
- set the IE "CN domain identity" as indicated by the upper layers; and
- set the IE "Intra Domain NAS Node Selector" as indicated by the upper layers.

In CELL_FACH state, the UE shall:

- if RACH measurement reporting has been requested in the IE "Intra-frequency reporting quantity for RACH reporting" and the IE "Maximum number of reported cells on RACH" in "System Information Block type 12" (or "System Information Block type 11" if "System Information Block type 12" is not being broadcast):
  - include IE "Measured results on RACH" in the INITIAL DIRECT TRANSFER message.

The UE shall:

- transmit the INITIAL DIRECT TRANSFER message on the uplink DCCH using AM RLC on signalling radio bearer RB 3;
- when the INITIAL DIRECT TRANSFER message has been submitted to lower layers for transmission:
  - confirm the establishment of a signalling connection to upper layers; and
  - add the signalling connection with the identity indicated by the IE "CN domain identity" in the variable ESTABLISHED_SIGNALLING_CONNECTIONS; and
  - The procedure ends.

When not stated otherwise elsewhere, the UE may also initiate the initial direct transfer procedure when another procedure is ongoing, and in that case the state of the latter procedure shall not be affected.

A new signalling connection request may be received from upper layers subsequent to the indication of the release of a previously established signalling connection to upper layers. From the time of the indication of release to upper layers until the UE has entered idle mode, any such upper layer request to establish a new signalling connection shall be queued. This request shall be processed after the UE has entered idle mode.

8.1.9.2 Initiation of downlink direct transfer procedure in the UTRAN

In the UTRAN, the direct transfer procedure is initiated when the upper layers request the transfer of a NAS message after the initial signalling connection is established. The UTRAN may also initiate the downlink direct transfer procedure when another RRC procedure is ongoing, and in that case the state of the latter procedure shall not be affected. The UTRAN shall transmit the DOWNLINK DIRECT TRANSFER message on the downlink DCCH using AM RLC on signalling radio bearer RB 3 or signalling radio bearer RB 4. The UTRAN should:

- if upper layers indicate "low priority" for this message:
  - select signalling radio bearer RB 4, if available. Specifically, for a GSM-MAP based CN, signalling radio bearer RB 4 should, if available, be selected when "SAPI 3" is requested;
  - select signalling radio bearer RB 3 when signalling radio bearer RB 4 is not available;
- if upper layers indicate "high priority" for this message:
  - select signalling radio bearer RB 3. Specifically, for a GSM-MAP based CN, signalling radio bearer RB 3 should be selected when "SAPI 0" is requested.

The UTRAN sets the IE "CN Domain Identity" to indicate, which CN domain the NAS message is originated from.

8.1.10.2 Initiation of uplink direct transfer procedure in the UE

In the UE, the uplink direct transfer procedure shall be initiated when the upper layers request a transfer of a NAS message on an existing signalling connection. When not stated otherwise elsewhere, the UE may initiate the uplink direct transfer procedure when another procedure is ongoing, and in that case the state of the latter procedure shall not be affected.

Upon initiation of the uplink direct transfer procedure in CELL_PCH or URA_PCH state, the UE shall:

- perform a cell update procedure, according to subclause 8.3.1, using the cause "uplink data transmission";
- when the cell update procedure has been completed successfully:
  - continue with the uplink direct transfer procedure as below.

The UE shall transmit the UPLINK DIRECT TRANSFER message on the uplink DCCH using AM RLC on signalling radio bearer RB 3 or signalling radio bearer RB 4. The UE shall:

- if upper layers indicate "low priority" for this message:
  - select signalling radio bearer RB 4, if available. Specifically, for a GSM-MAP based CN, signalling radio bearer RB 4 shall, if available, be selected when "SAPI 3" is requested;
  - select signalling radio bearer RB 3 when signalling radio bearer RB 4 is not available;
- if upper layers indicate "high priority" for this message:
  - select signalling radio bearer RB 3. Specifically, for a GSM-MAP based CN, signalling radio bearer RB 3 shall be selected when "SAPI 0" is requested.

The UE shall set the IE "NAS message" as received from upper layers and set the IE "CN domain identity" as indicated by the upper layers.

When the UPLINK DIRECT TRANSFER message has been submitted to lower layers for transmission the procedure ends.

8.1.10.3 Reception of UPLINK DIRECT TRANSFER message by the UTRAN

On reception of the UPLINK DIRECT TRANSFER message the NAS message should be routed using the value indicated in the IE "CN domain identity".

If the IE "Measured results on RACH" is present in the message, the UTRAN should extract the contents to be used for radio resource control.

When the UTRAN receives an UPLINK DIRECT TRANSFER message, it shall not affect the state of any other ongoing RRC procedures, when not stated otherwise elsewhere.

8.1.11 UE dedicated paging

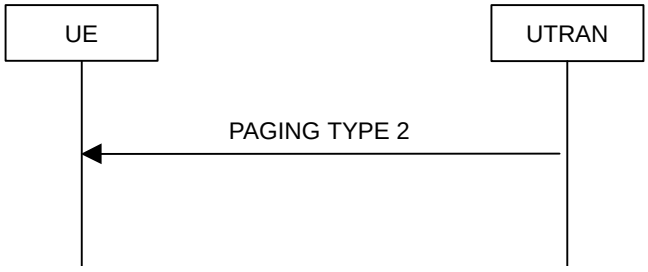

Figure 17: UE dedicated paging

8.1.11.1 General

This procedure is used to transmit dedicated paging information to one UE in connected mode in CELL_DCH or CELL_FACH state. Upper layers in the network may request initiation of paging.

8.1.11.2 Initiation

For a UE in CELL_DCH or CELL_FACH state, UTRAN initiates the procedure by transmitting a PAGING TYPE 2 message on the DCCH using AM RLC. When not stated otherwise elsewhere, the UTRAN may initiate the UE dedicated paging procedure also when another RRC procedure is ongoing, and in that case the state of the latter procedure shall not be affected.

UTRAN should set the IE "Paging cause" to the cause for paging received from upper layers. If no cause for paging is ~~available~~received from upper layers, UTRAN should set the value "Terminating – cause unknown".

8.1.12.3 Reception of SECURITY MODE COMMAND message by the UE

Upon reception of the SECURITY MODE COMMAND message, the UE shall perform the actions for the received information elements according to 8.6.

If the IE "Security capability" is the same as indicated by variable UE_CAPABILITY_TRANSFERRED, and the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- suspend all radio bearers and signalling radio bearers (except the signalling radio bearer used to receive the SECURITY MODE COMMAND message on the downlink DCCH in RLC-AM) using RLC-AM or RLC-UM that belong to the CN domain indicated in the IE "CN domain identity", with RLC sequence number greater than or equal to the number in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info";
- set the IE "RRC transaction identifier" in the SECURITY MODE COMPLETE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO, for the respective radio bearer and signalling radio bearer;
- if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- when the radio bearers and signalling radio bearers have been suspended:
  - send a SECURITY MODE COMPLETE message on the uplink DCCH in AM RLC, using the old ciphering configurations;
  - if the IE "Integrity protection mode info" was present in the SECURITY MODE COMMAND message:
    - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB#2 from and including the transmitted SECURITY MODE COMPLETE message;
- when the successful delivery of the SECURITY MODE COMPLETE message has been confirmed by RLC:
  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
  - if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info":
    - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
    - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - The procedure ends. If a RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been confirmed by RLC, but before the activation time for the new ciphering configuration has been reached, then the activation time shall be ignored and the new ciphering configuration shall be applied immediately after the RLC reset or RLC re-establishment;
  - notify upper layers upon change of the security configuration.

For radio bearers and signalling radio bearers used by the CN indicated in the IE "CN domain identity", the UE shall:

- if a new integrity protection key has been received or a new ciphering key has been received:
  - set the variable LATEST_CONFIGURED_CN_DOMAIN equal to the IE "CN domain identity";
- if a new integrity protection key has been received:
  - in the downlink:
    - use the new key;
    - set the HFN component of the downlink COUNT-I to zero at the RRC sequence number indicated in IE "Downlink integrity protection activation info" included in the IE "Integrity protection mode info";

    in the uplink:
    - use the new key;
    - set the HFN component of the uplink COUNT-I to zero at the RRC sequence number indicated in IE "Uplink integrity protection activation info";
- if a new ciphering key is available:
  - in the downlink:
    - use the new key;
    - set the HFN component of the downlink COUNT-C to zero at the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info";
  - in the uplink:
    - use the new key;
    - set the HFN component of the uplink COUNT-C to zero at the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info".

If the IE "Security capability" is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- release all its radio resources;
- indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- perform actions when entering idle mode as specified in subclause 8.5.2;
- And the procedure ends.

8.1.12.4 Void

8.1.12.4a Incompatible simultaneous security reconfiguration

If the variable INCOMPATIBLE_SECURITY_RECONFIGURATION becomes set to TRUE of the received SECURITY MODE CONTROL message, the UE shall:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "incompatible simultaneous reconfiguration";
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - And the procedure ends.

8.1.12.4b Cell update procedure during security reconfiguration

If:

- a cell update procedure according to subclause 8.3.1 is initiated; and
- the received SECURITY MODE CONTROL message causes either,
  - the IE "Reconfiguration" in the variable CIPHERING_STATUS to be set to TRUE; and/or
  - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to be set to TRUE:

the UE shall:

- abort the ongoing integrity and/or ciphering reconfiguration;
- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "cell update occurred";
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info":
    - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
    - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received; and
  - The procedure ends.

8.1.12.4c Invalid configuration

If the variable INVALID_CONFIGURATION is set to TRUE the UE shall:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC setting the information elements as specified below;
  - set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to "invalid configuration";
- set the variable INVALID_CONFIGURATION to FALSE;
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received.

The procedure ends.

8.1.12.5 Reception of SECURITY MODE COMPLETE message by the UTRAN

UTRAN should apply integrity protection on the received SECURITY MODE COMPLETE message and all subsequent messages with the new integrity protection configuration, if changed. When UTRAN has received a SECURITY MODE COMPLETE message and the integrity protection has successfully been applied, UTRAN shall:

- for radio bearers using RLC-AM or RLC-UM:
  - use the old ciphering configuration for received RLC PDUs with RLC sequence number less than the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
  - use the new ciphering configuration for received RLC PDUs with RLC sequence number greater than or equal to the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
  - if an RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been received by UTRAN before the activation time for the new ciphering configuration has been reached, ignore the activation time and apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment;
- for radio bearers using RLC-TM:
  - use the new ciphering configuration for the received RLC PDUs at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info";
- And the procedure ends.

8.1.15.3 Reception of a COUNTER CHECK message by the UE

When the UE receives a COUNTER CHECK message it shall compare the COUNT-C MSB values received in the IE "RB COUNT-C MSB information" in the COUNTER CHECK message to the COUNT-C MSB values of the corresponding radio bearers.

The UE shall:

- set the IE "RRC transaction identifier" in the COUNTER CHECK RESPONSE message to the value of "RRC transaction identifier" in the entry for the COUNTER CHECK message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry.

If

- there is one or more radio bearer(s) using UM or AM RLC mode stored in the variable ESTABLISHED_RABS, which is (are) not included in the IE "RB COUNT-C MSB information"; or
- there is one or more radio bearer(s) included in the IE "RB COUNT-C MSB information", which is (are) not stored in the variable ESTABLISHED_RABS; or
- for any radio bearer (excluding signalling radio bearers~~SRBs~~) using UM or AM RLC mode stored in the variable ESTABLISHED_RABS and included in the IE "RB COUNT-C MSB information" with COUNT-C MSB values different from the MSB part of the COUNT-C values in the UE

the UE shall:

- include these radio bearers in the IE "RB COUNT-C information" in the COUNTER CHECK RESPONSE message. For any RB which is included in the IE "RB COUNT-C MSB information" in the COUNTER CHECK message but not stored in the variable ESTABLISHED_RABS in the UE, the MSB part of COUNT-C values in the COUNTER CHECK RESPONSE message shall be set identical to COUNT-C-MSB values in the COUNTER CHECK message. The LSB part shall be filled by 0s;

The UE shall:

- submit a COUNTER CHECK RESPONSE message to lower layers for transmission on the uplink DCCH using AM RLC.

When the COUNTER CHECK RESPONSE message has been submitted to lower layers for transmission the procedure ends.

8.2.2.2 Initiation

To initiate any one of the reconfiguration procedures, UTRAN should:

- configure new radio links in any new physical channel configuration;
- start transmission and reception on the new radio links;
- for a radio bearer establishment procedure:
  - transmit a RADIO BEARER SETUP message on the downlink DCCH using AM or UM RLC;
- for a radio bearer reconfiguration procedure:
  - transmit a RADIO BEARER RECONFIGURATION message on the downlink DCCH using AM or UM RLC;
- for a radio bearer release procedure:
  - transmit a RADIO BEARER RELEASE message on the downlink DCCH using AM or UM RLC;
- for a transport channel reconfiguration procedure:
  - transmit a TRANSPORT CHANNEL RECONFIGURATION message on the downlink DCCH using AM or UM RLC;
- for a physical channel reconfiguration procedure:
  - transmit a PHYSICAL CHANNEL RECONFIGURATION message on the downlink DCCH using AM or UM RLC;
- if the reconfiguration procedure is simultaneous with SRNS relocation procedure, and ciphering and/or integrity protection are activated:
  - transmit new ciphering and/or integrity protection information to be used after reconfiguration.
- if transport channels are added, reconfigured or deleted in uplink and/or downlink:
  - set TFCS according to the new transport channel(s).
- if transport channels are added or deleted in uplink and/or downlink, and RB Mapping Info applicable to the new configuration has not been previously provided to the UE, the UTRAN should:
  - send the RB Mapping Info for the new configuration.

In the Radio Bearer Reconfiguration procedure UTRAN may indicate that uplink transmission shall be stopped or continued on certain radio bearers. Uplink transmission on a signalling radio bearer used by the RRC signalling (signalling radio bearer RB1 or signalling radio bearer RB2) should not be stopped.

If the IE "Activation Time" is included, UTRAN should set it to a value taking the UE performance requirements into account.

UTRAN should take the UE capabilities into account when setting the new configuration.

If the message is used to initiate a transition from CELL_DCH to CELL_FACH state, the UTRAN may assign a common channel configuration of a given cell and C-RNTI to be used in that cell to the UE.

8.2.2.3 Reception of RADIO BEARER SETUP or RADIO BEARER RECONFIGURATION or RADIO BEARER RELEASE or TRANSPORT CHANNEL RECONFIGURATION or PHYSICAL CHANNEL RECONFIGURATION message by the UE

The UE shall be able to receive any of the following messages:

- RADIO BEARER SETUP message; or

- RADIO BEARER RECONFIGURATION message; or
- RADIO BEARER RELEASE message; or
- TRANSPORT CHANNEL RECONFIGURATION message; or
- PHYSICAL CHANNEL RECONFIGURATION message

and perform a hard handover, even if no prior UE measurements have been performed on the target cell and/or frequency.

If the UE receives:

- a RADIO BEARER SETUP message; or
- a RADIO BEARER RECONFIGURATION message; or
- a RADIO BEARER RELEASE message; or
- a TRANSPORT CHANNEL RECONFIGURATION message; or
- a PHYSICAL CHANNEL RECONFIGURATION message

it shall:

- set the variable ORDERED_RECONFIGURATION to TRUE;
- ~~may first release the current physical channel configuration and~~
- ~~then establish a new physical channel configuration and~~ act upon all received information elements as specified in subclause 8.6, unless specified in the following and perform the actions below.~~:~~

The UE may first release the physical channel configuration used at reception of the reconfiguration message. The UE shall then:

  - in FDD, if the IE "PDSCH code mapping" is included but the IE "PDSCH with SHO DCH Info" is not included and if the DCH has only one link in its active set:
    - act upon the IE "PDSCH code mapping" as specified in subclause 8.6 and:
    - infer that the PDSCH will be transmitted from the cell from which the downlink DPCH is transmitted;
- enter a state according to subclause 8.6.3.3.

If the UE was in CELL_DCH state upon reception of the reconfiguration message and remains in CELL_DCH state ~~after state transition~~, the UE shall:

- if the IE "UL DPCH Info" is absent, not change its current UL Physical channel configuration;
- if the IE "DL DPCH Info for each RL" is absent, not change its current DL Physical channel configuration.

If after state transition the UE enters CELL_FACH state, the UE shall, after the state transition:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];
- if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE:
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:

- if the UE is in CELL_PCH or URA_PCH state:
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
  - proceed as below;

- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select PRACH according to subclause ~~8.6.6.2~~8.5.17;
- select Secondary CCPCH according to subclause ~~8.6.6.5~~8.5.19;
- use the transport format set given in system information;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;[Note to Hans: Indentation change +1]
- if the contents of the variable C_RNTI is empty:
  - perform a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:
    - if the UE is in CELL_PCH or URA_PCH state:
      - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
      - proceed as below;

The UE shall transmit a response message as specified in subclause 8.2.2.4, setting the information elements as specified below. The UE shall:

- if the received reconfiguration message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";
- if the received reconfiguration message did not include the IE "Downlink counter synchronisation info":
  - if the variable START_VALUE_TO_TRANSMIT is set:
    - include and set the IE "START" to the value of that variable;
  - if the variable START_VALUE_TO_TRANSMIT is not set and the IE "New U-RNTI" is included:
    - calculate the START value according to subclause 8.5.9;
    - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";
- if the received reconfiguration message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received reconfiguration message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the variable PDCP_SN_INFO is not empty:
  - include the IE "RB with PDCP information list" and set it to the value of the variable PDCP_SN_INFO;
- in TDD, if the procedure is used to perform a handover to a cell where timing advance is enabled, and the UE can calculate the timing advance value in the new cell (i.e. in a synchronous TDD network):
  - set the IE "Uplink Timing Advance" to the calculated value;
- if the IE "Integrity protection mode info" was present in the received reconfiguration message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB#2 from and including the transmitted response message;

If after state transition the UE enters CELL_PCH or URA_PCH state, the UE shall, after the state transition and transmission of the response message:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];
- prohibit periodical status transmission in RLC;
- remove any C-RNTI from MAC;
- clear the variable C_RNTI;
- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select Secondary CCPCH according to subclause ~~8.6.6.5~~8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2;
- if the UE enters CELL_PCH state, and the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE:
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
  - when the cell update procedure completed successfully:
    - The procedure ends;
- if the UE enters URA_PCH state, and after cell selection the criteria for URA update caused by "URA reselection" according to subclause 8.3.1 is fulfilled:
  - initiate a URA update procedure according to subclause 8.3.1 using the cause "URA reselection";
  - when the URA update procedure completed:
    - The procedure ends.

8.2.2.4 Transmission of a response message by the UE, normal case

In case the procedure was triggered by reception of a RADIO BEARER SETUP message, the UE shall:

- if the UE is not in CELL_DCH prior to this procedure and will be in CELL_DCH state at the conclusion of this procedure:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
- transmit a RADIO BEARER SETUP COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RECONFIGURATION message, the UE shall:

- if the UE will be in CELL_DCH state at the conclusion of this procedure:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
- transmit a RADIO BEARER RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RELEASE message, the UE shall:

- if the UE will be in CELL_DCH state at the conclusion of this procedure:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
- transmit a RADIO BEARER RELEASE COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a TRANSPORT CHANNEL RECONFIGURATION message, the UE shall:

- if the UE will be in CELL_DCH state at the conclusion of this procedure:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
- transmit a TRANSPORT CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a PHYSICAL CHANNEL RECONFIGURATION message, the UE shall:

- if the UE will be in CELL_DCH state at the conclusion of this procedure:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
- transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

If the new state is CELL_DCH or CELL_FACH, the response message shall be transmitted using the new configuration after the state transition, and the UE shall:

- if the variable PDCP_SN_INFO is empty:
  - if the received reconfiguration message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the response message:
      - notify upper layers upon change of the security configuration;
      - perform the actions below;

- if the received reconfiguration message did not contain the IE "Ciphering mode info":
  - when RLC has been requested to transmit the response message:
    - perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the response message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
        - configure the RLC entity for that radio bearer to "continue";
    - perform the actions below.

If the new state is CELL_PCH or URA_PCH, the response message shall be transmitted using the old configuration before the state transition, but the new C-RNTI shall be used if the IE "New C-RNTI" was included in the received reconfiguration message, and the UE shall:

- when RLC has confirmed the successful transmission of the response message:
  - for each radio bearer in the variable PDCP_SN_INFO:
    - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
      - configure the RLC entity for that radio bearer to "continue";
  - enter the new state (CELL_PCH or URA_PCH, respectively);
  - perform the actions below.

The UE shall:

- set the variable ORDERED_RECONFIGURATION to FALSE;
- if the received reconfiguration message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received reconfiguration message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- clear the variable PDCP_SN_INFO;
- clear the variable START_VALUE_TO_TRANSMIT.

8.2.2.5 Reception of a response message by the UTRAN, normal case

When UTRAN has received

- the RADIO BEARER SETUP COMPLETE message; or
- the RADIO BEARER RECONFIGURATION COMPLETE message; or
- the RADIO BEARER RELEASE COMPLETE message; or
- the TRANSPORT CHANNEL RECONFIGURATION COMPLETE message; or
- the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message;

UTRAN may delete the old configuration.

UTRAN may delete the C-RNTI of the UE if the procedure caused the UE to leave the CELL_FACH state.

If the IE "UL Timing Advance" is included, UTRAN shall evaluate the timing advance value that the UE has to use in the new cell after handover.

If the IE "COUNT-C activation time" is included, UTRAN should only begin incrementing the COUNT-C for radio bearers that are mapped on TM-RLC at the CFN indicated in this IE.

The procedure ends on the UTRAN side.

8.2.2.6 Unsupported configuration in the UE

If the UTRAN instructs the UE to use a configuration, which it does not support and/or if the received message causes the variable UNSUPPORTED_CONFIGURATION to be set to TRUE, the UE shall:

- transmit a failure response as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to "configuration unsupported";
- set the variable UNSUPPORTED_CONFIGURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received.

The procedure ends.

8.2.2.7 Physical channel failure

A physical channel failure occurs in case the criteria defined in subclause 8.5.4 are not fulfilled.

If the received message caused the UE to be in CELL_DCH state and the UE failed to establish the dedicated physical channel(s) indicated in the received message the UE shall:

- revert to the configuration prior to the reception of the message (old configuration);
- if the old configuration includes dedicated physical channels (CELL_DCH state) and the UE is unable to revert to the old configuration:
  - select a suitable UTRA cell according to [4];
  - initiate a cell update procedure according to subclause 8.3.1, using the cause "radio link failure";
  - after the cell update procedure has completed successfully:
    - proceed as below;
- if the old configuration does not include dedicated physical channels (CELL_FACH state):
  - select a suitable UTRA cell according to [4];
  - if the UE selects another cell than the cell the UE camped on upon reception of the reconfiguration message:
    - initiate a cell update procedure according to subclause 8.3.1, using the cause "Cell reselection";
    - after the cell update procedure has completed successfully:
      - proceed as below;

- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to "physical channel failure";
- set the variable ORDERED_RECONFURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received;

The procedure ends.

8.3.1.2 Initiation

A UE shall initiate the cell update procedure in the following cases:

- Uplink data transmission:
  - if the UE is in URA_PCH or CELL_PCH state; and
  - if the UE has uplink RLC data PDU or uplink RLC control PDU on RB 1 or upwards to transmit:
    - perform cell update using the cause "uplink data transmission".
- Paging response:
  - if the criteria for performing cell update with the cause specified above in the current subclause is not met; and
  - if the UE in URA_PCH or CELL_PCH state, receives a PAGING TYPE 1 message fulfilling the conditions for initiating a cell update procedure specified in subclause 8.1.2.3:
    - perform cell update using the cause "paging response".
- Re-entering service area:
  - if none of the criteria for performing cell update with the causes specified above in the current subclause is met; and
  - if the UE is in CELL_FACH or CELL_PCH state; and
  - if the UE has been out of service area and re-enters service area before T307 or T317 expires:
    - perform cell update using the cause "re-entering service area".
- Radio link failure:
  - if none of the criteria for performing cell update with the causes specified above in the current subclause is met; and
  - if the UE is in CELL_DCH state; and
  - if the criteria for radio link failure is met as specified in subclause 8.5.6:
    - perform cell update using the cause "radio link failure".
- RLC unrecoverable error:
  - if none of the criteria for performing cell update with the causes specified above in the current subclause is met; and
  - if the UE detects RLC unrecoverable error [16] in an AM RLC entity:
    - perform cell update using the cause "RLC unrecoverable error".
- Cell reselection:
  - if none of the criteria for performing cell update with the causes specified above in the current subclause is met; and
  - if the UE is in CELL_FACH or CELL_PCH state; and
  - if the UE performs cell re-selection or the variable C_RNTI is empty:
    - perform cell update using the cause "cell reselection".
- Periodical cell update:

- if none of the criteria for performing cell update with the causes specified above in the current subclause is met; and
- if the UE is in CELL_FACH or CELL_PCH state; and
- if the timer T305 expires; and
- if the criteria for "in service area" as specified in subclause 8.5.5.2 is fulfilled; and
- if periodic updating has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity":
  - perform cell update using the cause "periodical cell update".

A UE in URA_PCH state shall initiate the URA update procedure in the following cases:

- URA reselection:
  - if the UE detects that the current URA assigned to the UE, stored in the variable URA_IDENTITY, is not present in the list of URA identities in system information block type 2; or
  - if the list of URA identities in system information block type 2 is empty; or
  - if the system information block type 2 can not be found:
    - perform URA update using the cause "change of URA ~~reselection~~".
- Periodic URA update:
  - if the criteria for performing URA update with the causes as specified above in the current subclause are not met; and
  - if the timer T305 expires while the UE is in the service area; and
  - if periodic updating has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity":
    - perform URA update using the cause "periodic URA update".

When initiating the URA update or cell update procedure, the UE shall:

- stop timer T305;
- if the UE is in CELL_DCH state:
- in the variable RB_TIMER_INDICATOR, set the IE "T314 expired" and the IE "T315 expired" to FALSE;
  - if the stored values of the timer T314 and timer T315 are both equal to zero:
    - release all its radio resources;
    - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
    - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
    - clear the variable ESTABLISHED_RABS;
    - enter idle mode;
    - perform other actions when entering idle mode from connected mode as specified in subclause 8.5.2;
    - And the procedure ends.
  - if the stored value of the timer T314 is equal to zero:

- release all radio bearers, associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "useT314";
- in the variable RB_TIMER_INDICATOR set the IE "T314 expired" to TRUE;

- if the stored value of the timer T315 is equal to zero:
  - release all radio bearers associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "useT315";
  - in the variable RB_TIMER_INDICATOR set the IE "T315 expired" to TRUE;
- if the stored value of the timer T314 is greater than zero:
  - re-start timer T314;
- if the stored value of the timer T315 is greater than zero:
  - re-start timer T315;
- for the released radio bearer(s):
  - delete the information about the radio bearer from the variable ESTABLISHED_RABS;
  - when all radio bearers belonging to the same radio access bearer have been released:
    - indicate local end release of the radio access bearer to upper layers using the CN domain identity together with the RAB identity stored in the variable ESTABLISHED_RABS;
    - delete all information about the radio access bearer from the variable ESTABLISHED_RABS;

- set the variables PROTOCOL_ERROR_INDICATOR, FAILURE_INDICATOR, UNSUPPORTED_CONFIGURATION and INVALID_CONFIGURATION to FALSE;
- set the variable CELL_UPDATE_STARTED to TRUE;
- move to CELL_FACH state, if not already in that state;
- if the UE performs cell re-selection:
  - clear the variable C_RNTI; and
  - stop using that C_RNTI just cleared from the variable C_RNTI in MAC;
- set CFN in relation to SFN of current cell according to subclause 8.5.15;
- in case of a cell update procedure:
  - set the contents of the CELL UPDATE message according to subclause 8.3.1.3;
  - submit the CELL UPDATE message for transmission on the uplink CCCH;
- in case of a URA update procedure:
  - set the contents of the URA UPDATE message according to subclause 8.3.1.3;
  - submit the URA UPDATE message for transmission on the uplink CCCH;
- set counter V302 to 1;
- start timer T302 when the MAC layer indicates success or failure in transmitting the message.

8.3.1.3 CELL UPDATE / URA UPDATE message contents to set

In case of cell update procedure the UE shall transmit a CELL UPDATE message.

In case of URA update procedure the UE shall transmit a URA UPDATE message.

The UE shall set the IEs in the CELL UPDATE message as follows:

- set the IE "Cell update cause" corresponding to the cause specified in subclause 8.3.1.2 that is valid when the CELL UPDATE message is submitted to lower layers for transmission;

NOTE: During the time period starting from when a cell update procedure is initiated by the UE until when the procedure ends, additional CELL UPDATE messages may be transmitted by the UE with different causes.

- set the IE "U-RNTI" to the value of the variable U_RNTI;
- if the value of the variable PROTOCOL_ERROR_INDICATOR is TRUE:
  - include the IE "RRC transaction identifier"; and
    - set it to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - include and set the IE "failure cause" to the cause value "protocol error";
  - set the IE "Protocol error information" set to the value of the variable PROTOCOL_ERROR_INFORMATION;
- if the value of the variable FAILURE_INDICATOR is TRUE:
  - include the IE "RRC transaction identifier"; and
    - set it to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;
  - include and set the IE "failure cause" to the value of the variable FAILURE_CAUSE;
- include the START values for each CN domain, calculated according to subclause 8.5.9;
- if an unrecoverable error [16] in any of the AM RLC entities for the signalling radio bearer RB 2 or signalling radio bearer RB 3 is detected:
  - set the IE "AM_RLC error indication (RB2 or RB3)" to TRUE;
- otherwise:
  - set the IE "AM_RLC error indication (RB2 or RB3)" to FALSE;
- if an unrecoverable error [16] in any of the AM RLC entities for the RB 4 or upward is detected:
  - set the IE "AM_RLC error indication (RB>3)" to TRUE;
- otherwise:
  - set the IE "AM_RLC error indication (RB>3)" to FALSE;
- set the IE "RB Timer indicator" to the value of the variable RB_TIMER_INDICATOR;
- include an intra-frequency measurement report in the IE "Measured results on RACH", as specified in the IE "Intra-frequency reporting quantity for RACH reporting" and the IE "Maximum number of reported cells on RACH" in system information block type 12 (or System Information Block type 11, if System Information Block type 12 is not being broadcast).

The UE shall set the IEs in the URA UPDATE message as follows:

- set the IE "U-RNTI" to the value of the variable U_RNTI;
- set the IE "URA update cause" corresponding to which cause as specified in subclause 8.3.1.2 that is valid when the URA UPDATE message is submitted to lower layers for transmission;

NOTE: During the time period starting from when a URA update procedure is initiated by the UE until when the procedure ends, additional URA UPDATE messages may be transmitted by the UE with different causes, depending on which causes are valid for the respective URA UPDATE message.

- if the value of the variable PROTOCOL_ERROR_INDICATOR is TRUE:
  - include the IE "RRC transaction identifier"; and
    - set it to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - set the IE "Protocol error indicator" to TRUE;
  - include the IE "Protocol error information" set to the value of the variable PROTOCOL_ERROR_INFORMATION.
- if the value of the variable PROTOCOL_ERROR_INDICATOR is FALSE:
  - if the value of the variable INVALID_CONFIGURATION is TRUE:
    - include the IE "RRC transaction identifier"; and
    - set it to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;
    - set the IE "Protocol error indicator" to TRUE;
    - include the IE "Protocol error information" set to "Information element value not comprehended";
  - if the value of the variable INVALID_CONFIGURATION is FALSE:
    - set the IE "Protocol error indicator" to FALSE.

8.3.1.4 T305 expiry and the UE detects "out of service area"

When the T305 expires and the UE detects that it is "out of service area" as specified in subclause 8.5.5.1, the UE shall

- start timer T307;
- re-select to a new cell, as described in [4].

8.3.1.4.1 Re-entering "in service area"

If the UE detects "in service area" according to subclause 8.5.5.2 and timer T307 or T317 is running, the UE shall:

- check the value of V302; and
- if V302 is equal to or smaller than N302:
  - in case of a cell update procedure:
    - set the contents of the CELL UPDATE message according to subclause 8.3.1.3;
    - submit the CELL UPDATE message for transmission on the uplink CCCH;
  - in case of a URA update procedure:
    - set the contents of the URA UPDATE message according to subclause 8.3.1.3;
    - submit the URA UPDATE message for transmission on the uplink CCCH;
  - increment counter V302;
  - restart timer T302 when the MAC layer indicates success or failure to transmit the message.
- if V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- in case of a cell update procedure:
  - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- release all its radio resources;
- indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- perform other actions when entering idle mode from connected mode as specified in subclause 8.5.2;
- And the procedure ends.

8.3.1.4.2 Expiry of timer T307

When the T307 expires, the UE shall:

- move to idle mode;
- release all dedicated resources;
- indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- perform other actions when entering idle mode from connected mode as specified in subclause 8.5.2;
- And the procedure ends.

8.3.1.5 Reception of an CELL UPDATE/URA UPDATE message by the UTRAN

When the UTRAN receives a CELL UPDATE/URA UPDATE message, it may either:

- in case the procedure was triggered by reception of a CELL UPDATE:
  - transmit a CELL UPDATE CONFIRM message on the downlink DCCH or optionally on the CCCH but only if ciphering is not required; and
  - optionally include the IE "RLC re-establish indicator" to request a RLC re-establishment in the UE, in which case the corresponding RLC entities should also be re-established in UTRAN; or
- in case the procedure was triggered by reception of a URA UPDATE:
  - transmit a URA UPDATE CONFIRM message to the lower layers for transmission on the downlink CCCH or DCCH in which case the UTRAN should include the IE "URA identity" in the URA UPDATE CONFIRM message in a cell where multiple URA identifiers are broadcast; or
- initiate an RRC connection release procedure (see subclause 8.1.4) by transmitting an RRC CONNECTION RELEASE message on the downlink CCCH.

8.3.1.6 Reception of the CELL UPDATE CONFIRM/URA UPDATE CONFIRM message by the UE

When the UE receives a CELL UPDATE CONFIRM/URA UPDATE CONFIRM message; and

- if the message is received on the CCCH, and IE "U-RNTI" is present and has the same value as the variable U_RNTI, or;
- if the message is received on DCCH;

the UE shall:

- stop timer T302;
- set the variable CELL_UPDATE_STARTED to FALSE;
- in case of a cell update procedure and the CELL UPDATE CONFIRM message:
  - includes "RB information elements"; and/or
  - includes "Transport channel information elements"; and/or
  - includes "Physical channel information elements"; and
  - if the variable ORDERED_RECONFIGURATION is set to FALSE:
    - set the variable ORDERED_RECONFIGURATION to TRUE;
- act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following:
  - use the transport channel(s) applicable for the physical channel types that is used; and
  - if the IE "TFS" is neither included nor previously stored in the UE for that transport channel(s):
    - use the TFS given in system information.
  - if none of the TFS stored is compatible with the physical channel:
    - delete the stored TFS;
    - use the TFS given in system information.
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB2 and RB3)":
    - re-establish the RLC entities for signalling radio bearer RB 2 and signalling radio bearer RB 3;
    - if the variable CIPHERING_STATUS is set to "Started":
      - set the HFN values for AM RLC entities with RB identity 2 and 3 equal to the START value included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB>3)":
    - re-establish the AM RLC entities for RB with RB identity equal to or larger than 4;
    - if the variable CIPHERING_STATUS is set to "Started":
      - set the HFN values for AM RLC entities with RB identity equal to or larger than 4 equal to the START value included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
- enter a state according to subclause 8.6.3.3 applied on the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message.

If the UE after state transition enters CELL_DCH state, it shall:

- not prohibit periodical status transmission in RLC.

If the UE after state transition remains in CELL_FACH state, it shall

- start the timer T305 using its initial value if timer T305 is not running and periodical cell update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select PRACH according to subclause ~~8.6.6.2~~8.5.17;
- select Secondary CCPCH according to subclause ~~8.6.6.5~~8.5.19;
- not prohibit periodical status transmission in RLC;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;

If the UE after state transition enters URA_PCH or CELL_PCH state, it shall

- prohibit periodical status transmission in RLC;
- clear the variable C_RNTI;
- stop using that C_RNTI just cleared from the variable C_RNTI in MAC;
- start the timer T305 using its initial value if timer T305 is not running and periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select Secondary CCPCH according to subclause ~~8.6.6.5~~8.5.19.
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging Occasion and PICH Monitoring Occasion as specified in 8.6.3.2 in CELL_PCH state.

If the UE after the state transition remains in CELL_FACH state and;

- the contents of the variable C_RNTI are empty;

it shall check the value of V302 and

- If V302 is equal to or smaller than N302:
  - if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message,
    - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
    - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
      - abort the ongoing integrity and/or ciphering reconfiguration;
      - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
        - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
        - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
      - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
        - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
        - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a URA update procedure:

- stop the URA update procedure; and
- continue with a cell update procedure;

- set the contents of the CELL UPDATE message according to subclause 8.3.1.3, except for the IE "Cell update cause" which shall be set to "cell reselection";
- submit the CELL UPDATE message for transmission on the uplink CCCH;
- increment counter V302;
- restart timer T302 when the MAC layer indicates success or failure to transmit the message;

- If V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode;
  - other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;
  - And the procedure ends.

If the UE after the state transition remains in CELL_FACH state and

- a C-RNTI is stored in the variable C_RNTI;

or

the UE after the state transition moves to another state than the CELL_FACH state;

the UE shall:

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" in any response message transmitted below to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" in any response message transmitted below to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- in case of a cell update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry.
- in case of a cell update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in any response message transmitted below and set it to the value of the variable PDCP_SN_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in any response message transmitted below;
- transmit a response message as specified in subclause 8.3.1.7;
- if the IE "Integrity protection mode info" was present in the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB #2 from and including the transmitted response message;
- clear the variable PDCP_SN_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;

The procedure ends.

8.3.1.7 Transmission of a response message to UTRAN

If the CELL UPDATE CONFIRM message

- includes the IE "RB information to release list":

the UE shall:

- transmit a RADIO BEARER RELEASE COMPLETE as response message using AM RLC.

If the CELL UPDATE CONFIRM message

- does not include the IE "RB information to release list"; and
- includes the IE "RB information to reconfigure list "; or
- includes the IE "RB information to be affected list ":

the UE shall:

- transmit a RADIO BEARER RECONFIGURATION COMPLETE as response message using AM RLC.

If the CELL UPDATE CONFIRM message

- does not include "RB information elements"; and
- includes "Transport channel information elements":

the UE shall:

- transmit a TRANSPORT CHANNEL RECONFIGURATION COMPLETE as response message using AM RLC.

If the CELL UPDATE CONFIRM message

- does not include "RB information elements"; and
- does not include "Transport channel information elements"; and
- includes "Physical channel information elements":

the UE shall:

- transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE as response message using AM RLC.

If the CELL UPDATE CONFIRM message

- does not include "RB information elements"; and
- does not include "Transport channel information elements"; and
- does not include "Physical channel information elements"; and
- includes "CN information elements"; or
- includes the IE "Ciphering mode info"; or
- includes the IE "Integrity protection mode info"; or
- includes the IE "New C-RNTI"; or
- includes the IE "New U-RNTI":

the UE shall:

- transmit a UTRAN MOBILITY INFORMATION CONFIRM as response message using AM RLC.

If the CELL UPDATE CONFIRM message

- does not include "RB information elements"; and
- does not include "Transport channel information elements"; and
- does not include "Physical channel information elements"; and
- does not include "CN information elements"; and
- does not include the IE "Ciphering mode info"; and
- does not include the IE "Integrity protection mode info"; and
- does not include the IE "New C-RNTI"; and
- does not include the IE "New U-RNTI":

the UE shall:

- transmit no response message.

If the URA UPDATE CONFIRM message

- includes "CN information elements"; or
- includes the IE "Ciphering mode info"; or
- includes the IE "Integrity protection mode info"; or
- includes any one or both of the IEs "New C-RNTI" and "New U-RNTI":

the UE shall:

- transmit a UTRAN MOBILITY INFORMATION CONFIRM as response message using AM RLC.

If the URA UPDATE CONFIRM message

- does not include "CN information elements"; and
- does not include the IE "Ciphering mode info"; and
- does not include the IE "Integrity protection mode info"; and
- does not include the IE "New U-RNTI"; and
- does not include the IE "New C-RNTI":

the UE shall:

- transmit no response message.

If the new state is CELL_DCH or CELL_FACH, the response message shall be transmitted using the new configuration after the state transition., and the UE shall:

- if the variable PDCP_SN_INFO is empty:
  - if the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the response message:
      - continue with the remainder of the procedure;
  - if the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the response message,
      - continue with the remainder of the procedure;

- if the variable PDCP_SN_INFO non-empty:
  - when RLC has confirmed the successful transmission of the response message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
        - configure the RLC entity for that radio bearer to "continue";
    - continue with the remainder of the procedure;

If the new state is CELL_PCH or URA_PCH, the response message shall be transmitted in CELL_FACH state, and the UE shall:

- when RLC has confirmed the successful transmission of the response message:
  - for each radio bearer in the variable PDCP_SN_INFO:
    - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
      - configure the RLC entity for that radio bearer to "continue";
  - enter the new state (CELL_PCH or URA_PCH, respectively);
- continue with the remainder of the procedure.

8.3.1.7a Physical channel failure

If the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message would cause the UE to transit to CELL_DCH state; and

- in case of a received CELL UPDATE CONFIRM message:
  - if the UE failed to establish the physical channel(s) indicated in the received CELL UPDATE CONFIRM message according to the criteria defined in subclause 8.5.4 are not fulfilled; or
  - the received CELL UPDATE CONFIRM message does not contain dedicated physical channels;
- in case of the UE received a URA UPDATE CONFIRM message:

the UE shall:

- if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message
  - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
  - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
    - abort the ongoing integrity and/or ciphering reconfiguration;
    - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
      - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
      - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
    - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
      - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
      - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if V302 is equal to or smaller than N302:
  - in case of a URA update procedure:

- stop the URA update procedure; and
- continue with a cell update procedure;

- select a suitable UTRA cell according to [4];
- set the contents of the CELL UPDATE message according to subclause 8.3.1.3, except for the IE "Cell update cause" which shall be set to "Radio link failure";
- submit the CELL UPDATE message for transmission on the uplink CCCH;
- increment counter V302;
- restart timer T302 when the MAC layer indicates success or failure to transmit the message;

- if V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode.

8.3.1.12 T302 expiry or cell reselection

If any or several of the following conditions are true:

- expiry of timer T302;
- reselection to another UTRA cell (including the previously serving cell) before completion of the cell update or URA update procedure;

the UE shall:

- stop T302 if it is running;
- if the UE was in CELL_DCH state prior to the initiation of the procedure; and
  - if timers T314 and T315 have elapsed while T302 was running:
    - enter idle mode.
    - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.
    - and the procedure ends.
    - if timer T314 has elapsed while T302 was running and,
      - if "T314 expired" in the variable RB_TIMER_INDICATOR is set to FALSE and
      - if T315 is still running:
        - release locally all radio bearers which are associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "useT314";
        - indicate release of those radio access bearers to upper layers;
        - delete all information about those radio access bearers from the variable ESTABLISHED_RABS;
        - set "T3154 expired" in the variable RB_TIMER_INDICATOR to TRUE;
    - if timer T315 has elapsed while T302 was running and,
      - if "T315 expired" in the variable RB_TIMER_INDICATOR is set to FALSE and,
      - if T314 is still running:
        - release locally all radio bearers which are associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "~~useT314~~useT315";
        - indicate release of those radio access bearers to upper layers;
        - delete all information about those radio access bearers from the variable ESTABLISHED_RABS;
        - set "~~T314~~ T315 expired" in the variable RB_TIMER_INDICATOR to TRUE;
- check whether it is still in "in service area" (see subclause 8.5.5.2);
- if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE and/or the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
  - abort the ongoing integrity and/or ciphering reconfiguration;
  - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
- clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- in case of a cell update procedure:
  - clear any entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;

- in case of a URA update procedure:
  - clear any entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;

If the UE detects "in service area" if it has not entered idle mode, and:

- if V302 is equal to or smaller than N302, the UE shall:
  - if the UE performed cell re-selection:
    - delete its C-RNTI;
  - in case of a cell update procedure:
    - set the contents of the CELL UPDATE message according to subclause 8.3.1.3;
    - submit the CELL UPDATE message for transmission on the uplink CCCH;
  - in case of a URA update procedure:
    - set the contents of the URA UPDATE message according to subclause 8.3.1.3;
    - submit the URA UPDATE message for transmission on the uplink CCCH;
  - increment counter V302;
  - restart timer T302 when the MAC layer indicates success or failure to transmit the message;
- if V302 is greater than N302, the UE shall:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - clear the variable PDCP_SN_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;

- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;
- And the procedure ends.

If the UE does not detect "in service area", it shall:

- continue searching for "in service area".

8.3.3.3 Reception of UTRAN MOBILITY INFORMATION message by the UE

When the UE receives a UTRAN MOBILITY INFORMATION message, it shall:

- act on received information elements as specified in subclause 8.6;
- if the IE "UE Timers and constants in connected mode" is present:
- ~~use~~ store the values ~~in~~ of the IE "UE Timers and constants in connected mode" ~~for the relevant timers and constants~~in the variable TIMERS_AND_CONSTANTS, replacing any previously ~~used~~ stored value for each timer and constant~~s including those read in idle mode in system information block type 1~~, and;
  - for each updated timer value, start using the new value next time the timer is started;
  - for each updated constant values, start to use the new value directly;
- set the IE "RRC transaction identifier" in the UTRAN MOBILITY INFORMATION CONFIRM message to the value of "RRC transaction identifier" in the entry for the UTRAN MOBILITY INFORMATION message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in the UTRAN MOBILITY INFORMATION CONFIRM message and set it to the value of the variable PDCP_SN_INFO;
- if the received UTRAN MOBILITY INFORMATION message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in the UTRAN MOBILITY INFORMATION CONFIRM message;
- transmit a UTRAN MOBILITY INFORMATION CONFIRM message on the uplink DCCH using AM RLC;
- if the IE "Integrity protection mode info" was present in the UTRAN MOBILITY INFORMATION message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB #2 from and including the transmitted UTRAN MOBILITY INFORMATION CONFIRM message;
- if the variable PDCP_SN_INFO is empty; and
  - if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the UTRAN MOBILITY INFORMATION CONFIRM message, perform the actions below;
  - if the UTRAN MOBILITY INFORMATION message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the UTRAN MOBILITY INFORMATION CONFIRM message, perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:

- when RLC has confirmed the successful transmission of the UTRAN MOBILITY INFORMATION CONFIRM message:
  - for each radio bearer in the variable PDCP_SN_INFO:
    - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
    - configure the RLC entity for that radio bearer to "continue";
  - clear the variable PDCP_SN_INFO;

- if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

The procedure ends.

8.3.3.4 Reception of an UTRAN MOBILITY INFORMATION CONFIRM message by the UTRAN

When the network receives UTRAN MOBILITY INFORMATION CONFIRM message, UTRAN may delete any old U-RNTI. The procedure ends.

8.3.3.5 Cell re-selection

If the UE performs cell re-selection, the UE shall:

- initiate a cell update procedure according to subclause 8.3.1;
- if the UTRAN MOBILITY INFORMATION message contains the IE "New C-RNTI"; and
- if the UE has not yet submitted the UTRAN MOBILITY INFORMATION CONFIRM message to lower layers for transmission;
  - transmit a UTRAN MOBILITY INFORMATION FAILURE message on the uplink DCCH using AM RLC;
  - set the IE "RRC transaction identifier" in the UTRAN MOBILITY INFORMATION FAILURE message to the value of "RRC transaction identifier" in the entry for the UTRAN MOBILITY INFORMATION message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry.
  - set the IE "failure cause" to the cause value "cell update occured ~~cell reselection~~";
  - when the UTRAN MOBILITY INFORMATION FAILURE message has been submitted to lower layers for transmission:
    - continue with any ongoing processes and procedures as if the invalid UTRAN MOBILITY INFORMATION message has not been received and the procedure ends.
- otherwise:
  - continue the procedure normally.

8.3.4.3 Reception of an ACTIVE SET UPDATE message by the UE

Upon reception of an ACTIVE SET UPDATE message the UE shall act upon all received information elements as specified in 8.6, unless specified otherwise in the following. The UE shall:

- first add the RLs indicated in the IE "Radio Link Addition Information";
- remove the RLs indicated in the IE "Radio Link Removal Information". If the UE active set is full or becomes full, an RL, which is included in the IE "Radio Link Removal Information" for removal, shall be removed before adding RL, which is included in the IE "Radio Link Addition Information" for addition;
- if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in the ACTIVE SET UPDATE COMPLETE message; and
  - set it to the value of the variable PDCP_SN_INFO;
- if the ACTIVE SET UPDATE message includes the IE "TFCI combining indicator" associated with a radio link to be added:
  - configure Layer 1 to soft combine TFCI (field 2) of this new link with those links already in the TFCI (field 2) combining set;
- if the received ACTIVE SET UPDATE message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in the ACTIVE SET UPDATE COMPLETE message;
- set the IE "RRC transaction identifier" in the ACTIVE SET UPDATE COMPLETE message to the value of "RRC transaction identifier" in the entry for the ACTIVE SET UPDATE message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- transmit an ACTIVE SET UPDATE COMPLETE message on the uplink DCCH using AM RLC without waiting for the Physical Layer synchronization;
- if the IE "Integrity protection mode info" was present in the ACTIVE SET UPDATE message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB# 2 from and including the transmitted ACTIVE SET UPDATE COMPLETE message;
- if the variable PDCP_SN_INFO is empty:
  - if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the ACTIVE SET UPDATE COMPLETE message:
      - perform the actions below;
  - if the ACTIVE SET UPDATE message did not contain the IE "Ciphering mode info":

- when RLC has been requested to transmit the ACTIVE SET UPDATE COMPLETE message:
  - perform the actions below;

- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the ACTIVE SET UPDATE COMPLETE message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
        - configure the RLC entity for that radio bearer to "continue";
    - clear the variable PDCP_SN_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- The procedure ends on the UE side.

8.3.4.4 Unsupported configuration in the UE

If UTRAN instructs the UE to use a configuration that it does not support, the UE shall:

- keep the active set as it was before the ACTIVE SET UPDATE message was received;
- transmit an ACTIVE SET UPDATE FAILURE message on the DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the ACTIVE SET UPDATE FAILURE message to the value of "RRC transaction identifier" in the entry for the ACTIVE SET UPDATE message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to "~~configuration unacceptable~~configuration unsupported";
- when the ACTIVE SET UPDATE FAILURE message has been submitted to lower layers for transmission:
  - The procedure ends on the UE side.

8.3.6.2 Initiation

The procedure is initiated when a radio access technology other than UTRAN, e.g. GSM, using ~~system~~ radio access technology specific procedures, orders the UE to make a handover to UTRAN.

A HANDOVER TO UTRAN COMMAND message is sent to the UE via the radio access technology from which inter-~~system~~ RAT handover is performed.

In case UTRAN decides to uses a predefined or default radio configuration that is stored in the UE, it should include the following information in the HANDOVER TO UTRAN COMMAND message.

- the IE "U-RNTI" to be assigned;
- the IE "Predefined configuration identity", to indicate which pre-defined configuration of RB, transport channel and physical channel parameters shall be used; or
- the IE "Default configuration mode" and IE "Default configuration identity", to indicate which default configuration of RB, transport channel and physical channel parameters shall be used;
- PhyCH information elements.

NOTE: When using a predefined or default configuration during handover to UTRAN, UTRAN can only assign values of IEs "U-RNTI" and "scrambling code" that are within the special subranges defined exclusively for this procedure. UTRAN may re- assign other values after completion of the handover procedure.

In case UTRAN does not use a predefined radio configuration that is stored in the UE, it should include the following information in the HANDOVER TO UTRAN COMMAND message.

- the IE "U-RNTI" to be assigned;
- the complete set of RB, TrCH and PhyCH information elements to be used.

8.3.6.3 Reception of HANDOVER TO UTRAN COMMAND message by the UE

The UE shall be able to receive a HANDOVER TO UTRAN COMMAND message and perform an inter-RAT handover, even if no prior UE measurements have been performed on the target UTRAN cell and/or frequency.

The UE shall act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following. The UE shall:

- store a U-RNTI value (32 bits), which is derived by the IEs "SRNC identity" (12 bits) and "S-RNTI 2" (10 bits) included in IE "U-RNTI-short". In order to produce a full size U-RNTI value, a full size "S-RNTI" (20 bits) shall be derived by padding the IE "S-RNTI 2" with 10 zero bits in the most significant positions; and
- initialise the variable ESTABLISHED_SIGNALLING_CONNECTIONS with the signalling connections that remains after the handover according to the specifications of the source RAT;
- initialise the variable UE_CAPABILITIES_TRANSFERRED to which UE capabilities that have been transferred to the network up to the point prior to the handover (if any);
- initialise the variable TIMERS_AND_CONSTANTS to the default values and start to use those timer and constants values;
- if IE "Specification mode" is set to "Preconfiguration" and IE "Preconfiguration mode" is set to "Predefined configuration":
  - initiate the radio bearer and transport channel configuration in accordance with the predefined parameters identified by the IE "Predefined configuration identity";
  - initiate the physical channels in accordance with the predefined parameters identified by the IE "Predefined radio configuration identity" and the received physical channel information elements;
  - store information about the established radio access bearers and radio bearers according to the IE "Predefined configuration identity"; and

- set the IE "RAB Info Post" in the variable ESTABLISHED_RABS and the IE "Re-establishment timer" in the IE "RAB Info" in the variable ESTABLISHED_RABS to "useT314";

- if IE "Specification mode" is set to "Preconfiguration" and IE "Preconfiguration mode" is set to "Default configuration":

  - initiate the radio bearer and transport channel configuration in accordance with the default parameters identified by the IE "Default configuration mode" and IE "Default configuration identity";

  - initiate the physical channels in accordance with the default parameters identified by the IE "Default configuration mode" and IE "Default configuration identity" and the received physical channel information elements;

  NOTE IE "Default configuration mode" specifies whether the FDD or TDD version of the default configuration shall be used

  - set the IE "RAB Info Post" in the variable ESTABLISHED_RABS and the IE "Re-establishment timer" in the IE "RAB Info" in the variable ESTABLISHED_RABS to "useT314";

- if IE "Specification mode" is set to "Complete specification":

  - initiate the radio bearer, transport channel and physical channel configuration in accordance with the received radio bearer, transport channel and physical channel information elements;

- perform an open loop estimation to determine the UL transmission power according to subclause 8.5.3;

- apply the same ciphering (ciphered/unciphered, algorithm) as prior to inter--RAT handover, unless a change of algorithm is requested by means of the "Ciphering algorithm".

If the UE succeeds in establishing the connection to UTRAN, it shall:

- transmit a HANDOVER TO UTRAN COMPLETE message on the uplink DCCH;

- when the HANDOVER TO UTRAN COMPLETE message has been submitted to lower layers for transmission,:

  - if the IE "Transport format combination subset" was not included in the HANDOVER TO UTRAN COMMAND message or in the predefined parameters;

    - set the IE "Current TFC subset" in the variable TFS_SUBSET to "Full transport format combination set";

  - set the IE "Status" in the variable CIPHERING_STATUS to "Not started";

  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE;

  - set the IE "Status" in the variable INTEGRITY_ PROTECTION_INFO to "Not started";

  - set the IE "Historical status" in the variable INTEGRITY_ PROTECTION_INFO to "Never been active";

  - set the IE "Reconfiguration" in the variable INTEGRITY_ PROTECTION _INFO to FALSE;

  - set the variable CELL_UPDATE_STARTED to FALSE;

  - set the variable CONFIGURATION_INCOMPLETE to FALSE;

  - set the variable ORDERED_RECONFIGURATION to FALSE;

  - set the variable FAILURE_INDICATOR to FALSE;

  - set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;

  - set the variable INVALID_CONFIGURATION to FALSE;

  - set the variable PROTOCOL_ERROR_INDICATOR, TFC_SUBSET to FALSE;

  - set the variable PROTOCOL_ERROR_REJECT to FALSE;

- set the variable TGSN_REPORTED to FALSE;
- set the variable UNSUPPORTED_CONFIGURATION to FALSE;
- clear all optional IEs in all variables, except those optional IEs that are set in this procedure;

- And the procedure ends.

8.3.8.2 Initiation

When the UE makes an inter-RAT cell reselection to UTRAN according to the criteria specified in [4], it shall initiate this procedure. The inter-RAT cell reselection made by the UE may use system information broadcast from the source radio access technology or UE dedicated information.

The UE shall:

- set the variable ESTABLISHMENT_CAUSE to “Inter-RAT cell reselection";
- initiate an RRC connection establishment procedure as specified in subclause 8.1.3 ~~except that the IE "establishment cause" in the RRC CONNECTION REQUEST message shall be set to "Inter-RAT cell reselection"~~;
- after initiating an RRC connection establishment:
  - release all resources specific to the other radio access technology.

8.3.10.2 Initiation

The procedure is initiated when a radio access technology other than UTRAN, e.g. GSM/GPRS, using procedures specific for that RAT, orders the UE to change to a UTRAN cell.

NOTE: Within the message used to order the UE to change to a UTRAN cell, the source RAT should specify the identity of the target UTRAN cell as specified in the specifications for that RAT.

The UE shall:

- set the variable ESTABLISHMENT_CAUSE to “Inter-RAT cell reselection";
- initiate an RRC connection establishment procedure as specified in subclause 8.1.3 ~~except that the IE "establishment cause" in the RRC CONNECTION REQUEST message shall be set to "Inter-RAT cell change order"~~.

8.4.1.4a Configuration Incomplete

If the variable CONFIGURATION_INCOMPLETE is set to TRUE, the UE shall:

- retain the measurement configuration that was valid before the MEASUREMENT CONTROL message was received;
- set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS and clear that entry;
- clear the variable CONFIGURATION_INCOMPLETE;
- set the cause value in IE "failure cause" to "~~incomplete~~ configuration incomplete";
- submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;
- continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;
- And the procedure ends.

8.5.5.2.2 Actions following re-entry into "in service area" in CELL_FACH state

If the UE detects "in service area" before T317 expiry the UE shall perform the following actions. If ~~T~~no cell update procedure or URA update procedure is ongoing, the UE shall:

- stop T317;
- initiate the cell update procedure using as cause "Re-entering service area" as specified in subclause 8.3.1;
- perform processes described in subclause 7.2.2.

If an cell update procedure or URA update procedure is ongoing, the UE shall perform the actions as specified in 8.3.1.

8.5.5.3 T316 expiry

On T316 expiry the UE shall perform the following actions. The UE shall:

- if "out of service area" is detected:
  - start timer T317; [Note to Hans: indentation increased to B2]
  - move to CELL_FACH state;
  - perform processes described in subclause 7.2.2;
- if "in service area" is detected:
  - initiate the cell update procedure using as cause "Re-entering service area" as specified in subclause 8.3.1; [Note to Hans: indentation increased to B2]
  - perform processes described in subclause 7.2.2.

8.5.5.4 T317 expiry

When the T317 expires, the UE shall:

- move to idle mode;
- release all dedicated resources;
- indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- perform actions specified in subclause 8.5.2 when entering idle mode from connected mode.

8.5.6 Radio link failure criteria and actions upon radio link failure

In CELL_DCH State, after receiving N313 consecutive "out of sync" indications from layer 1 for the established DPCCH physical channel in FDD, and the DPCH associated with mapped DCCHs in TDD, the UE shall:

- start timer T313;
- upon receiving N315 successive "in sync" indications from layer 1 and upon change of UE state:
  - stop and reset timer T313;
- if T313 expires:
  - consider it as a "Radio link failure";

~~-~~ W~~w~~hen a radio link failure occurs, the UE shall: [Note to Hans: changed indentation to “Normal”]

- clear the dedicated physical channel configuration; ~~and;~~
- select a suitable UTRA cell according to [4];
- perform actions as specified for the ongoing procedure ~~elsewhere.~~
- if no procedure is ongoing or no actions are specified for the ongoing procedure:
  - select a suitable UTRA cell according to [4];
  - perform a cell update procedure according to subclause 8.3.1 using the cause “radio link failure”.

8.5.8 Hyper Frame Numbers

The hyper frame numbers (HFN) are used as MSBs of both the ciphering sequence number (COUNT-C) and the integrity sequence number (COUNT-I) for the ciphering and integrity protection algorithms, respectively. For non-transparent mode RLC radio bearers there is an uplink and downlink COUNT-C per radio bearer and an uplink and downlink COUNT-I per signalling radio bearer. For all transparent mode RLC radio bearers of the same CN domain, COUNT-C is the same, and COUNT-C is also the same for uplink and downlink. For transparent mode RLC radio bearers there is an uplink and a downlink COUNT-I per signalling radio bearer. COUNT-C and COUNT-I are defined in [40], with the following supplement for COUNT-C: for transparent mode RLC radio bearers with a transmission time interval of x radio frames (x = 2, 4, 8), the MAC PDU is carried by L1 in x consecutive radio frames due to radio frame segmentation. In this case, the CFN of the first segment of the MAC PDU is used as the CFN component of COUNT-C.

NOTE: In this release of the specification there is only an uplink transparent mode COUNT-I, which is used for signalling radio bearer RB 0.

The following hyper frame numbers are defined:

MAC-d HFN	24 bits	MSB of COUNT-C for data sent over RLC TM
RLC UM HFN	25 bits	MSB of COUNT-C for data sent over RLC UM
RLC AM HFN	20 bits	MSB of COUNT-C for data sent over RLC AM
RRC HFN	28 bits	MSB of COUNT-I

The START value is used to initialise the 20 most significant bits of all the hyper frame numbers and the remaining bits of the hyper frame numbers are set equal to zero.

8.5.10.1 Integrity protection in downlink

If the UE receives an RRC message on signalling radio bearer with RB identity n, the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" and the IE 'Integrity check info' is present the UE shall:

- perform the actions in subclause 8.6.3.5; and
- apply the new integrity protection configuration;
- check the value of the IE "RRC message sequence number" included in the IE "Integrity check info";
  - if the "Downlink RRC Message sequence number" is not present in the variable INTEGRITY_PROTECTION_INFO:
    - initialise the "Downlink RRC Message sequence number" in the variable INTEGRITY_CHECK_INFO with the value of the IE "RRC message sequence number" included in the IE "Integrity check info" of the received message;
  - if the "Downlink RRC Message sequence number" is present in the variable INTEGRITY_PROTECTION_INFO:
    - if the RRC message sequence number is lower than the "Downlink RRC Message sequence number" for signalling radio bearer RB #n in the variable INTEGRITY_PROTECTION_INFO:
      - increment "Downlink RRC HFN" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO with one;
    - if the RRC message sequence number is equal to the "Downlink RRC Message sequence number" for signalling radio bearer RB #n in the variable INTEGRITY_PROTECTION_INFO:
      - discard the message;
- calculate an expected message authentication code in accordance with subclause 8.5.10.3;
- compare the expected message authentication code with the value of the received IE "message authentication code" contained in the IE "Integrity check info";
  - if the expected message authentication code and the received message authentication code are the same, the integrity check is successful:
    - update the "Downlink RRC Message sequence number" for signalling radio bearer RB #n in the variable INTEGRITY_PROTECTION_INFO with the value of the IE "RRC message sequence number" included in the IE "Integrity check info" of the received RRC message;
  - if the calculated expected message authentication code and the received message authentication code differ:
    - if the IE "RRC message sequence number" included in the IE "Integrity check info" is lower than the "Downlink RRC Message sequence number" for signalling radio bearer RB #n in the variable INTEGRITY_PROTECTION_INFO (in this case the "Downlink RRC HFN" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO was incremented by one, as stated above):
      - decrement "Downlink RRC HFN" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO by one;
    - discard the message.

If the UE receives an RRC message on signalling radio bearer with identity n, the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" and the IE 'Integrity check info' is not present the UE shall:

- discard the message.

8.5.10.2 Integrity protection in uplink

Upon transmitting an RRC message using the signalling radio bearer with radio bearer identity n, and the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" the UE shall:

- increment "Uplink RRC Message sequence number" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO with 1. When "Uplink RRC Message sequence number" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO becomes 0, the UE shall increment "Uplink RRC HFN" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO with 1

- calculate the message authentication code in accordance with subclause 8.5.10.3

- replace the "Message authentication code" in the IE "Integrity check info" in the message with the calculated message authentication code.

- replace the "RRC Message sequence number" in the IE "Integrity check info" in the message with contents set to the new value of the "Uplink RRC Message sequence number" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO

During an ongoing reconfiguration of the integrity protection, UTRAN should, for all signalling radio bearers, apply the old configuration (that is, the configuration that was applied before the reconfiguration) for the integrity protection. In the response message for the procedure ordering the reconfiguration, the UE indicates the activation time, for each signalling radio bearer except RB2, when the new configuration is to be applied in uplink. UTRAN should then start to apply the new configuration according to the activation time for each signalling radio bearer (for signalling radio bearer RB 2 the new configuration is applied starting from reception of the response message).

8.5.10.3 Calculation of message authentication code

The UE shall calculate the message authentication code in accordance with [40]. The input parameter MESSAGE [40] for the integrity algorithm shall be constructed by:

- setting the "Message authentication code" in the IE "Integrity check info" in the message to the ~~signalling~~ radio bearer identity for the signalling radio bearer

- setting the "RRC Message sequence number" in the IE "Integrity check info" in the message to zero

- encoding the message

- appending RRC padding (if any) as a bitstring to the encoded bitstring as the least significant bits

8.5.17 PRACH selection

For this version of the specification, when a UE selects a cell, the uplink frequency to be used for the initial PRACH transmission shall have a default duplex frequency spacing offset from the downlink frequency that the cell was selected on. The default duplex frequency separation to be used by the UE is specified in [35] (for FDD only).

The UE shall select a "PRACH system information" according to the following rule. The UE shall:

- select a default "PRACH system information" from the ones indicated in the IE "PRACH system information list" in System Information Block type 5 (applicable in Idle Mode and Connected Mode) or System Information Block type 6 (applicable in Connected Mode only), as follows:
  - if both RACH with 10 ms and 20 ms TTI are indicated in System Information Block type 5 or System Information Block type 6:
    - select the appropriate TTI based on power requirements, as specified in subclause ~~8.6.6.3~~8.5.18;
  - select a "PRACH system information" randomly from the ones listed in System Information Block type 5 or System Information Block type 6 as follows:

    "Index of selected PRACH" = floor (rand * K)

    where K is equal to the number of listed PRACH system informations that carry an RACH with the above selected TTI, "rand" is a random number uniformly distributed in the range 0,...,1, and "floor" refers to rounding down to nearest integer. PRACH system informations carrying RACHs with 10 and 20 ms TTI shall be counted separately. These PRACH system informations shall be indexed from 0 to K-1 in the order of their occurrence in SIB 5 or SIB 6. The random number generator is left to implementation. The scheme shall be implemented such that one of the available PRACH system informations is randomly selected with uniform probability. At start-up of the random number generator in the UE the seed shall be dependent on the IMSI of the UE or time, thereby avoiding that all UEs select the same RACH;
  - in Connected mode:
    - select the PRACH according to the following preference:
      - if SIB 6 is defined and PRACH info is included:
        - select PRACH from the PRACHs listed in SIB 6;
      - if SIB 6 is defined and no PRACH info is included:
        - select PRACH from the PRACHs listed in SIB 5;
      - if no SIB 6 is defined:
        - select PRACH from the PRACHs listed in SIB 5.
    - reselect the default PRACH system information when a new cell is selected. RACH reselection may also be performed after each transmission of a Transport Block Set on RACH;
- for emergency call, the UE is allowed to select any of the available PRACH system informations.

After selecting a PRACH system information, the RRC in the UE shall configure the MAC and the physical layer for the RACH access according to the parameters included in the selected "PRACH system information" IE.

8.5.18 Selection of RACH TTI

In FDD mode, a RACH may employ either 10 or 20 ms TTI. The supported TTI is indicated as a semi-static parameter of the RACH Transport Format in system information. If in one cell RACHs for both 10 and 20 ms TTI are supported, the UE shall select an appropriate RACH according to the following rule:

The UE shall first check whether a RACH Transport Format is available which is suitable for the transmission of the current transport Block Set for both 10 and 20 ms TTI. The UE shall:

- if the required transport format is available only for one particular TTI:

- select this TTI;
- identify the corresponding RACHs;
- proceed with RACH selection as specified in subclause ~~8.6.6.2~~8.5.17.

- if the required transport format is available on both types of RACH, 10 and 20 ms TTI:
  - perform TTI selection as follows:
    - when the UE calculates the initial preamble transmit power ("Preamble_Initial_Power") as specified in subclause 8.5.7:
      - calculate a transmit power margin,

$$\text{Margin} = \{\min(\text{Maximum allowed UL tx power}, P\_MAX) - \max(\text{Preamble\_Initial\_Power}, \text{Preamble\_Initial\_Power} + \Delta Pp\text{-}m + 10*\log_{10}(1 + (\beta_d/\beta_c)^2)\}$$

      where "Maximum allowed UL tx power" is the maximum allowed uplink transmit power indicated in system information (in dBm), and P_MAX is the maximum RF output power of the UE (dBm). The margin shall be calculated for 10 ms TTI RACH message gain factors β_d and β_c.

NOTE: the expression Preamble_Initial_Power + $\Delta Pp\text{-}m + 10*\log_{10}(1 + (\beta_d/\beta_c)^2)$ represents the total RACH message power if the message would be sent after the initial preamble.

    - if the value of "Margin" calculated for RACH with 10 ms TTI is less than 6 dB:
      - select RACH with 20 ms TTI, and proceed as specified in subclause ~~8.6.6.2~~8.5.17.
    - perform reselection of the RACH TTI only after successful transmission of one Transport Block Set. However in case L1 message transmission on PRACH has failed at least once while using 10 ms TTI, the UE may use the 20 ms TTI RACH for the retransmission. Handling of RACH Message transmission failure is part of general error handling procedure.

8.6.3.2 UTRAN DRX Cycle length coefficient

If the IE "UTRAN DRX cycle length coefficient" is present, the UE shall use it to calculate the UTRAN DRX cycle length, according to the following:

- set k to the value of the IE "UTRAN DRX cycle length coefficient";
- store the result of MAX(2^k,PBP), where PBP is the Paging Block Periodicity, as the DRX cycle length.

The UE shall determine its connected mode paging occasions and PICH monitoring occasions in the same way as for idle mode, according to [4].

The DRX cycle length to use in connected mode is the shorter of the following two parameters:

- UTRAN DRX cycle length;
- CN domain specific DRX cycle length stored for any CN domain, when using Discontinuous Reception (DRX) in CELL_PCH and URA_PCH state.

The CN domain specific DRX cycle length stored for any CN domain is only used in Cell_PCH state and URA_PCH state if the UE is registered to that CN domain and no signalling connection stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS exists to that CN domain.

8.6.3.3 Generic state transition rules depending on received information elements

The IE "RRC State Indicator" indicates the state the UE shall enter. The UE shall, if the IE "RRC State Indicator" in the received message has the value:

- "CELL_FACH":
  - enter CELL_FACH state as dictated by the procedure governing the message received;
- "CELL_DCH":
  - if neither DPCH is assigned in the message nor is the UE is CELL_DCH:
    - set the variable INVALID_CONFIGURATION to TRUE;
  - else:
    - enter CELL_DCH state as dictated by the procedure governing the message received;
- "CELL_PCH":
  - if the received message is RRC CONNECTION SETUP and IE "RRC State Indicator" is set to CELL_PCH:
    - set the variable INVALID_CONFIGURATION to TRUE;
  - else:
    - enter CELL_PCH state as dictated by the procedure governing the message received;
- "URA_PCH":
  - if the received message is RRC CONNECTION SETUP and IE "RRC State Indicator" is set to URA_PCH:
    - set the variable INVALID_CONFIGURATION to TRUE;
  - else:
    - enter URA_PCH state as dictated by the procedure governing the message received.

8.6.3.5 Integrity protection mode info

The IE "Integrity protection mode info" defines the new integrity protection configuration. If the IE "Integrity protection mode info" is present and if the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_STATUS is set to FALSE, the UE shall check the IE "Integrity protection mode command" as part of the IE "Integrity protection mode info", and perform the following. The UE shall:

- if the IE "Integrity protection mode command" has the value "start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Started"; or if the IE "Integrity protection mode command" has the value "Modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not Started":
  - ignore this attempt to change the integrity protection configuration; and
  - set the variable INVALID_CONFIGURATION to TRUE;
- else:
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_STATUS to TRUE;
  - if IE "Integrity protection mode command" has the value "start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not started":
    - if the IE "Historical status" in the variable INTEGRITY_PROTECTION_INFO has the value "Never been active":
      - initialise the information for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO according to the following:
        - set the IE "Uplink RRC Message sequence number" to zero;
        - do not include the IE "Downlink RRC Message sequence number";
      - set the IE "Historical status" in the variable INTEGRITY_PROTECTION_INFO to the value "Has been active";
    - set the IE "Status" in the variable INTEGRITY_PROTECTION_INFO to the value "Started";
    - perform integrity protection on the received message as described in subclause 8.5.10.1;
    - use the algorithm (UIA [40]) indicated by the IE "Integrity protection algorithm" contained in the IE "Integrity protection mode info";
    - use the IE "Integrity protection initialisation number", contained in the IE "Integrity protection mode info" as the value of FRESH [40];
  - if IE "Integrity protection mode command" has the value "modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Started":
    - start applying the new integrity protection configuration in the downlink at the RRC sequence number, for each radio bearer n, indicated by the entry for radio bearer n in the "RRC message sequence number list" in the IE "Downlink integrity protection activation info", included in the IE "Integrity protection mode info";
    - perform integrity protection on the received message as described in subclause 8.5.10.1;
    - if present, use the algorithm indicated by the IE "Integrity protection algorithm" (UIA [40]);
    - set the content of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO according to the following:
      - for each established signalling radio bearer, stored in the variable ESTABLISHED_RABS:
        - include a value of the RRC sequence number, when the new integrity protection in uplink is to be applied;

- for signalling radio bearer RB #0:
  - set the value of the included RRC sequence number to greater than or equal to the current value of the RRC sequence number for signalling radio bearer RB #0 in the variable INTEGRITY_PROTECTION_INFO, plus the value of the constant N302 plus one;
- start applying the new integrity protection configuration in the uplink at the RRC sequence number, for each radio bearer n, except for signalling radio bearer RB #2, indicated by the entry for radio bearer n in the "RRC message sequence number list" in the IE "Uplink integrity protection activation info", included in the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- start applying the new integrity protection configuration in the uplink at the RRC sequence number for signalling radio bearer RB #2, as specified for the procedure initiating the integrity protection reconfiguration;
- set the values of the IE "Uplink integrity protection activation info".

If the IE "Integrity protection mode info" is present and if the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_STATUS is set to TRUE, the UE shall:

- ignore this second attempt to change the integrity protection configuration; and
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.

If the IE "Integrity protection mode info" is not present, the UE shall not change the integrity protection configuration.

8.6.3.11 RRC transaction identifier

The IE “RRC transaction identifier” may be used, together with the message type, for identification of an invokation of a downlink procedure (transaction). The UE behaviour for accepting or rejecting transactions based on the message type and the IE “RRC transaction identifier” is specified below.

If the IE "RRC transaction identifier" is included in a received message, the UE shall perform the actions below. The UE shall:

If the received message is any of the messages:

- RADIO BEARER SETUP; or
- RADIO BEARER RECONFIGURATION; or
- RADIO BEARER RELEASE; or
- TRANSPORT CHANNEL RECONFIGURATION; or
- PHYSICAL CHANNEL RECONFIGURATION:

the UE shall:

- if the variable ORDERED_RECONFIGURATION is set to FALSE; and
- if the variable CELL_UPDATE_STARTED is set to FALSE; and
- if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
  - accept the transaction; and
  - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
- else:
- if the variable ORDERED_RECONFIGURATION is set to TRUE; or
- if the variable CELL_UPDATE_STARTED is set to TRUE; or
- if the table "Accepted transactions" in the variable TRANSACTIONS contains an entry with an IE "Message Type" set to ACTIVE SET UPDATE; or
- if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored for the same "Message Type" as the received message in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received;
    - and end the procedure;
  - else:
    - reject the transaction; and
    - if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

Else:

If the received message is any of the messages:

- RRC CONNECTION SETUP; or
- CELL UPDATE CONFIRM; or
- URA UPDATE CONFIRM:

the UE shall:

- if the IE "Message Type" of the received message is not present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
    - accept the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
  - else:
  - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
    - reject the transaction; and
    - if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.
- else:
- if the IE "Message Type" of the received message is present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received; and
    - end the procedure;
  - else:
  - if the IE "RRC transaction identifier" of the received message is different from the "RRC transaction identifier" stored for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
      - ignore the once accepted transaction and instead accept the new transaction; and
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS, replacing the previous entry;
    - else:
    - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:

- reject the transaction; and
- if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
  - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

Else:

If the received message is any other message, the UE shall:

- if the IE "Message Type" of the received message is not present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
    - accept the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
  - else:
  - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
    - reject the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.
- else:
- if the IE "Message Type" of the received message is present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored in any entry for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received; and
    - end the procedure;
  - else:
  - if the IE "RRC transaction identifier" of the received message is different from the "RRC transaction identifier" stored in all entries for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
      - accept the additional transaction; and
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS, in addition to the already existing entries;
    - else:
    - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:

- reject the transaction; and
- store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

8.6.6.4 Downlink information for each radio link

If the IE "Downlink information for each radio link" is included in a received message, the UE shall:

- if the UE would enter CELL_DCH state according to subclause 8.6.3.3 applied on the received message:
  - if the IE "Secondary CCPCH info" is included; and
  - if the UE is not capable of simultaneous reception of DPCH and Secondary CCPCH:
    - set the variable UNSUPPORTED_CONFIGURATION to TRUE;
  - else:
    - if the UE is capable of simultaneous reception of DPCH and SCCPCH:
      - start to receive the indicated Secondary CCPCH;
  - act on the other IEs contained in the IE "Downlink information for each radio link" as specified in subclause 8.6 applied on this radio link;
- if the UE would enter either the CELL_FACH, CELL_PCH or URA_PCH state according to subclause 8.6.3.3 applied on the received message:
  - if the received message is CELL UPDATE CONFIRM:
    - set the variable INVALID_CONFIGURATION to TRUE;
  - if the received message is any other message than CELL UPDATE CONFIRM; and
  - if other IEs than the IE "Primary CPICH info" (for FDD) or the IE "Primary CCPCH info" (for TDD) are included in the IE "Downlink information for each radio link":
    - set the variable INVALID_CONFIGURATION to TRUE.
  - act on the other IEs contained in the IE "Downlink information for each radio link" as specified in subclause 8.6 applied on this radio link;

8.6.6.18 Primary CPICH info

If the IE "Primary CPICH info" in FDD ~~and the IE "New C-RNTI" a are~~ is included ~~and the message including these IEs is used to initiate a state transition to CELL_FACH~~, the UE shall:

- use the value of this IE as the primary scrambling code for the downlink radio link;

- ~~select the cell indicated by the IE "Primary CPICH info";~~

- ~~use the given C-RNTI when using common transport channels of type RACH, FACH and CPCH in that given cell after having completed the transition to that cell.~~

8.6.6.30 SRB delay, PC preamble

When the IE "SRB delay" and IE "PC preamble" is received in a message that results in a configuration of uplink DPCH, the UE shall:

- after the establishment of the uplink physical channel, send DPCCH and no DPDCH according to [26] during the number of frames indicated in the IE "PC preamble"; and
- then not send any data on signalling radio bearers ~~S~~RB 0 to ~~S~~RB 4 during the number of frames indicated in the IE "SRB delay".

8.6.7 Measurement information elements

8.6.7.1 Measurement validity

If the optional IE "measurement validity" for a given measurement has not been included in measurement control information, the UE shall delete the measurement associated with the variable MEASUREMENT_IDENTITY after the UE makes a transition to a new state.

If the IE "measurement validity" for this measurement has been included in measurement control information, the UE shall save the measurement associated with the variable MEASUREMENT_IDENTITY. The IE "UE state" defines the scope of resuming the measurement.

If the "UE state" is defined as "all states", the UE shall continue the measurement after making a transition to a new state. This scope is assigned only for traffic volume type measurements and can only be applied by the UE if the IE "measurement object" has not been included in measurement control information. If the IE "measurement object" has been included in measurement control information, the UE shall not save the measurement control information in variable MEASUREMENT_IDENTITY, but shall send a MEASUREMENT CONTROL FAILURE message to the UTRAN with failure cause "incomplete configuration".

If the "UE state" is defined as "all states except CELL_DCH", the UE shall store the measurement to be resumed after a subsequent transition from CELL_DCH state to any of the other states in connected mode. This scope is assigned only for traffic volume type measurements.

If the "UE state" is defined as "CELL_DCH", the UE shall store the measurement to be resumed after a subsequent transition to CELL_DCH state. After cell re-selection, the UE shall delete any ongoing intra-frequency or inter-frequency and inter-RAT type measurement associated with the variable MEASUREMENT_IDENTITY. Other measurement types shall, however, be continued regardless of cell reselection.

8.6.7.4 Intra-frequency measurement quantity

If the IE "Intra-frequency measurement quantity" is received in a MEASUREMENT CONTROL message, the UE shall:

- if the IE "Measurement quantity" is set to "pathloss"; and
- for any intra-frequency cell indicated by the IE "Cells for measurement", the IE "Primary CPICH Tx power" in FDD or the IE "Primary CCPCH TX Power" in TDD in the intra frequency cell info list in the variable CELL_INFO_LIST is not present:
  - set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE;
- else:
  - configure the measurement quantity accordingly.

8.6.7.5 Inter-RAT measurement quantity

If the IE "Inter-RAT measurement quantity" is received in a MEASUREMENT CONTROL message and CHOICE system is GSM, the UE shall:

- if IE "BSIC verification required" is set to "required", for cells that match any of the BCCH ARFCN and BSIC combinations in the list of inter-RAT cells that the UE has received in IE "Inter-RAT cell info list", and that has a "verified" BSIC:
  - report measurement quantities according to IE "inter-RAT reporting quantity";
  - trigger inter-RAT events according to IE "inter-RAT measurement reporting criteria";
- if IE "BSIC verification required" is set to "not required", for cells that match any of the BCCH ARFCN in the list of inter-RAT cells that the UE has received in IE "Inter-RAT cell info list", regardless if the BSIC is "verified" or "non-verified":
  - report measurement quantities according to IE "inter-RAT reporting quantity";
  - trigger inter-RAT events according to IE "inter-RAT measurement reporting criteria";
- if the IE "Measurement quantity" is set to "pathloss"; and
- for any inter-RAT cell indicated by the IE "Cells for measurement", the IE "Output power" in the inter-RAT cell info list in the variable CELL_INFO_LIST is not present:
  - set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

NOTE: The requirements for a cell to be considered "verified" or "non-verified" can be found in [19].

8.6.7.10 Traffic Volume Measurement

If the IE "Traffic Volume Measurement" is received by the UE, the UE shall:

- store the content of the IE to the variable MEASUREMENT_IDENTITY.

If the IE "Traffic volume measurement Object" is not included, the UE shall:

- apply the measurement reporting criteria to all uplink transport channels.

If IE "Traffic volume measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", and if the IE "traffic volume reporting quantity" is included, the UE shall:

- report the measured quantities specified in the IE "traffic volume reporting quantity";
- if the parameter "Average of RLC Buffer Payload for each RB" or the parameter "Variance of RLC Buffer payload for each RB" is set:
  - if the IE "Traffic volume measurement quantity" is not included:
    - set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE;
  - if the IE "Traffic volume measurement quantity" is included;
    - if the parameter "time interval to take an average or a variance" is included:
      - use the time specified in the parameter "time interval to take an average or a variance" to calculate the average and/or variance of RLC Buffer Payload according to the IE "traffic volume reporting quantity";
    - if the parameter "time interval to take an average or a variance" is not included:
      - set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

If IE "Traffic volume measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Traffic volume measurement quantity", IE "Traffic volume reporting quantity" or "CHOICE Report criteria" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.13 Measurement Reporting Mode

If IE "Measurement Reporting Mode" is received by the UE, the UE shall:

- store the contents of the IE "Measurement Report Transfer Mode" in the variable MEASUREMENT_IDENTITY;
- use the indicated RLC mode when sending MEASUREMENT REPORT message(s) related to this measurement;
- ignore IE "Periodical Reporting / Event Trigger Reporting Mode".

If IE "Measurement Reporting Mode" is not received by the UE in MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.14 Inter-frequency measurement

If IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Inter-frequency measurement quantity", IE "Inter-frequency reporting quantity" or "CHOICE Report criteria" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.15 Inter-RAT measurement

If IE "Inter-RAT measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Inter-RAT measurement quantity", IE "Inter-RAT reporting quantity" or "CHOICE Report criteria" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.16 Intra-frequency measurement

If IE "Intra-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Intra-frequency measurement quantity", IE "Intra-frequency reporting quantity" or "CHOICE Report criteria" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.17 Quality measurement

If IE "Quality measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Quality reporting quantity" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.18 UE internal measurement

If IE "UE internal measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "UE internal measurement quantity" or IE "UE internal reporting quantity" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.19 UE positioning GPS real-time integrity

The GPS real-time integrity information element specified in 10.3.7.95 is primarily intended for non-differential applications. The real-time integrity of the satellite constellation is of importance as there is no differential correction data by which the UE can determine the soundness of each satellite signal. The Real-Time GPS Satellite Integrity data communicates the health of the constellation to the mobile via a list of bad satellites. The UE shall consider the data associated with the satellites identified in this IE as invalid.

8.6.8 Void~~UE positioning GPS real-time integrity information~~

~~The GPS real-time integrity message specified in 10.3.7.95 is primarily intended for non-differential applications. The real-time integrity of the satellite constellation is of importance as there is no differential correction data by which the UE can determine the soundness of each satellite signal. The Real-Time GPS Satellite Integrity data communicates the health of the constellation to the mobile via a list of bad satellites. The UE shall consider the data associated with the satellites identified in this IE as invalid.~~

9 Handling of unknown, unforeseen and erroneous protocol data

9.1 General [Note to Hans: Paragraph type changed to Heading 2]

This subclause specifies procedures for the handling of unknown, unforeseen, and erroneous protocol data by the receiving entity. These procedures are called "error handling procedures", but in addition to provide recovery mechanisms for error situations they define a compatibility mechanism for future extensions of the protocol.

The error handling procedures specified in this subclause shall apply to all RRC messages. When there is a specific handling for messages received on different logical channels this is specified.

When the UE receives an RRC message, it shall set the variable PROTOCOL_ERROR_REJECT to FALSE and then perform the checks in the order as defined below.

The procedures specified in clause 8 are applied only for the messages passing the checks as defined below, except when procedure specific handling is used to recover from the error.

9.3b Unexpected critical message extension

If the UE receives a message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, containing an undefined critical message extension, the UE shall:

- set the variable PROTOCOL_ERROR_REJECT to TRUE;
- set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "Message extension not comprehended";

- if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:

  - store the IE "Message type" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS, and;

  - set the IE "RRC transaction identifier" to zero in that table entry;

- perform procedure specific error handling according to clause 8.

If the UE receives a message on the BCCH or PCCH, containing an undefined critical message extension, the UE shall:

- ignore the message.

10.1.1 Protocol extensions

RRC messages may be extended in future ~~releases~~versions of this protocol, either by adding values for choices, enumerated and size constrained types or by adding information elements. An important aspect concerns the behaviour of a UE, conforming to this revision of the standard, upon receiving a not comprehended future extension. The details of this error handling behaviour are provided in clause 9.

NOTE 1: By avoiding the need for partial decoding (skipping uncomprehended IEs to continue decoding the remainder of the message), the RRC protocol extension mechanism also avoids the overhead of length determinants for extensions.

Two kinds of protocol extensions are distinguished: non-critical and critical extensions. In general, a receiver shall process a message including not comprehended non-critical extensions as if the extensions were absent. However, a receiver shall entirely reject a message including not comprehended critical extensions (there is no partial rejection) and notify the sender, as specified in clause 9.

The general mechanism for adding critical extensions is by defining a new version of the message, which is indicated at the beginning of the message.

The UE shall always comprehend the complete transfer syntax specified for the protocol version it supports; if the UE comprehends the transfer syntax defined within protocol version A for message 1, it shall also comprehend the transfer syntax defined within protocol version A for message 2.

The following table shows for which messages only non-critical extensions may be added while for others both critical and non-critical extensions may be added.

NOTE 2: Critical extensions can only be added to ~~the~~ certain downlink messages~~, with the exception of the SYSTEM INFORMATION message~~.

Extensions	Message
Critical and non-critical extensions	ACTIVE SET UPDATE 10.2.1 ASSISTANCE DATA DELIVERY 10.2.4 CELL CHANGE ORDER FROM UTRAN 10.2.5 CELL UPDATE CONFIRM 10.2.8 COUNTER CHECK 10.2.9 DOWNLINK DIRECT TRANSFER 10.2.11 HANDOVER TO UTRAN COMMAND 10.2.12 HANDOVER FROM UTRAN COMMAND 10.2.15 MEASUREMENT CONTROL 10.2.17 PHYSICAL CHANNEL RECONFIGURATION 10.2.22 PHYSICAL SHARED CHANNEL ALLOCATION 10.2.25 RADIO BEARER RECONFIGURATION 10.2.27 RADIO BEARER RELEASE 10.2.30 RADIO BEARER SETUP 10.2.33 RRC CONNECTION REJECT 10.2.36 RRC CONNECTION RELEASE 10.2.37 RRC CONNECTION SETUP 10.2.40 SECURITY MODE COMMAND 10.2.43 SIGNALLING CONNECTION RELEASE 10.2.46 TRANSPORT CHANNEL RECONFIGURATION 10.2.50 TRANSPORT FORMAT COMBINATION CONTROL 10.2.53 UE CAPABILITY ENQUIRY 10.2.55 UE CAPABILITY INFORMATION CONFIRM 10.2.57 UPLINK PHYSICAL CHANNEL CONTROL 10.2.59 URA UPDATE CONFIRM 10.2.61 UTRAN MOBILITY INFORMATION 10.2.62
Non-critical extensions only	ACTIVE SET UPDATE COMPLETE 10.2.2 ACTIVE SET UPDATE FAILURE 10.2.3 CELL CHANGE ORDER FROM UTRAN FAILURE 10.2.6 CELL UPDATE 10.2.7 COUNTER CHECK RESPONSE 10.2.10 HANDOVER TO UTRAN COMPLETE 10.2.13 INITIAL DIRECT TRANSFER 10.2.14 HANDOVER FROM UTRAN FAILURE 10.2.16 MEASUREMENT CONTROL FAILURE 10.2.18 MEASUREMENT REPORT 10.2.19 PAGING TYPE 1 10.2.20 PAGING TYPE 2 10.2.21 PHYSICAL CHANNEL RECONFIGURATION COMPLETE 10.2.23 PHYSICAL CHANNEL RECONFIGURATION FAILURE 10.2.24 PUSCH CAPACITY REQUEST 10.2.26 RADIO BEARER RECONFIGURATION COMPLETE 10.2.28 RADIO BEARER RECONFIGURATION FAILURE 10.2.29 RADIO BEARER RELEASE COMPLETE 10.2.31 RADIO BEARER RELEASE FAILURE 10.2.32 RADIO BEARER SETUP COMPLETE 10.2.34 RADIO BEARER SETUP FAILURE 10.2.35 RRC CONNECTION RELEASE COMPLETE 10.2.38 RRC CONNECTION REQUEST 10.2.39 RRC CONNECTION SETUP COMPLETE 10.2.41 RRC STATUS 10.2.42 SECURITY MODE COMPLETE 10.2.44 SECURITY MODE FAILURE 10.2.45 SIGNALLING CONNECTION RELEASE REQUEST10.2.47 Master Information Block 10.2.48.8.1 System Information Block type 1 to System Information Block type 17 10.2.48.8.2 to 10.2.48.8.19 SYSTEM INFORMATION CHANGE INDICATION 10.2.49 TRANSPORT CHANNEL RECONFIGURATION COMPLETE 10.2.51 TRANSPORT CHANNEL RECONFIGURATION FAILURE 10.2.52 TRANSPORT FORMAT COMBINATION CONTROL FAILURE 10.2.54 UE CAPABILITY INFORMATION 10.2.56 UPLINK DIRECT TRANSFER 10.2.58 URA UPDATE 10.2.60 UTRAN MOBILITY INFORMATION CONFIRM 10.2.63 UTRAN MOBILITY INFORMATION FAILURE 10.2.64
No extensions	SYSTEM INFORMATION 10.2.48

Extensions	Message
	First Segment 10.2.48.1 Subsequent or last Segment 10.2.48.3 Complete SIB 10.2.48.5 SIB content 10.2.48.8.1

NOTE: For the SYSTEM INFORMATION message protocol extensions are only possible at the level of system information blocks. ~~If extension is needed at the level of SYSTEM INFORMATION, another message should be defined.~~

10.1.1.1 Non critical extensions

10.1.1.1.1 Extension of an information element with additional values or choices

In future ~~releases~~versions of this protocol, non critical values may be added to choices, enumerated and size constrained types.

For choices, enumerated and size constrained types it is possible to indicate how many non critical spare values need to be reserved for future extension. The number of spare values is specified within the ASN.1 type definitions; the tabular format only indicates that at least one spare value is needed. This kind of extension is allowed only for items with need set to OP or MD, and the receiver shall interpret the reception of a spare as absence of the IE and as reception of the default value respectively.

Information elements applicable to choices reserved for future releases of the protocol shall be added to the end of the message.

10.1.1.1.2 Extension of a message with additional information elements

In future ~~releases~~versions of this protocol, non critical information elements may be added to RRC messages. These additional information elements shall be appended at the end of the message; the transfer syntax specified in this revision of the standard facilitates this. A receiver conformant to this revision of the standard shall accept such extension, and proceed as if it was not included.

10.1.1.2 Critical extensions

10.1.1.2.1 Extension of an information element with additional values or choices

~~All~~ In future versions of this protocol, choices, enumerated and size constrained types ~~can~~ may be extended with critical values. For extension with critical values the general critical extension mechanism is used, i.e. for this no spare values are reserved since backward compatibility is not required.

10.1.1.2.2 Extension of a message with additional information elements

In future ~~releases~~ versions of this protocol, RRC messages may be extended with new information elements. Since messages including critical extensions are rejected by receivers not comprehending them, these messages may be modified completely, e.g. IEs may be inserted at any place and IEs may be removed or redefined.

10.2 Radio Resource Control messages

10.2.1 ACTIVE SET UPDATE

NOTE: Only for FDD.

This message is used by UTRAN to add, replace or delete radio links in the active set of the UE.

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	
Activation time	MD		Activation time 10.3.3.1	Default value is "now".
New U-RNTI	OP		U-RNTI 10.3.3.47	
CN information elements				
CN Information info	OP		CN Information info 10.3.1.3	
RB information elements				
Downlink counter synchronisation info	OP			
>RB with PDCP information list	OP	1 to <maxRBallRABs>		This IE is needed for each RB having PDCP in the case of lossless SRNS relocation
>>RB with PDCP information	MP		RB with PDCP information 10.3.4.22	
Phy CH information elements				
Uplink radio resources				
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing "maximum UL TX power.
Downlink radio resources				
Radio link addition information	OP	1 to <maxRL-1>		Radio link addition information required for each RL to add
>Radio link addition information	MP		Radio link addition information 10.3.6.68	
Radio link removal information	OP	1 to <maxRL>		Radio link removal information required for each RL to remove
>Radio link removal information	MP		Radio link removal information 10.3.6.69	
TX Diversity Mode	MD		TX Diversity Mode 10.3.6.86	Default value is the existing TX diversity mode.
SSDT information	OP		SSDT information 10.3.6.77	

10.2.5 CELL CHANGE ORDER FROM UTRAN

This message is used to order a cell change from ~~UMTS~~ UTRA to another ~~system~~ radio access technology e.g. GSM.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN→UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"
RB Information elements				
RAB information list	OP	1 to <maxRABsetup>		For each RAB to be handed over
>RAB info	MP		RAB info 10.3.4.8	
Other information elements				
Target cell description	MP			
>CHOICE *Radio Access Technology*	MP			At least one spare choice, Criticality: Reject, is needed.
>>GSM				
>>>BSIC	MP		BSIC 10.3.8.2	
>>>Band Indicator	MP		Enumerated (DCS 1800 band used, PCS 1900 band used)	Indicates how to interpret the BCCH ARFCN
>>>BCCH ARFCN	MP		Integer (0..1023)	[45]
>>>NC mode	OP		Bitstring(3)	[43]
>>IS-2000				

10.2.6 CELL CHANGE ORDER FROM UTRAN FAILURE

This message is sent on the RRC connection used before the Cell change order from UTRAN was executed. The message indicates that the UE has failed to seize the new channel in the other ~~system~~radio access technology.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE→UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Other information elements				
Inter-RAT change failure	MD		Inter-RAT change failure 10.3.8.5	

10.2.9 COUNTER CHECK

This message is used by the UTRAN to indicate the current COUNT-C MSB values associated to each radio bearer utilising UM or AM RLC mode and to request the UE to compare these to its COUNT-C MSB values and to report the comparison results to UTRAN.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN→UE

Information Element/Group name	Presence	Multi	IE type and reference	Semantics description
Message Type	MP			
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
RB information elements				
RB COUNT-C MSB information	MP	1 to < maxRBallRABs >		For each RB (excluding ~~SRBs~~signalling radio bearers) using UM or AM RLC.
>RB COUNT-C MSB information	MP		RB COUNT-C MSB information 10.3.4.14	

10.2.12 HANDOVER TO UTRAN COMMAND

This message is sent to the UE via other system to make a handover to UTRAN.

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

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

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
New U-RNTI	MP		U-RNTI Short 10.3.3.48	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"
Ciphering algorithm	OP		Ciphering algorithm 10.3.3.4	
CHOICE specification mode	MP			
>Complete specification				
~~**UE information elements**~~				
RB information elements				
>>Signalling RB information to setup list	MP	1 to <maxSRBsetup>		For each signalling radio bearer established
>>>Signalling RB information to setup	MP		Signalling RB information to setup 10.3.4.24	
>>RAB information to setup list	OP	1 to <maxRABsetup>		For each RAB established
>>>RAB information for setup	MP		RAB information for setup 10.3.4.10	
Uplink transport channels				
>>UL Transport channel information common for all transport channels	MP		UL Transport channel information common for all transport channels 10.3.5.24	
>>Added or Reconfigured TrCH information	MP	1 to <maxTrCH>		
>>>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2	
Downlink transport channels				
>>DL Transport channel information common for all transport channels	MP		DL Transport channel information common for all transport channels 10.3.5.6	
>>Added or Reconfigured TrCH information	MP	1 to <maxTrCH>		
>>>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1	
Uplink radio resources				
>>Uplink DPCH info	MP		Uplink DPCH info 10.3.6.88	
>>CHOICE *mode*	MP			
>>>FDD				

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>>>CPCH SET Info	OP		CPCH SET Info 10.3.6.13	
Downlink radio resources				
>>>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30	
>>>TDD				(no data)
>>Downlink information common for all radio links	MP		Downlink information common for all radio links 10.3.6.24	
>>Downlink information per radio link	MP	1 to <maxRL>		
>>>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27	
>Preconfiguration				
>>CHOICE Preconfiguration mode	MP			
>>>Predefined configuration	MP		Predefined configuration identity 10.3.4.5	
>>>Default configuration				
>>>>Default configuration mode	MP		Enumerated (FDD, TDD)	Indicates whether the FDD or TDD version of the default configuration shall be used
>>>>Default configuration identity	MP		Default configuration identity 10.3.4.0	
>>RAB info	OP		RAB info Post 10.3.4.9	One RAB is established
>>Uplink DPCH info	MP		Uplink DPCH info Post 10.3.6.89	
Downlink radio resources				
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Downlink information common for all radio links	MP		Downlink information common for all radio links Post 10.3.6.25	
>>>TDD				(no data)
>>Downlink information per radio link	MP	1 to <maxRL>		Send downlink information for each radio link to be set-up. In TDD MaxRL is 1.
>>>Downlink information for each radio link	MP		Downlink information for each radio link Post 10.3.6.28	
Frequency info	MP		Frequency info 10.3.6.36	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Maximum allowed UL TX power	MP		Maximum allowed UL TX power 10.3.6.39	
CHOICE mode	MP			
>FDD				(no data)
>TDD				
>>Primary CCPCH Tx Power	MP		Primary CCPCH Tx Power 10.3.6.59	

10.2.17 MEASUREMENT CONTROL

This message is sent by UTRAN to setup, modify or release a measurement in the UE.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN→UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Measurement Information elements				
Measurement Identity	MP		Measurement Identity 10.3.7.48 [Note to Hans: A space has been added]	
Measurement Command	MP		Measurement Command 10.3.7.46	
Measurement Reporting Mode	OP		Measurement Reporting Mode 10.3.7.49	
Additional measurements list	OP		Additional measurements list 10.3.7.1	
CHOICE Measurement type	CV *command*			
>Intra-frequency measurement			Intra-frequency measurement 10.3.7.36	
>Inter-frequency measurement			Inter-frequency measurement 10.3.7.16	
>Inter-RAT measurement			Inter-RAT measurement 10.3.7.27	
>UE positioning measurement			UE positioning measurement 10.3.7.100	
>Traffic Volume measurement			Traffic Volume measurement 10.3.7.68	
>Quality measurement			Quality measurement 10.3.7.56	
>UE internal measurement			UE internal measurement 10.3.7.77	
Physical channel information elements				
DPCH compressed mode status info	OP		DPCH compressed mode status info 10.3.6.34	

Condition	Explanation
Command	The IE is mandatory if the "Measurement command" IE is set to "Setup", optional if the "Measurement command" IE is set to "modify", otherwise the IE is not needed.

10.2.26 PUSCH CAPACITY REQUEST

NOTE: Only for TDD.

This message is used by the UE for request of PUSCH resources to the UTRAN.

RLC-SAP: TM

Logical channel: SHCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
C-RNTI	OP		C-RNTI 10.3.3.8	
RRC transaction identifier	CV-*ProtErr*		RRC transaction identifier 10.3.3.36	
Traffic Volume	OP		Traffic Volume, measured results list 10.3.7.67	
Timeslot list	OP	1 to maxTS		
>Timeslot number	MP		Timeslot number 10.3.6.84	
>Timeslot ISCP	MP		Timeslot ISCP info 10.3.7.65	
Primary CCPCH RSCP	OP		Primary CCPCH RSCP info 10.3.7.54	
CHOICE Allocation confirmation	OP			
>PDSCH Confirmation	~~MP~~		Integer(1..HiPDSCHIdentities)	
>PUSCH Confirmation	~~MP~~		Integer(1..HiPUSCHIdentities)	
Protocol error indicator	MD		Protocol error indicator 10.3.3.27	Default value is FALSE
Protocol error information	CV-*ProtErr*		Protocol error information 10.3.8.12	

Condition	Explanation
ProtErr	If the IE "Protocol error indicator" has the value "TRUE"

10.2.38 RRC CONNECTION RELEASE COMPLETE

This message is sent by UE to confirm that the RRC connection has been released.

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Error indication	OP		Failure cause and error information 10.3.3.14	

10.2.43 SECURITY MODE COMMAND

This message is sent by UTRAN to start or reconfigure ciphering and/or integrity protection parameters.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN to UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
Security capability	MP		Security capability 10.3.3.37	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	Only present if ciphering shall be controlled
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	Only present if integrity protection shall be controlled
CN Information elements				
CN domain identity	MP		CN domain identity 10.3.1.1	Indicates which cipher and integrity protection keys are applicable
Other information elements				
UE system specific security capability	CH	1 to <maxSystemCapability>		This IE is included if the IE "Inter-RAT UE radio access capability" was included in RRC CONNECTION SETUP COMPLETE message
>Inter-RAT UE security capability	MP		Inter-RAT UE security capability 10.3.8.8a	

10.2.48 SYSTEM INFORMATION

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message type	OP		Message type	The message type is mandatory on the FACH, and absent on the BCH
SFNprime	CV channel		Integer(0..4094 by step of 2)	SFN=SFNprime (for first 10ms frame of 20ms TTI), SFN=SFNprime+1 (for last 10ms frame of 20ms TTI)
CHOICE Segment combination	MP			
>Combination 1				(no data)
>Combination 2				
>>First Segment	MP		First Segment, 10.2.48.1	
>Combination 3				
>>Subsequent Segment	MP		Subsequent Segment, 10.2.48.3	
>Combination 4				
>>Last segment	MP		Last segment (short),10.2.48.5	
>Combination 5				
>>Last segment	MP		Last Segment (short)10.2.48.5	
>>First Segment	MP		First Segment (short), 10.2.48.2	
>Combination 6				
>>Last Segment	MP		Last Segment (short), 10.2.48.5	
>>Complete list	MP	1 to maxSIBperMsg		Note 1
>>>Complete	MP		Complete SIB (short),10.2.48.7	
>Combination 7				
>>Last Segment	MP		Last Segment (short), 10.2.48.5	
>>Complete list	MP	1..16		Note 1
>>>Complete	MP		Complete SIB (short),10.2.48.7	
>>First Segment	MP		First Segment (short), 10.2.48.2	
>Combination 8				
>>Complete list	MP	1 to maxSIBperMsg		Note 1
>>>Complete	MP		Complete	

			SIB (short),10.2.48.7	
>Combination 9				
>>Complete list	MP	1..MaxSIB perMsg		Note 1
>>>Complete	MP		Complete SIB (short),10.2.48.7	
>>First Segment	MP		First Segment (short), 10.2.48.2	
>Combination 10				
>>>Complete SIB of size 215 to 226	MP		Complete SIB,10.2.48.6	
>Combination 11				
>>Last segment of size 215 to 222	MP		Last segment,10.2.48.4	

If the encoded message does not fill a transport block, the RRC layer shall insert padding according to subclause 12.1. Padding is needed e.g. if the remaining space is insufficient to start a new First Segment (which requires several bits for SIB type, SEG_COUNT and SIB data).

NOTE 1: If Combination 6 - 9 contains a Master information block Master information shall be located as the first IE in the list.

10.3.2.3 Cell selection and re-selection info for SIB3/4

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Mapping Info	MD		Mapping info 10.3.2.5	Contains mapping function for quality measurements. Default is an implicit mapping: $Q_{map} = Q_{meas,LEV}$, [4].
Cell_selection_and_reselection_quality_measure	MP		Enumerated (CPICH Ec/N0, CPICH RSCP)	Choice of measurement (CPICH Ec/N0 or CPICH RSCP) to use as quality measure Q for FDD cells.
CHOICE *mode*	MP			
>FDD				
>>$S_{intrasearch}$	OP		Integer (-32..20 by step of 2)	[4] [dB]
>>$S_{intersearch}$	OP		Integer (-32..20 by step of 2)	[4] [dB]
>>$S_{searchHCS}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
>>RAT List	OP	1 to <maxOtherRAT>		
>>>RAT identifier	MP		Enumerated (GSM, cdma2000)	
>>>$S_{search,RAT}$	MP		Integer (-105..91 by step of 2)	[4] [dB]
>>>$S_{HCS,RAT}$	OP		Integer (-32..20 by step of 2)	[4] [dB]
>>$S_{limit,ShearchRAT}$	OP		Integer (-32..20 by step of 2)	[4] [dB]
>TDD				
>>$S_{intrasearch}$	OP		Integer (-105..91 by step of 2)	[4] [dB]

>>$S_{intersearch}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
>>$S_{searchHCS}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
>>RAT List	OP	1 to <maxOtherRAT>		
>>>RAT identifier	MP		Enumerated (GSM, cdma2000)	
>>>$S_{search,RAT}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
>>>$S_{HCS,RAT}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
>>>$S_{limit,ShearchRAT}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
$Qhyst1_S$	MP		Integer (0..40 by step of 2)	[4]
$Qhyst2_S$	CV-*FDD-Quality-Measure*		Integer (0..40 by step of 2)	Default value is $Qhist1_S$ [4]
$Treselection_S$	MP		Integer (0..31)	[s]
HCS Serving cell Information	OP		HCS Serving cell information 10.3.7.12	
Maximum allowed UL TX power	MP		Maximum allowed UL TX power 10.3.6.39	[dBm] UE_TXPWR_MAX_RACH in [4].
CHOICE *mode*	MP			
>FDD				
>>Qqualmin	MP		Integer (-2420..0)	Ec/N0, [dB]
>>Qrxlevmin	MP		Integer (-115..-25 by step of 2)	RSCP, [dBm]
>TDD				
>>Qrxlevmin	MP		Integer (-115..-25 by step of 2)	RSCP, [dBm]

Condition	Explanation
CV-FDD-Quality-Measure	Presence is not allowed if the IE "Cell_selection_and_reselection_quality_measure" has the value CPICH RSCP, otherwise the IE is mandatory and has a default value.

10.3.2.4 Cell selection and re-selection info for SIB11/12

Information Element/Group name	Need	Multi	Type and reference	Semantics description
$Qoffset1_{s,n}$	MD		Real(-50.0..50.0 by step of 1)	Default value is 0.
$Qoffset2_{s,n}$	CV-*FDD-Quality-Measure*		Real(-50.0..50.0 by step of 1)	Default value is 0.
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	[dBm] UE_TXPWR_MAX_RACH in [4]. Default is the Maximum allowed UL TX power for the serving cell
HCS neighbouring cell information	OP		HCS Neighbouring cell information 10.3.7.11	
CHOICE *mode*	MP			
>FDD				
>>Qqualmin	MD		Integer (-2420..0)	Ec/N0, [dB] Default value is Qqualmin for the serving cell
>>Qrxlevmin	MD		Integer (-115..-25 by step of 2)	RSCP, [dBm] Default value is Qrxlevmin for the serving cell
>TDD				
>>Qrxlevmin	MD		Integer (-115..-25 by step of 2)	RSCP, [dBm] Default value is Qrxlevmin for the serving cell
>GSM				
>>Qrxlevmin	MD		Integer (-115..-25 by step of 2)	RSCP, [dBm] Default value is Qrxlevmin for the serving cell

Condition	Explanation
FDD-Quality-Measure	Presence is not allowed if the IE "Cell_selection_and_reselection_quality_measure" has the value CPICH RSCP, otherwise the IE is mandatory and has a default value.

10.3.3.1 Activation time

Activation Time defines the frame number/time at which the operation/changes caused by the related message shall take effect. Values between 0 and 255 indicate the absolute value of CFN (Connection Frame Number) of that frame number/time.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Activation time	MP		Integer(0..255~~, Now~~)	CFN [10]

10.3.3.21 Measurement capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Need for downlink compressed mode				
FDD measurements	MP		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on FDD
TDD measurements	CV *tdd_sup*		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on TDD
GSM 900	CV *Gsm900_sup*M		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on GSM 900
DCS 1800	CV *Gsm1800_sup*		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on DCS 1800
GSM 1900	CV *Gsm1900_sup*		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on GSM 1900
Multi-carrier measurement	CV *mc_sup*		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on multi-carrier
Need for uplink compressed mode				
FDD measurements	MP		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on FDD
TDD measurements	CV *tdd_sup*		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on TDD
GSM 900	CV *Gsm900_sup*		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on GSM 900
DCS 1800	CV *Gsm1800_sup*		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on DCS 1800
GSM 1900	CV *Gsm1900_sup*		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on GSM 1900
Multi-carrier measurement	CV *mc_sup*		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on multi-carrier

Condition	Explanation
tdd_sup	Presence is mandatory if IE Multi-mode capability has the value "TDD" or "FDD/TDD". Otherwise this field is not needed in the message.
Gsm900_sup	Presence is needed if the IE "Inter-RAT UE radio access capability" indicates support for GSM900. Absence is needed if the IE "Inter-RAT UE radio access capability" indicates no support for GSM900.~~Presence is mandatory if IE Support of GSM900 has the value TRUE. Otherwise this field is not needed in the message.~~
Gsm1800_sup	Presence is needed if the IE "Inter-RAT UE radio access capability" indicates support for GSM1800. Absence is needed if the IE "Inter-RAT UE radio access capability" indicates no support for GSM1800.~~Presence is mandatory if IE Support of GSM1800 has the value TRUE. Otherwise this field is not needed in the message.~~
Gsm1900_sup	Presence is needed if the IE "Inter-RAT UE radio access capability" indicates support for GSM1900. Absence is needed if the IE "Inter-RAT UE radio access capability" indicates no support for GSM1900.~~Presence is mandatory if IE Support of GSM1900 has the value TRUE. Otherwise this field is not needed in the message.~~
mc_sup	Presence is mandatory if IE Support of multi-carrier has the value TRUE. Otherwise this field is not needed in the message.

10.3.3.25 Physical channel capability

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Downlink physical channel capability information elements				
FDD downlink physical channel capability	CH-*fdd_req_sup*			
>Max no DPCH/PDSCH codes	MP		Integer (1..8)	Maximum number of DPCH/PDSCH codes to be simultaneously received
>Max no physical channel bits received	MP		Integer (600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 48000, 57600, 67200, 76800)	Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH)
>Support for SF 512	MP		Boolean	TRUE means supported
>Support of PDSCH	MP		Boolean	TRUE means supported
>Simultaneous reception of SCCPCH and DPCH	MP		Boolean	TRUE means supported
>Simultaneous reception of SCCPCH, DPCH and PDSCH	CV-*if_sim_rec_pdsch_sup*		Boolean	TRUE means supported
>Max no of S-CCPCH RL	CV-*if_sim_rec*		Integer(1)	Maximum number of simultaneous S-CCPCH radio links
TDD downlink physical channel capability	CH-*tdd_req_sup*			
>Maximum number of timeslots per frame	MP		Integer (1..14)	
>Maximum number of physical channels per frame	MP		Integer (1..224)	
>Minimum SF	MP		Integer (1, 16)	
>Support of PDSCH	MP		Boolean	TRUE means supported
>Maximum number of physical channels per timeslot	MP		Integer (1..16)	
Uplink physical channel capability information elements				
>FDD uplink physical channel capability	CH-*fdd_req_sup*			
>Maximum number of DPDCH bits transmitted per 10 ms	MP		Integer (600, 1200, 2400, 4800. 9600, 19200. 28800, 38400, 48000, 57600)	
>Support of PCPCH	MP		Boolean	TRUE means supported
TDD uplink physical channel capability	CH-*tdd_req_sup*			
>Maximum Number of timeslots	MP		Integer	

per frame			(1..14)	
>Maximum number of physical channels per timeslot	MP		Integer (1, 2)	
>Minimum SF	MP		Integer (1, 2, 4, 8, 16)	
>Support of PUSCH	MP		Boolean	TRUE means supported

Condition	Explanation
if_sim_rec_pdsch_sup	Presence is mandatory if IE Simultaneous reception of SCCPCH and DPCH = True and IE Support of PDSCH = True. Otherwise this field is not needed in the message.
if_sim_rec	Presence is mandatory if IE capability Simultaneous reception of SCCPCH and DPCH = True. Otherwise this field is not needed in the message.
tdd_req_sup	Presence is mandatory if IE Multi-mode capability has the value "TDD" or "FDD/TDD" and a TDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.
fdd_req_sup	Presence is mandatory if IE Multi-mode capability has the value "FDD" or "FDD/TDD" and a FDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.

10.3.4.23 RLC info

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *Uplink RLC mode*	OP			Indicates if Acknowledged, Unacknowledged or Transparent mode RLC shall be used.
>AM RLC				
>>Transmission RLC discard	MP		Transmission RLC discard 10.3.4.25	
>>Transmission window size	MP		Integer(1,8,16,32,64,128,256,512,768,1024,1536,2047,2560,3072,3584,4095)	Maximum number of RLC PUs sent without getting them acknowledged. This parameter is needed if acknowledged mode is used. UE shall also assume that the UTRAN receiver window is equal to this value.
>>Timer_RST	MP		Integer(50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 700, 800, 900, 1000)	Elapsed time in milliseconds. It is used to trigger the retransmission of RESET PDU.~~It is used to detect the loss of RESET ACK PDU~~
>>Max_RST	MP		Integer(1, 4, 6, 8, 12 16, 24, 32)	The maximum number of retransmission of RESET PDU
>>Polling info	OP		Polling info 10.3.4.4	
>UM RLC				
>>Transmission RLC discard	OP		Transmission RLC discard 10.3.4.25	
>TM RLC				
>>Transmission RLC discard	OP		Transmission RLC discard 10.3.4.25	
>>Segmentation indication	MP		Boolean	TRUE indicates that segmentation is performed.
CHOICE *Downlink RLC mode*	OP			Indicates if Acknowledged, Unacknowledged or Transparent mode RLC shall be used
>AM RLC				
>>In-sequence delivery	MP		Boolean	TRUE indicates that RLC shall preserve the order of higher layer PDUs when these are delivered. FALSE indicates that receiving RLC entity could allow SDUs to be delivered to the higher layer in different order than submitted to RLC sublayer at the transmitting side.
>>Receiving window size	MP		Integer(1,8,16,32,64,128,256,512,768,1024,1536,2047,2560,3072,3584,4095)	Maximum number of RLC PUs allowed to be received. This parameter is needed if acknowledged mode is used. UE shall also assume that the UTRAN transmitter window is equal to this value
>>Downlink RLC status Info	MP		Downlink RLC status info 10.3.4.1	
>UM RLC				(No data)

>TM RLC				
>>Segmentation indication	MP		Boolean	TRUE indicates that segmentation is performed.

NOTE This information element is included within IE "Predefined RB configuration"

10.3.5.8 Power Offset Information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *Gain Factors*	MP			
>Signalled Gain Factors				
>>CHOICE mode				
>>>FDD				
>>>>Gain Factor β_c	MP		Integer (0.. 15)	For UL DPCCH or control part of PRACH or PCPCH
>>>TDD				(no data)
>>Gain Factor β_d	MP		Integer (0..15)	For UL DPDCH or data part of PRACH or PCPCH in FDD and all uplink channels in TDD
>>Reference TFC ID	OP		Integer (0..3)	If this TFC is a reference TFC, indicates the reference ID.
>Computed Gain Factors				
>>Reference TFC ID	MP		Integer (0.. 3)	Indicates the reference TFC Id of the TFC to be used to calculate the gain factors for this TFC. In case of using computed gain factors, at least one signalled gain factor is necessary for reference.
CHOICE mode	MP			
>FDD				
>>Power offset P p-m	OP		Integer(-5..10)	In dB. Power offset between the last transmitted preamble and the control part of the message (added to the preamble power to receive the power of the message control part) Needed only for PRACH
>TDD				(no data)

CHOICE *Gain Factors*	**Condition under which the way to signal the *Gain Factors* is chosen**
Signalled Gain Factors	The values for gain factors β_c (only in FDD mode) and β_d are signalled directly for a TFC.
Computed Gain Factors	The gain factors β_c (only in FDD mode) and β_d are computed for a TFC, based on the signalled settings for the associated reference TFC.

10.3.6.6 ASC setting

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE mode	MP			
>FDD				
>>Available signature Start Index	MP		Integer(0..15)	
>>Available signature End Index	MP		Integer(0..15)	
>>Assigned Sub-Channel Number	MP		Bitstring(4)	
>TDD				
>>Available Channelisation codes indices	MD		Bitstring(8)	Default is all defined in PRACH Info.
>>CHOICE subchannel size	MP			
>>>Size1				
>>>>Available Subchannels	MP		null	Indicates all Subchannels
>>>Size2				
>>>>Available Subchannels	MD		Bitstring (2)	Each bit indicates if the subchannel is available for the given ASC. 01: subchannel 0 10: subchannel 1 11: all subchannels Default is all subchannels.
>>>Size4				
>>>>Available Subchannels	MD		Bitstring (4)	Each bit indicates if the subchannel is available for the given ASC. 0001: subchannel 0 0011: subchannels 0 & 1 ... 1111: all subchannels. Default is all subchannels.
>>>Size8				
>>>>Available Subchannels	MD		Bitstring (8)	Each bit indicates if the subchannel is available for the given ASC. 00000001: subchannel 0 00000011: subchannels 0 & 1 ... 11111111: all subchannels Default is all subchannels.

10.3.6.18 Downlink DPCH info common for all RL

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Timing Indication	MP		Enumerated(Initialise, Maintain)	
CFN-targetSFN frame offset	CV TimInd		Integer(0..255)	In frame
CHOICE mode	MP			
>FDD				
>>Downlink DPCH power control information	OP		Downlink DPCH power control information 10.3.6.23	
>>Power offset $P_{Pilot-DPDCH}$	MP		Integer(0..24)	Power offset equals P_{Pilot} - P_{DPDCH}, range 0..6 dB, in steps of 0.25 dB
>>Downlink rate matching restriction information	OP		Downlink rate matching restriction information 10.3.6.31	If this IE is set to "absent", no Transport CH is restricted in TFI.
>>Spreading factor	MP		Integer(4, 8, 16, 32, 64, 128, 256, 512)	
>>Fixed or Flexible Position	MP		Enumerated (Fixed, Flexible)	
>>TFCI existence	MP		Boolean	TRUE indicates that TFCI exists
>>CHOICE *SF*	MP			
>>>SF = 256				
>>>>Number of bits for Pilot bits	MP		Integer (2,4,8)	In bits
>>>SF = 128				
>>>>Number of bits for Pilot bits	MP		Integer(4,8)	In bits
>>>Otherwise				(no data)
>TDD				
>>Downlink DPCH power control information	OP		Downlink DPCH power control information 10.3.6.23	
>>Common timeslot info	MD		Common Timeslot Info 10.3.6.10	Default is the current Common timeslot info

CHOICE *SF*	Condition under which the given *SF* is chosen
SF=128	"Spreading factor" is set to 128
SF=256	"Spreading factor" is set to 256
Otherwise	"Spreading factor" is set to a value distinct from 128 and 256

Condition	Explanation
TimInd	This IE is OPTIONAL if the IE "Timing Indication" is set to "Initialise". Otherwise it is absent.

10.3.6.24 Downlink information common for all radio links

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Downlink DPCH info common for all RL	OP		Downlink DPCH info common for all RL 10.3.6.18	
CHOICE *mode*	MP			
>FDD				
>>DPCH compressed mode info	MD		DPCH compressed mode info 10.3.6.33	Default value is the existing value of DPCH compressed mode information
>>TX Diversity Mode	MD		TX Diversity Mode 10.3.6.86	Default value is the existing value of TX Diversity mode
>>SSDT information	OP		SSDT information 10.3.6.77	
>TDD				(no data)
Default DPCH Offset Value	OP		Default DPCH Offset Value, 10.3.6.16	

10.3.6.28 Downlink information for each radio link Post

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Choice mode	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>Primary CCPCH info	MP		Primary CCPCH info post 10.3.6.58	
Downlink DPCH info for each RL	MP		Downlink DPCH info for each RL Post 10.3.6.22~~19~~	

10.3.6.33 DPCH compressed mode info

NOTE: Only for FDD.

This information element indicates the parameters of the compressed mode to be used by the UE in order to perform inter-frequency and inter-RAT measurements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Transmission gap pattern sequence	MP	1 to <maxTGPS>		
>TGPSI	MP		TGPSI 10.3.6.82	
>TGPS Status Flag	MP		Enumerated(active, inactive)	This flag indicates the current status of the Transmission Gap Pattern Sequence, whether it shall be activated or deactivated.
>TGCFN	CV Active		Integer (0..255)	Connection Frame Number of the first frame of the first pattern within the Transmission Gap Pattern Sequence.
>Transmission gap pattern sequence configuration parameters	OP			
>>TGMP	MP		Enumerated(TDD measurement, FDD measurement, GSM carrier RSSI measurement, GSM Initial BSIC identification, GSM BSIC re-confirmation)	Transmission Gap pattern sequence Measurement Purpose.
>>TGPRC	MP		Integer (1..511, Infinity)	The number of transmission gap patterns within the Transmission Gap Pattern Sequence.
>>TGSN	MP		Integer (0..14)	Transmission Gap Starting Slot Number The slot number of the first transmission gap slot within the TGCFN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>TGL1	MP		Integer(1..14)	The length of the first Transmission Gap within the transmission gap pattern expressed in number of slots
>>TGL2	MD		Integer (1..14)	The length of the second Transmission Gap within the transmission gap pattern. If omitted, then TGL2=TGL1.
>>TGD	MP		Integer(15..269, undefined)	Transmission gap distance indicates the number of slots between starting slots of two consecutive transmission gaps within a transmission gap pattern. If there is only one transmission gap in the transmission gap pattern, this parameter shall be set to zero.
>>TGPL1	MP		Integer (1..144)	The duration of transmission gap pattern 1.
>>TGPL2	MD		Integer (1..144)	The duration of transmission gap pattern 2. If omitted, then TGPL2=TGPL1.
>>RPP	MP		Enumerated (mode 0, mode 1).	Recovery Period Power control mode during the frame after the transmission gap within the compressed frame. Indicates whether normal PC mode or compressed PC mode is applied
>>ITP	MP		Enumerated (mode 0, mode 1).	Initial Transmit Power is the uplink power control method to be used to compute the initial transmit power after the compressed mode gap.
>>UL/DL mode	MP		Enumerated (UL only, DL only, UL/DL)	Defines whether only DL, only UL, or combined UL/DL compressed mode is used.
>>Downlink compressed mode method	CV DL		Enumerated (puncturing, SF/2, higher layer scheduling)	Method for generating downlink compressed mode gap
>>Uplink compressed mode method	CV UL		Enumerated (SF/2, higher layer scheduling)	Method for generating uplink compressed mode gap
>>Downlink frame type	MP		Enumerated (A, B)	
>>DeltaSIR1	MP		Real(0..3 by step of 0.1)	Delta in DL SIR target value to be set in the UE during the frame containing the start of the first transmission gap in the transmission gap pattern (without including the effect of the bit-rate increase)
>>DeltaSIRafter1	MP		Real(0..3 by step of 0.1)	Delta in DL SIR target value to be set in the UE one frame after the frame containing the start of the first transmission gap in the transmission gap pattern.
>>DeltaSIR2	OP		Real(0..3 by step of 0.1)	Delta in DL SIR target value to be set in the UE during the frame containing the start of the second transmission gap

Information Element/Group name	Need	Multi	Type and reference	Semantics description
				in the transmission gap pattern (without including the effect of the bit-rate increase) When omitted, DeltaSIR2 = DeltaSIR1.
>>DeltaSIRafter2	OP		Real(0..3 by step of 0.1)	Delta in DL SIR target value to be set in the UE one frame after the frame containing the start of the second transmission gap in the transmission gap pattern. When omitted, DeltaSIRafter2 = DeltaSIRafter1.
>>N Identify abort	CV Initial BSIC		Integer(1..128)	Indicates the maximum number of repeats of patterns that the UE shall use to attempt to decode the unknown BSIC of the GSM cell in the initial BSIC identification procedure
>>T Reconfirm abort	CV Re-confirm BSIC		Integer(1..20)	Indicates the maximum time allowed for the re-confirmation of the BSIC of one GSM cell in the BSIC re-confirmation procedure. The time is given in steps of 0.5 seconds.

Condition	Explanation
UL	This information element is only sent when the value of the "UL/DL mode" IE is "UL only" or "UL/DL".
DL	This information element is only sent when the value of the "UL/DL mode" IE is "DL only" or "UL/DL".
Active	This information element is only sent when the value of the "TGPS Status Flag" IE is "Active".
Initial BSIC	This information element is only sent when the value of the IE "TGMP" is set to "GSM Initial BSIC identification".
Re-confirm BSIC	This information element is only sent when the value of the IE "TGMP" is set to "GSM BSIC re-confirmation".

10.3.6.34 DPCH Compressed Mode Status Info

This information element indicates status information of the compressed mode used by the UE in order to perform inter-frequency and inter-RAT measurements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
TGPS reconfiguration CFN	MP		Integer (0..255)	Connection Frame Number of the frame where already active Transmission Gap Pattern Sequences shall be deactivated
Transmission gap pattern sequence	MP	1 to <maxTGPS>		
>TGPSI	MP		TGPSI 10.3.6.82	Transmission Gap Pattern Sequence Identifier
>TGPS Status Flag	MP		Enumerated(active, inactive)	This flag indicates the current status of the Transmission Gap Pattern Sequence, whether it shall be active or

Information Element/Group name	Need	Multi	Type and reference	Semantics description
				inactive.
>TGCFN	CV Active		Integer (0..255)	Connection Frame Number of the first frame of the first pattern within the Transmission Gap Pattern Sequence.

Condition	Explanation
Active	This information element is only sent when the value of the "TGPS Status Flag" IE is "Active".

10.3.6.48 Persistence scaling factors

This IE defines scaling factors associated with ASC 2 – ASC 7 to be applied to the dynamic persistence value.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Access Service Class	MP	1 to maxASCpersist		multiplicity corresponds to the number of PRACH partitions minus 2
>Persistence scaling factor	MP		Real(0.9..0.2, by step of 0.1)	Scaling factors in the range 0,…,1

10.3.6.56 Predefined PhyCH configuration

This information element concerns a pre- defined configuration of physical channel parameters.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Uplink radio resources				
Uplink DPCH info	MP		Uplink DPCH info Pre 10.3.6.90	
Downlink radio resources				
Downlink information common for all radio links	MP		Downlink information common for all radio links Pre 10.3.6.26	

10.3.7.3 Cell measured results

Includes non frequency related measured results for a cell.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Cell Identity	OP		Cell Identity 10.3.2.2	
SFN-SFN observed time difference	OP		SFN-SFN observed time difference 10.3.7.63	
Cell synchronisation information	OP		Cell synchronisation information 10.3.7.6	
CHOICE *mode*	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>>CPICH Ec/N0	OP		Integer(0..50)	According to CPICH_Ec/No in [19] and [20]
>>CPICH RSCP	OP		Integer(0..91)	According to CPICH_RSCP in [19] and [20]
>>Pathloss	OP		Integer(46..158)	In dB
>TDD				
>>Cell parameters Id	MP		Cell parameters Id 10.3.6.9	
>>Proposed TGSN	OP		Integer (0..14)	Proposal for the next TGSN
>>Primary CCPCH RSCP	OP		Primary CCPCH RSCP info 10.3.7.54	
>>Pathloss	OP		Integer(46..158)	In dB
>>Timeslot list	OP	1 to < maxTS>		
>>>Timeslot ISCP	MP		Timeslot ISCP Info 10.3.7.65	The UE shall report the Timeslot ISCP in the same order as indicated in the cell info

10.3.7.11 HCS neighbouring cell information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
HCS_PRIO	MD		Integer (0..7)	Default value = 0
Q_{HCS}	MD		Integer (-0..99)	Default value = 0
HCS Cell Re-selection Information	OP		HCS Cell Re-selection Information 10.3.7.10	

10.3.7.19 Inter-frequency measurement reporting criteria

The triggering of the event-triggered reporting for an inter-frequency measurements. All events concerning inter-frequency measurements are labelled 2x where x is a,b,c..

Event 2a: Change of best frequency.

Event 2b: The estimated quality of the currently used frequency is below a certain threshold **and** the estimated quality of a non-used frequency is above a certain threshold.

Event 2c: The estimated quality of a non-used frequency is above a certain threshold.

Event 2d: The estimated quality of the currently used frequency is below a certain threshold.

Event 2e: The estimated quality of a non-used frequency is below a certain threshold.

Event 2f: The estimated quality of the currently used frequency is above a certain threshold.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Parameters required for each event	OP	1 to <maxMeasEvent>		
>Inter-frequency event identity	MP		Inter-frequency event identity 10.3.7.14	
>Threshold used frequency	CV – clause 0		Integer(-115..0)	Ranges used depend on measurement quantity. CPICH Ec/No -24..0dB CPICH/Primary CCPCH RSCP -115..-25dBm
>W used frequency	CV – clause 0		Real(0, 0.1..2.0 by step of 0.1)	
>Hysteresis	MP		Real(0, 0.5..14.5 by step of 0.5)	In event 2a, 2b, 2c, 2d, 2e, 2f
>Time to trigger	MP		Time to trigger 10.3.7.64	Indicates the period of time between the timing of event detection and the timing of sending Measurement Report. Time in ms.
>Reporting cell status	OP		Reporting cell status 10.3.7.61	
>Parameters required for each non-used frequency	OP	1 to <maxFreq>		
>>Threshold non used frequency	CV – clause 1		Integer(-115..0)	Ranges used depend on measurement quantity. CPICH Ec/No -24..0dB CPICH/Primary CCPCH RSCP -115..-25dBm
>>W non-used frequency	CV-*clause 1*		Real(0, 0.1..2.0 by step of 0.1)	

Condition	Explanation
Clause 0	2a,2b, 2d, or 2f, otherwise the IE is not needed
Clause 1	The IE is mandatory in if "inter frequency event identity" is set to 2a, 2b, 2c or 2e, otherwise the IE is not needed

10.3.7.26 Inter-RAT measured results list

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Inter-RAT measurement results	OP	1 to <maxOtherRAT>		
>CHOICE system	MP			At least one spare value needed
>>GSM				
>>>Measured GSM cells	MP	1 to <maxReportedGSMCells>		
>>>>GSM carrier RSSI	OP		bit string(6)	RXLEV, [46]
>>>>Pathloss	OP		Integer(46..158)	In dB
>>>>CHOICE BSIC	MP			
>>>>>Verified BSIC				
>>>>>>inter-RAT cell id	MP		Integer(0..<maxCellMeas>)	
>>>>>Non verified BSIC				
>>>>>>BCCH ARFCN	MP		Integer (0..1023)	[45]
>>>>Observed time difference to GSM cell	OP		Observed time difference to GSM cell 10.3.7.52	

10.3.7.28 Inter-RAT measurement event results

This IE contains the measurement event results that are reported to UTRAN for inter-RAT measurements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Inter-RAT event identity	MP		Inter-RAT event identity 10.3.7.24	
Cells to report	MP	1 to <maxCellMeas>		
>CHOICE BSIC	MP			
>>Verified BSIC				
>>>inter-RAT cell id	MP		Integer(0..<maxCellMeas>)	
>>Non verified BSIC				
>>>BCCH ARFCN	MP		Integer (0..1023)	[45]

10.3.7.38 Intra-frequency measurement quantity

The quantity the UE shall measure in case of intra-frequency measurement. It also includes the filtering of the measurements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Filter coefficient	MP		Filter coefficient 10.3.7.9	
CHOICE *mode*	MP			
>FDD				
>>Measurement quantity	MP		Enumerated(CPICH Ec/N0, CPICH RSCP, Pathloss, UTRA Carrier RSSI)	Pathloss=Primary CPICH Tx power-CPICH RSCP If used in Inter system measurement quantity only Ec/N0 and RSCP is allowed. If used in inter-frequency measurement quantity RSSI is not allowed.
>TDD				
>>Measurement quantity list	MP	1 to 4		
>>>Measurement quantity	MP		Enumerated(Primary CCPCH RSCP, Pathloss, Timeslot ISCP, UTRA Carrier RSSI)	Pathloss=Primary CCPCH Tx power-Primary CCPCH RSCP If used in inter-frequency measurement quantity RSSI is not allowed.

10.3.7.55 Quality measured results list

Information Element/Group name	Need	Multi	Type and reference	Semantics description
BLER measurement results	OP	1 to <maxTrCH>		
>DL Transport channel identity	MP		Transport channel identity 10.3.5.18	transport channel type = DCH
>DL Transport Channel BLER	OP		Integer (0..63)	According to BLER_LOG in [19] and [20]
CHOICE mode	MP			
>FDD				No data
>TDD				
>>SIR measurement results	OP	1 to <MaxCCTrCH>		SIR measurements for DL CCTrCH
>>>TFCS ID	MP		Enumerated (1...8)	
>>>Timeslot list	MP	1 to <maxTS>		for all timeslot on which the CCTrCH is mapped on
>>>>SIR	MP		Integer(0..63)	According to UE_SIR in [20]

10.3.7.59 Quality reporting quantity

Information Element/Group name	Need	Multi	Type and reference	Semantics description
DL Transport Channel BLER	MP		Boolean	TRUE means report requested
Transport channels for BLER reporting	CV BLER reporting	1 to <maxTrCH>		The default, if no transport channel identities are present, is that the BLER is reported for all downlink transport channels
>DL Transport channel identity	MP		Transport channel identity 10.3.5.18	transport channel type = DCH
CHOICE mode	MP			
>FDD				No data
>TDD				
>>SIR measurement list	OP	1 to <maxCCTrCH>		SIR measurements shall be reported for all listed TFCS IDs
>>>TFCS ID	MP		Enumerated (1...8)	

Condition	Explanation
BLER reporting	This information element is absent if 'DL Transport Channel BLER' is 'False' and optional, if 'DL Transport Channel BLER' is 'True'

10.3.7.61 Reporting Cell Status

Indicates maximum allowed number of cells to report and whether active set cells and/or virtual active set cells and/or monitored set cells on and/or detected set cells used frequency and/or monitored set cells on non used frequency should/should not be included in the IE "Measured results".

Information Element/Group name	Need	Multi	Type and reference	Semantics description
~~Choice~~ CHOICE reported cell	MP			
>Report cells within active set				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells within monitored set cells on used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells within active set and/or monitored set cells on used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells within detected set on used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells within monitored set and/or detected set on used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report all active set cells + cells within monitored set on used frequency				
>>Maximum number of reported cells	MP		Enumerated (virtual/active set cells+1, virtual/active set cells+2, …., virtual/active set cells+6)	
>Report all active set cells + cells within detected set on used frequency				
>>Maximum number of reported cells	MP		Enumerated (virtual/active set cells+1, virtual/active set cells+2, …., virtual/active set cells+6)	
>Report all active set cells + cells within monitored set and/or detected set on used frequency				
>>Maximum number of reported cells	MP		Enumerated (virtual/active set cells+1, virtual/active set cells+2, …., virtual/active set cells+6)	

>Report cells within virtual active set				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells w within monitored set on non-used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells within monitored and/or active set on non-used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report all virtual active set cells + cells within monitored set on non-used frequency				
>>Maximum number of reported cells	MP		Enumerated (virtual/active set cells+1, virtual/active set cells+2, …., virtual/active set cells+6)	
>Report cells within active set or within virtual active set				
>>Maximum number of reported cells	MP		Integer (1..12)	
>Report cells within active and/or monitored set on used frequency or within active and/or monitored set on non-used frequency				
>>Maximum number of reported cells	MP		Integer(1..12)	

10.3.7.88 UE positioning GPS acquisition assistance

This IE contains parameters that enable fast acquisition of the GPS signals in UE-assisted GPS positioning.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE Reference Time	MP			
>UTRAN reference time				GPS Time of Week counted in microseconds, given as GPS TOW in milliseconds and GPS TOW remainder in microseconds, UTRAN reference time = 1000 * GPS TOW msec + GPS TOW rem usec
>>GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit)
>>GPS TOW rem usec	MP		Integer(0..999)	GPS Time of Week in microseconds MOD 1000.
>>SFN	MP		Integer(0..4095)	
>GPS reference time only				
>>GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).
Satellite information	MP	1 to <maxSat>		
>SatID	MP		Integer (0..63)	
>Doppler (0th order term)	MP		Real(-5.120..5.1175 by step of 2.5)	Hz
>Extra Doppler	OP			
>>Doppler (1st order term)	MP		Real (-1..0.5 by step of 0.023)	Scaling factor 1/42
>>Doppler Uncertainty	MP		Enumerated (12.5,25,50,100,200)	Hz
>Code Phase	MP		Integer(0..1022)	Chips, specifies the centre of the search window
>Integer Code Phase	MP		Integer(0..19)	1023 chip segments
>GPS Bit number	MP		Integer(0..3)	Specifies GPS bit number (20 1023 chip segments)
>Code Phase Search Window	MP		Integer(1023,1,2,3,4,6,8,12,16,24,32,48,64,96,128,192)	Specifies the width of the search window.
>Azimuth and Elevation	OP			
>>Azimuth	MP		Real(0..348.75 by step of 11.25)	Degrees
>>Elevation	MP		Real(0..78.75 by step of 11.25)	Degrees

CHOICE *Reference time*	Condition under which the given *reference time* is chosen
UTRAN reference time	The reference time is relating GPS time to UTRAN time (SFN)
GPS reference time only	The time gives the time for which the location estimate is valid

10.3.7.103 UE positioning OTDOA assistance data

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning OTDOA reference cell info	OP		UE positioning OTDOA cell info 10.3.7.108	
UE positioning OTDOA neighbour cell list	OP	1 to <maxCellMeas>		
>UE positioning OTDOA neighbour cell info	OP		UE positioning OTDOA neighbour cell info 10.3.7.106	

10.3.7.105 UE positioning OTDOA measurement

The purpose of the OTDOA Measurement Information element is to provide OTDOA measurements of signals sent from the reference and neighbour cells.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
SFN	MP		Integer(0..4095)	SFN during which the last measurement was performed
UE Rx-Tx time difference type 2	MP		UE Rx-Tx time difference type 2 10.3.7.84	
UE positioning OTDOA quality type	MP		UE positioning OTDOA quality type 10.3.7.107	
Neighbours	MP	0 to <maxCellMeas>		
>CHOICE mode	MP			
>>FDD				
>>>Neighbour Identity	MD		Primary CPICH info 10.3.6.60	Default value is the same as in the first set of multiple sets.
>>TDD				
>>>Cell and Channel ID	MD		Cell and Channel Identity info 10.3.6.8a	Default value is the same as in the first set of multiple sets.
>UE positioning OTDOA quality type	MP		UE positioning OTDOA quality type 10.3.7.107	Quality of the OTDOA from the neighbour cell.
>SFN-SFN observed time difference	MP		SFN-SFN observed time difference 10.3.7.63	Gives the timing relative to the reference cell. Only type 2 is allowed. Type 2 means that only the slot timing is accounted for
>UE Rx-Tx time difference type 2	OP		UE Rx-Tx time difference type 2 10.3.7.84	Included if the neighbour is in the active set

10.3.7.106 UE positioning OTDOA neighbour cell info

This IE gives approximate cell timing in order to decrease the search window.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE mode	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell and channel ID	MP		Cell and Channel Identity info 10.3.6.8a	Identifies the channel to be measured on.
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
IPDL parameters	CV-*IPDLs*		UE positioning IPDL parameters 10.3.7.98	
SFN-SFN relative time difference	MP		Integer(0..9830399)	Gives the relative timing compared to the reference cell. in chips.
SFN-SFN drift	OP		Real(0,+0.33,+0.66,+1,+1.33,+1.66,+2,+2.5,+3,+4,+5,+7,+9,+11,+13,+15,-0.33,-0.66,-1,-1.33,-1.66,-2,-2.5,-3,-4,-5,-7,-9,-11,-13,-15)	meters/sec
Search Window Size	MP		Integer(10, 20, 30, 40, 50, 60,70, infinity)	in chips. Infinity means more
CHOICE PositioningMode	MP			
>UE based				
>>Cell Position	MD			Default is the same as previous cell
>>>Relative North	MP		Integer(-20000..20000)	Seconds, scale factor 0.03. Relative position compared to reference cell.
>>>Relative East	MP		Integer(-20000..20000)	Seconds, scale factor 0.03. Relative position compared to reference cell.
>>>Relative Altitude	OP		Integer(-4000..4000)	Relative altitude in meters compared to ref. cell.
>>Fine SFN-SFN	MP		Real(0..0.9375 in steps of 0.0625)	Gives finer resolution
>>Round Trip Time	OP		Real(876.00 .. 2923.875) in steps of 0.0625	In chips. Included if cell is in active set.
>UE assisted				(no data)

Condition	Explanation
IPDLs	This IE is present only if IPDLs are applied.

10.3.7.108 UE positioning OTDOA reference cell info

This IE defines the cell used for time references in all OTDOA measurements.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
SFN	OP		Integer (0..4095)	Time stamp (SFN of Reference Cell) of the SFN-SFN observed time differences and SFN-SFN drift rates. Included if any SFN-SFN drift value is included.
CHOICE mode	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell and channel ID	MP		Cell and Channel Identity info 10.3.6.8a	Identifies the channel to be measured on.
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information.
CHOICE PositioningMode	MP			
>UE based				
>>CHOICE *Cell Position*	MP			The position of the antenna that defines the cell. Used for the UE based method.
>>>Ellipsoid point	~~OP~~		Ellipsoid point 10.3.8.4a	
>>>Ellipsoid point with altitude	~~OP~~		Ellipsoid point with altitude 10.3.8.4b	
>>Round Trip Time	OP		Real(876.00 .. 2923.875) in steps of 0.0625	In chips.
>UE assisted				(no data)
IPDL parameters	OP		UE positioning IPDL parameters 10.3.7.98	If this element is not included there are no idle periods present

10.3.7.110 UE positioning reporting criteria

The triggering of the event-triggered reporting for an UE positioning measurement.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Parameters required for each event	OP	1 to <maxMeasEvent>		
>Amount of reporting	MP		Integer(1, 2, 4, 8, 16, 32, 64,infinite)	
>Report first fix	MP		Boolean	If true the UE reports the position once the measurement control is received, and then each time an event is triggered.
>Measurement interval	MP		Integer(5,15, 60,300,900,1800,3600,7200)	Indicates how often the UE should make the measurement In seconds
>CHOICE Event ID	MP			
>>7a				
>>>Threshold Position Change	MP		Integer(10,20,30,40,50,100,200,300,500,1000,2000,5000,10000,20000,50000,100000)	Indicated how much the position should change compared to last reported position fix in order to trigger the event.
>>7b				
>>>Threshold SFN-SFN change	MP		Real(0.25,0.5,1,2,3,4,5,10,20,50,100,200,500,1000,2000,5000)	Chips. Indicates how much the SFN-SFN measurement of ANY measured cell is allowed to change before the event is triggered.
>>7c				
>>>Threshold SFN-GPS TOW	MP		Integer(1,2,3,5,10,20,50,100)	Time in ms. When the GPS TOW and SFN timer has drifted apart more than the specified value the event is triggered)

11.3 Information element definitions

[...]

```
-- **************************************************
--
--     PHYSICAL CHANNEL INFORMATION ELEMENTS (10.3.6)
--
-- **************************************************
```

[...]

```
DL-DPCH-InfoPerRL ::=               CHOICE {
    fdd                                 SEQUENCE {
        pCPICH-UsageForChannelEst           PCPICH-UsageForChannelEst,
        dpchdcph-FrameOffset                    DPCH-FrameOffset,
        secondaryCPICH-Info                 SecondaryCPICH-Info             OPTIONAL,
        dl-ChannelisationCodeList           DL-ChannelisationCodeList,
        tpc-CombinationIndex                TPC-CombinationIndex,
        ssdt-CellIdentity                   SSDT-CellIdentity               OPTIONAL,
        closedLoopTimingAdjMode             ClosedLoopTimingAdjMode         OPTIONAL
    },
    tdd                                 DL-CCTrChList
}
```

[…]

```
-- **************************************************
--
--     MEASUREMENT INFORMATION ELEMENTS (10.3.7)
--
-- **************************************************
```

[…]

```
CellSelectReselectInfoSIB-3-4 ::=   SEQUENCE {
    mappingInfo                         MappingInfo                         OPTIONAL,
    cellSelectQualityMeasure            CHOICE {
        cpich-Ec-NoN0                           SEQUENCE {
            q-HYST-2-S                          Q-Hyst-S                    OPTIONAL
            -- Default value for q-HYST-2-S is q-HYST-1-S
        },
        cpich-RSCP                          NULL
    },
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            s-Intrasearch                       S-SearchQual                OPTIONAL,
            s-Intersearch                       S-SearchQual                OPTIONAL,
            s-SearchHCS                         S-SearchRXLEV               OPTIONAL,
            rat-List                            RAT-FDD-InfoList            OPTIONAL,
            q-QualMin                           Q-QualMin,
            q-RxlevMin                          Q-RxlevMin
        },
        tdd                                 SEQUENCE {
            s-Intrasearch                       S-SearchRXLEV               OPTIONAL,
            s-Intersearch                       S-SearchRXLEV               OPTIONAL,
            s-SearchHCS                         S-SearchRXLEV               OPTIONAL,
            rat-List                            RAT-TDD-InfoList            OPTIONAL,
            q-RxlevMin                          Q-RxlevMin
        }
    },
    q-Hyst-l-S                          Q-Hyst-S,
    t-Reselection-S                     T-Reselection-S,
    hcs-ServingCellInformation          HCS-ServingCellInformation          OPTIONAL,
    maxAllowedUL-TX-Power               MaxAllowedUL-TX-Power
}

CellSelectReselectInfoSIB-11-12-HCS-RSCP ::=    SEQUENCE {
    q-OffsetS-N                         Q-OffsetS-N                     DEFAULT 0,
    maxAllowedUL-TX-Power               MaxAllowedUL-TX-Power           OPTIONAL,
    hcs-NeighbouringCellInformation-RSCP        HCS-NeighbouringCellInformation-RSCP
    OPTIONAL, [Note to Hans: Color changed from red to black]
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            q-QualMin                           Q-QualMin                   OPTIONAL,
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
```

```
        tdd                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
        gsm                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        }
    }
}


IntraFreqMeasQuantity-FDD ::=       ENUMERATED {
                                        cpich-Ec-NONO,
                                        cpich-RSCP,
                                        pathloss,
                                        utra-CarrierRSSI }

MeasurementControlSysInfo ::=       SEQUENCE {
    use-of-HCS                          CHOICE  {
        hcs-not-used                    SEQUENCE    {
            cellSelectQualityMeasure    CHOICE  {
                cpich-RSCP              SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-RSCP
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-RSCP    OPTIONAL
                },
                cpich-Ec-NoNO               SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-ECN0
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-ECN0    OPTIONAL
                }
            },
            interRATMeasurementSysInfo      InterRATMeasurementSysInfo-HCS      OPTIONAL
        },
        hcs-used                        SEQUENCE    {
            cellSelectQualityMeasure    CHOICE  {
                cpich-RSCP              SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-HCS-RSCP
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-HCS-RSCP
    OPTIONAL
                },
                cpich-Ec-NoNO               SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-HCS-ECN0
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-HCS-ECN0
    OPTIONAL                }
            },
            interRATMeasurementSysInfo      InterRATMeasurementSysInfo      OPTIONAL
        }
    },

    trafficVolumeMeasSysInfo            TrafficVolumeMeasSysInfo            OPTIONAL,
    ue-InternalMeasurementSysInfo       UE-InternalMeasurementSysInfo       OPTIONAL
}
```

12.1.3 Padding

Emitters compliant with this version of the specification of the protocol shall, unless indicated otherwise on a PDU type basis, pad the basic production with the smallest number of bits required to meet the size constraints of the lower layers. Padding bits shall be set to 0.

Receivers compliant with this version of the specification have no need to distinguish the extension and padding parts, and shall, unless indicated otherwise on a PDU type basis, accept RRC PDUs with any bit string in the extension and padding parts.

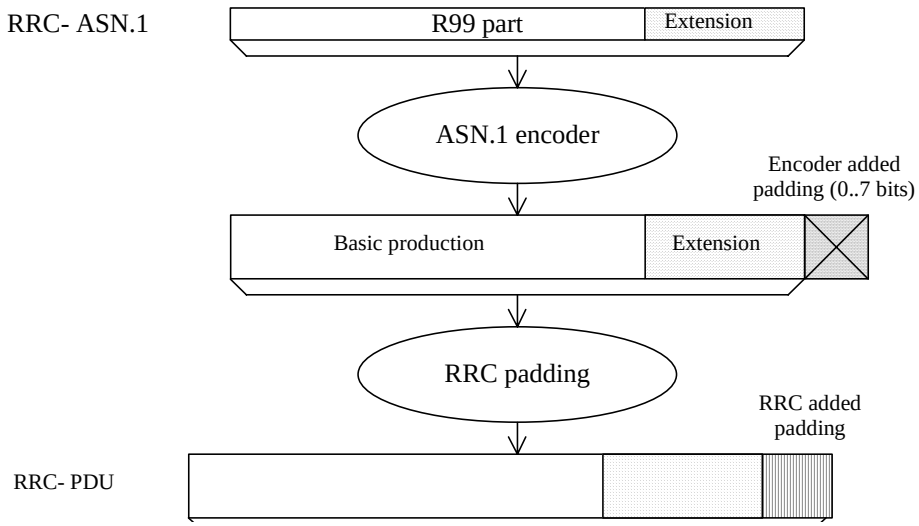

Figure 61: Padding

When using AM or UM mode, RLC requires that the RRC PDU length is a multiple of 8 bits.

When using Tr mode, RLC does neither impose size requirements nor perform padding. This implies that RRC has to take into account the transport format set defined for the transport channel across which the message is to be sent. RRC shall select the smallest transport format that fits the RRC PDU and shall add the lowest number of padding bits required to fit the size specified for the selected transport format.

For system information blocks, building the PDU involves two steps. The first step is the building of the SIBs, in which step padding is not applied (the rules for extension apply). The second step is the building of the RRC PDUs, involving segmentation and concatenation of SIBs, and then padding as described above for Tr mode. The procedure is shown by means of an example as described in Figure 62. The example includes two SIBs, SIBn and SIBn+1, of which only SIBn includes a protocol extension. The two SIBS used in the example don't require segmentation and are concatenated into one SYSTEM INFORMATION message.

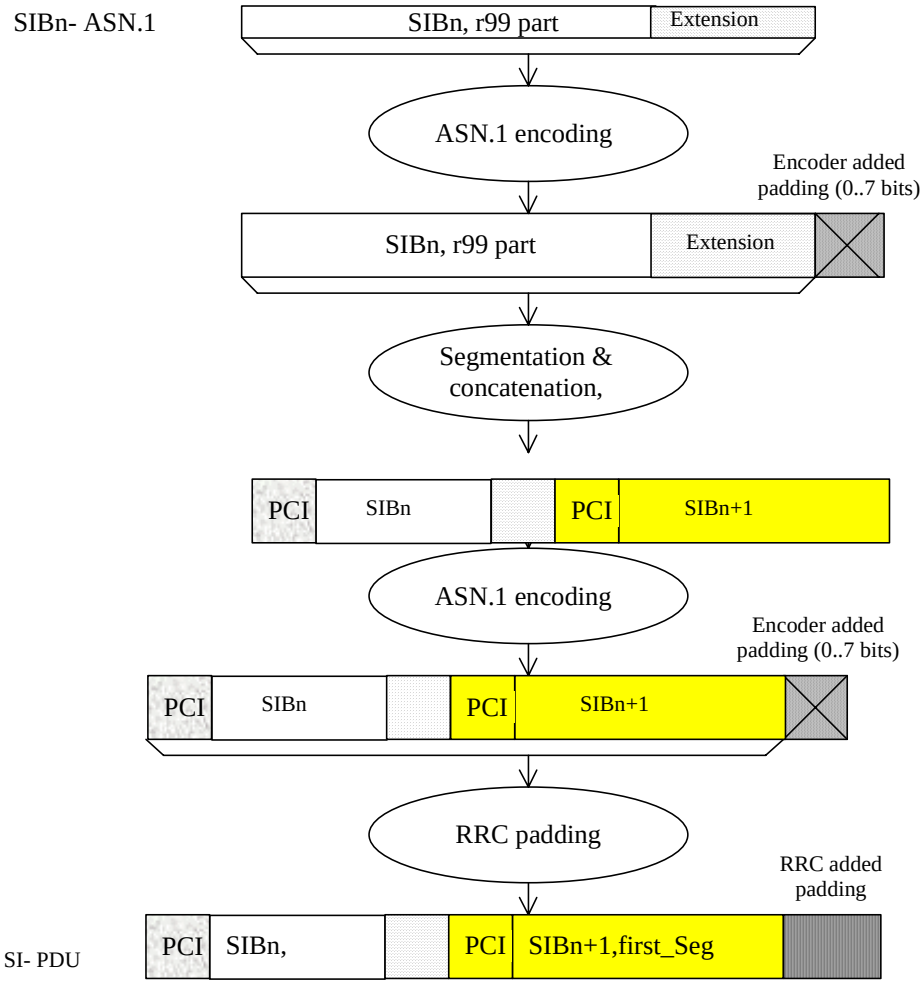

Figure 62: Padding for System Information

PCI: Protocol control information at SYSTEM INFORMATION message level

SI: SYSTEM INFORMATION message

For system information blocks, RRC may also add padding information at the end of IE "SIB data fixed", used both within IE "Last segment" and IE "Complete SIB". The IE "SIB data fixed" has a fixed length i.e. no length denominator used. In case the remaining amount of "SIB data" information is insufficient to fill the IE completely, RRC includes padding bits.

Since no length denominator is included, the receiving RRC can not remove the padding added by the sender. However, since the padding used is the same as the padding added by the PER encoder to achieve octet alignment, the receiver can handle it.

NOTE 1 The mechanism described above implies that the PDU provided to the ASN.1 decoder may have more than 7 padding bits included. For a complete SIB of length 215 bits, 11 padding bits are added by RRC. Since the decoder requires an octet aligned input, 6 additional bits need to be added. In this (worst) case, a total of 17 padding bits is included.

NOTE 2 For the above cases, use of padding bits is possible and more efficient than including a length denominator.

When using the RRC padding described above, the segment has a fixed length, which completely fills the transport block. Therefore, in this case no RRC padding is added within the SYSTEM INFORMATION message. This is illustrated by means of the following figure.

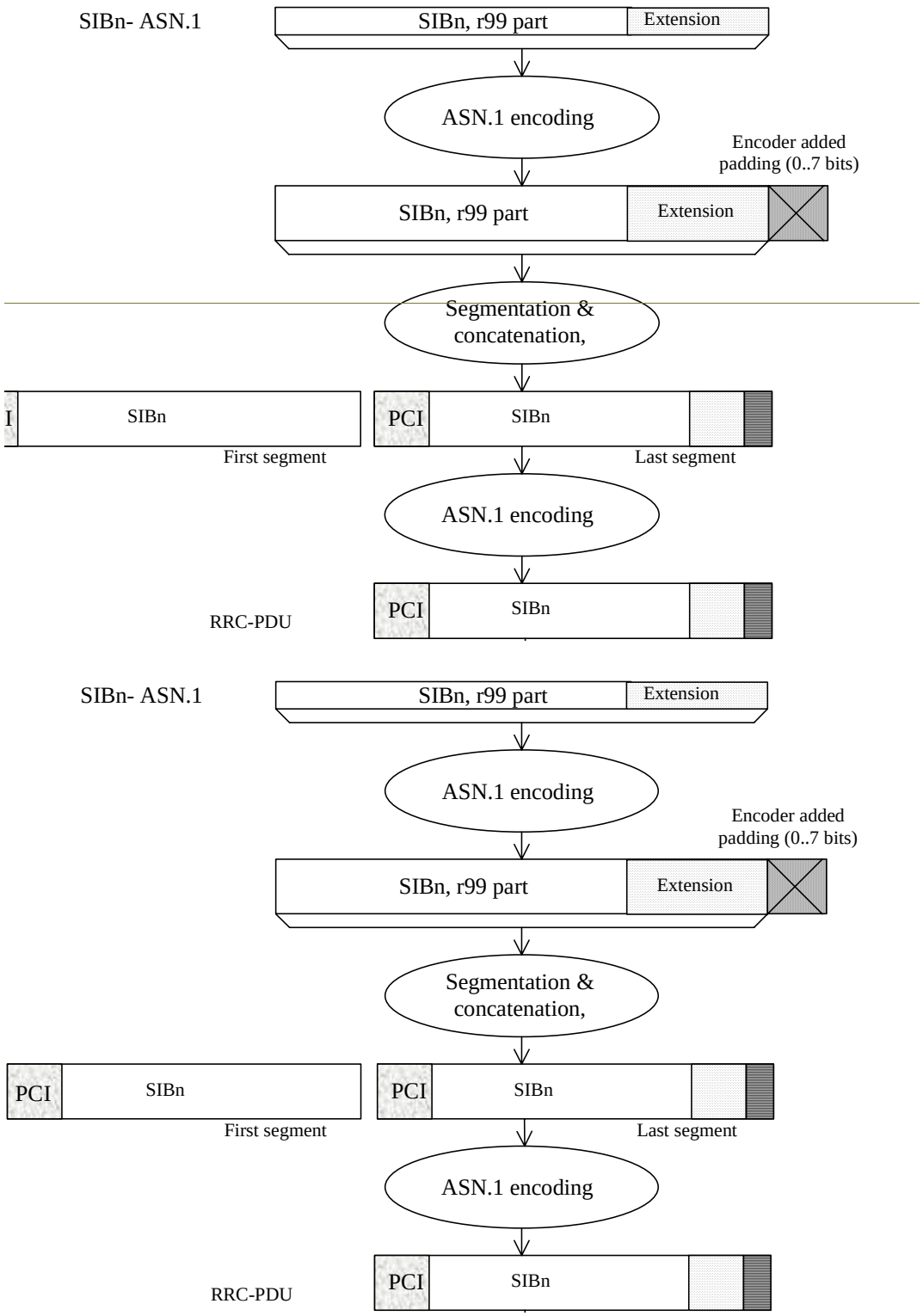

Figure 62a: No RRC padding for System Information

13.1 Timers for UE

Timer	Start	Stop	At expiry
T300	Transmission of RRC CONNECTION REQUEST	Reception of RRC CONNECTION SETUP	Retransmit RRC CONNECTION REQUEST if V300 =< N300, else go to Idle mode
T302	Transmission of CELL UPDATE/URA UPDATE	Reception of CELL UPDATE CONFIRM/URA UPDATE CONFIRM	Retransmit CELL UPDATE/URA UPDATE if V302 =< N302, else, go to Idle mode
T304	Transmission of UE CAPABILITY INFORMATION	Reception of UE CAPABILITY INFORMATION CONFIRM	Retransmit UE CAPABILITY INFORMATION if V304 =< N304, else initiate a cell update procedure
T305	Entering CELL_FACH or URA_PCH or CELL_PCH state. Reception of CELL UDPATE CONFIRM/URA UPDATE CONFIRM.	Entering another state.	Transmit CELL UPDATE if T307 is not activated, and the UE detects "in service area". Otherwise, if T307 is not active, start T307.
T307	When the timer T305 has expired and the UE detects "out of service area".	When the UE detects "in service area".	Transit to idle mode
T308	Transmission of RRC CONNECTION RELEASE COMPLETE	Not stopped	Transmit RRC CONNECTION RELEASE COMPLETE if V308 <=N308, else go to idle mode.
T309	Upon reselection of a cell belonging to another radio access system from connected mode	Successful establishment of a connection in the new cell	Resume the connection to UTRAN
T310	Transmission of PUSCH CAPACITY REQUEST	Reception of PHYSICAL SHARED CHANNEL ALLOCATION	Transmit PUSCH CAPACITY REQUEST if V310 =< N310, else procedure stops.
T311	Reception of PHYSICAL SHARED CHANNEL ALLOCATION message with the CHOICE "PUSCH allocation" set to "PUSCH allocation pending".	Reception of PHYSICAL SHARED CHANNEL ALLOCATION message with CHOICE "PUSCH allocation" set to "PUSCH allocation assignment".	UE may initiate a PUSCH capacity request procedure.
T312	When the UE starts to establish dedicated CH	When the UE detects consecutive N312 "in sync" indication from L1.	The criteria for physical channel establishment failure is fulfilled
T313	When the UE detects consecutive N313 "out of sync" indication from L1.	When the UE detects consecutive N315 "in sync" indication from L1.	The criteria for Radio Link failure is fulfilled
T314	When the criteria for radio link failure are fulfilled. The timer is started only if radio bearer(s) that are associated with T314 exist.	When the Cell Update procedure has been completed.	See subclause 8.3.1.13

Timer	Start	Stop	At expiry
T315	When the criteria for radio link failure are fulfilled. The timer is started only if radio bearer(s) that are associated with T315 exist.	When the Cell Update procedure has been completed.	See subclause 8.3.1.14
T316	When the UE detects "out of service area" in URA_PCH or CELL_PCH state	When the UE detects "in service area".	Initiate cell update procedure If in service area is detected. Otherwise start timer T317, transit to CELL_FACH state and initiate cell update procedure when the UE detects “in service area”.
T317	When the T316 expires or when in CELL_FACH state,and the UE detects "out of service area".	When the UE detects "in service area".	Transit to idle mode

13.3 UE constants and parameters

Constant	Usage
N300	Maximum number of retransmissions of the RRC CONNECTION REQUEST message
N302	Maximum number of retransmissions of the CELL UPDATE / URA UPDATE message
N304	Maximum number of retransmissions of the UE CAPABILITY INFORMATION message
N308	Maximum number of retransmissions of the RRC CONNECTION RELEASE COMPLETE message
N310	Maximum number of retransmission of the PUSCH CAPACITY REQUEST message
N312	Maximum number of successive "in sync" received from L1.
N313	Maximum number of successive "out of sync" received from L1.
N315	Maximum number of successive "in sync" received from L1 during T313 is activated.

13.4 UE variables

13.4.0 CELL INFO LIST

This variable contains cell information on intra-frequency, inter-frequency and inter-RAT cells, as received in messages System Information Block Type 11, System Information Block Type 12, and MEASUREMENT CONTROL.

The first position in Intra-frequency cell info list corresponds to Intra-frequency cell id 0~~)~~, the second to Intra-frequency cell id 1, etc.

The first position in Inter-frequency cell info list corresponds to Inter-frequency cell id 0~~)~~, the second to Inter-frequency cell id 1, etc.

The first position in Inter-RAT cell info list corresponds to Intra-frequency cell id 0~~)~~, the second to Inter-RAT cell id 1, etc.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Intra-frequency cell info	MP	1..<maxCellMeas>		
>CHOICE *position status*	MP			
>>Occupied				
>>>Cell info	MP		Cell info 10.3.7.2	
>>Vacant				No data
Inter-frequency cell info	MP	1..<maxCellMeas>		
>CHOICE *position status*	MP			
>>Occupied				
>>>Frequency info	MP		Frequency info 10.3.6.36	
>>>Cell info	MP		Cell info 10.3.7.2	
>>Vacant				No data
Inter-RAT cell info	MP	1..<maxCellMeas>		
>CHOICE *position status*	MP			
>>Occupied				
>>>CHOICE *Radio Access Technology*				
>>>>GSM				
>>>>>Cell selection and re-selection info	MP		Cell selection and re-selection info for SIB11/12 10.3.2.4	
>>>>>BSIC	MP		BSIC 10.3.8.2	
>>>>>BCCH ARFCN	MP		Integer (0..1023)	[43]
>>>>>Output power	OP			
>>>>IS-2000				
>>>>>System specific measurement info			enumerated (frequency, timeslot, colour code, output power, PN offset)	For IS-2000, use fields from TIA/EIA/IS-2000.5, Subclause 3. 7.3.3.2.27, *Candidate Frequency Neighbour List Message*
>>Vacant				No data

13.4.0a CELL_UPDATE_STARTED

This variable indicates whether a cell update or URA update procedure is in progress.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Cell update started	MP		Boolean	TRUE means a cell or URA update procedure is in progress.

13.4.1 CIPHERING_STATUS

This variable contains information about the current status of ciphering in the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Status	MP		Enumerated(Not started, Started)	
Reconfiguration	MP		Boolean	TRUE means a RRC procedure performing reconfiguration of ciphering is ongoing.

13.4.11a LATEST_CONFIGURED_CN_DOMAIN

This variable stores the CN-domain that is latest configured to be used for ciphering and integrity protection for each RB.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Latest configured CN domain	~~MP~~OP		CN domain identity 10.3.1.1	

13.4.12 MEASUREMENT_IDENTITY

This variable stores the measurements configured in the UE. For each configured measurement, the information below shall be stored.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
MEASUREMENT CONTROL	OP		MEASUREMENT CONTROL 10.2.17, System Information Block type 11 10.2.48.8.12, System Information Block type 12 10.2.48.8.13 [Note to Hans: A space has been added before each reference]	Information as contained in these messages.

13.4.26 TGSN_REPORTED

This variable specifies whether an IE "Proposed TGSN" was reported to the UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Proposed TGSN reported	MP		Boolean	

13.4.26a TIMERS_AND_CONSTANTS

This variable contains the values for all timers and constants used in connected mode.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE Timers and constants in connected mode	MD		UE Timers and constants in connected mode 10.3.3.43	Default value means that for all timers and constants - For parameters with need MD, the defaults specified in 10.3.3.43 apply and - For parameters with need OP, the parameters are absent

13.4.27 TRANSACTIONS

This variable stores the identifications of the ongoing RRC procedure transactions.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Accepted transactions	OP	1 to <maxtransactions>		
>Message type	MP		Message Type	
>RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Rejected transactions	OP	1 to <maxtransactions>		
>Message type	MP		Message Type	
>RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	

13.6 RB information parameters for ~~SRB~~ signalling radio bearer RB 0

The following Radio Bearer parameter values apply for signalling radio bearer RB 0~~SRB0~~:

Information element/ Group name	Value	Comment
RLC info		
>Uplink RLC mode	TM	
>>Transmission RLC discard	No discard	Neither discard is used, nor will there be a reset
>>Segmentation indication	FALSE	
>Downlink RLC mode	UM	
RB mapping info		Single multiplexing option
>Uplink mapping info		
>>UL transport channel	RACH	RACH corresponding with selected PRACH
>>RLC size list	N/A	The first TB defined in the Transport Format Set for the transport channel that is used
>Downlink mapping info		
>>DL transport channel	FACH	

13.7 Parameter values for default radio configurations

The UE shall support the use of the default radio configurations that are specified in the following.

NOTE 1: These configurations are based on [41] and cover a number of RAB and signalling connection configurations.

In the table that is used to specify the parameter values for these default configurations, the following principles are used:

- Optional IEs that are not used are omitted;
- In case no parameter value is specified in a column, this means the value given the previous (left side) column applies.

NOTE 2: If needed, signalling radio bearer ~~S~~RB4 is established after the completion of handover.

NOTE 3: For each default configuration, the value of both FDD and TDD parameters are specified. All parameters apply to both FDD and TDD modes, unless explicitly stated otherwise. It should be noted that in this respect default configurations differ from pre-defined configurations, which only include parameter values for one mode.

NOTE 4: The transport format sizes, indicated in the following table, concern the RLC PDU size, since all configurations concern dedicated channels. The transport block sizes indicated in TS 34.108 are different since these include the size of the MAC header.

<…>

14.11 UE autonomous update of active set on non-used frequency (FDD only)

Within the measurement reporting criteria field in the MEASUREMENT CONTROL message the UTRAN notifies the UE which events should trigger a measurement report. For inter frequency measurements it is possible to specify intra-frequency measurements reporting events for support of maintenance of a active set associated with a non-used frequency, a "virtual active set". A "non-used frequency" is a frequency that the UE has been ordered to measure upon but are not used by the active set. A "used frequency" is a frequency that the UE has been ordered to measure upon and is also currently used for the connection.

The autonomous update is controlled by the IE "UE autonomous update mode" that can be set to the following values.

- On: Do the autonomous updates of the "virtual active set" according to the described rules below and also report the events that trigger the update of the "virtual active set".
- On with no reporting: Do the autonomous updates of the "virtual active set" according to the described rules below.
- Off: Only report the events and do no updates of the "virtual active set" unless ordered to do so by the IE " Inter-frequency set update".

If the IE "UE autonomous update mode" is set to "on" or "on with no reporting" the UE shall evaluate the following intra-frequency events and update the "virtual active set" associated with the frequency measured upon, according to the following rules:

- Event 1a shall make the UE add the primary CPICH that enters the reporting range to the "virtual active set".
- Event 1b shall make the UE remove a primary CPICH that leaves the reporting range from the "virtual active set".
- Event 1c shall make the UE replace an active primary CPICH in the "virtual active set" with a non-active primary CPICH that have become better than the active primary CPICH.

14.12.3 RRC information, target RNC to source system

The RRC information, target RNC to source system is used to transfer information to another RAT, e.g., in case of handover to UTRAN. In this case, the RRC information concerns the "Handover To UTRAN Command" that is compiled by the target RNC but transferred via another RAT towards the UE, as specified in 8.3.6.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *case*	MP			
>handover to UTRAN			HANDOVER TO UTRAN COMMAND 10.2.1210	
>spare				(no data) Criticality: reject

B.3.3 CELL_PCH state

The CELL_PCH state is characterised by:

- No dedicated physical channel is allocated to the UE.
- The UE selects a PCH with the algorithm specified in subclause ~~8.6.6.5~~8.5.19, and uses DRX for monitoring the selected PCH via an associated PICH.
- No uplink activity is possible.
- The position of the UE is known by UTRAN on cell level according to the cell where the UE last made a cell update in CELL_FACH state.

The DCCH logical channel cannot be used in this state. If the network wants to initiate any activity, it needs to make a paging request on the PCCH logical channel in the known cell to initiate any downlink activity.

B.3.4 URA_PCH State

The URA_PCH state is characterised by:

- No dedicated channel is allocated to the UE.
- The UE selects a PCH with the algorithm specified in subclause ~~8.6.6.5~~8.5.19, and uses DRX for monitoring the selected PCH via an associated PICH.
- No uplink activity is possible.
- The location of the UE is known on UTRAN Registration area level according to the URA assigned to the UE during the last URA update in CELL_FACH state.

The DCCH logical channel cannot be used in this state. If the network wants to initiate any activity, it needs to make a paging request on the PCCH logical channel within the URA where the location of the UE is known. If the UE needs to transmit anything to the network, it goes to the CELL_FACH state. The transition to URA_PCH State can be controlled with an inactivity timer, and optionally, with a counter that counts the number of cell updates. When the number of cell updates has exceeded certain limits (a network parameter), then the UE changes to the URA_PCH State.

URA updating is initiated by the UE, which, upon the detection of the Registration area, sends the network the Registration area update information on the RACH of the new cell.

B.3.5 States and Transitions for Cell Reselection in URA_PCH, CELL_PCH, and CELL_FACH

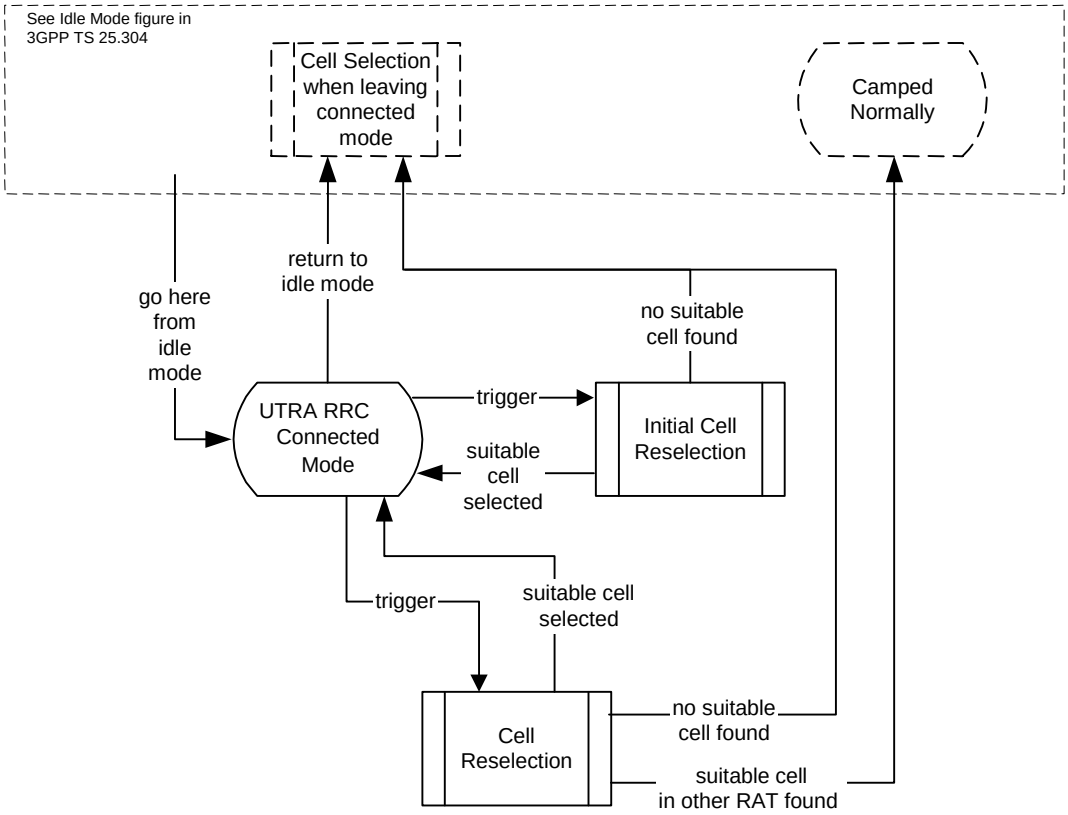

Figure 61: UTRA RRC Connected mode cell reselection for URA_PCH, CELL_PCH, and CELL_FACH

In some states the UE performs cell reselection procedures. The UE selects a suitable cell (defined in [4]) and radio access technology based on connected mode radio measurements and cell reselection criteria.

Figure 61 shows the states and procedures in the cell reselection process in connected mode.

When a cell reselection is triggered, the UE evaluates the cell reselection criteria based on radio measurements, and if a better cell is found that cell is selected, procedure Cell reselection (see [4]). If the change of cell implies a change of radio access technology, the RRC connection is released, and the UE enters idle mode of the other RAT. If no suitable cell is found in the cell reselection procedure, ~~the RRC connection is released, and~~ the UE eventually enters idle mode.

When an Initial cell reselection is triggered, the UE shall use the Initial cell reselection procedure (see [4]) to find a suitable cell. One example where this procedure is triggered is at radio link failure, where the UE may trigger an initial cell reselection in order to request re-establishment of the RRC connection. If the UE is unable to find a suitable cell, the UE ~~shall release the RRC connection and~~ eventually enters idle mode.

B.4 Inter-RAT handover with ~~PSTN/ISDN~~CS domain services

When using ~~PSTN / ISDN~~CS domain services, UTRAN is using an Inter-Radio access system Handover Procedure and GSM is using a Handover procedure for the transition from UTRA RRC Connected Mode to GSM Connected Mode.

B.5 Inter-RAT handover with ~~IP~~ PS domain services

When using ~~IP~~ PS domain services, the UE initiates cell reselection from a GSM/GPRS cell to a UTRAN cell and then uses the RRC Connection Establishment procedure for the transition to UTRA RRC Connected mode.

When the RRC Connection is established from Idle Mode (GPRS Packet Idle Mode) the RRC CONNECTION REQUEST message contains an indication, that UTRAN needs to continue an already established GPRS UE context from the CN. This indication allows UTRAN to e.g. prioritise the RRC CONNECTION REQUEST from the UE.

In UTRA RRC connected mode UTRAN is using UE or network initiated cell reselection to change from a UTRAN cell to a GSM/GPRS cell. If the cell reselection was successful the UE enters Idle Mode (GPRS Packet Idle Mode). The UE sends a packet channel request from Idle Mode (GPRS Packet Idle mode) to establish a Temporary Block flow and enter GPRS Packet Transfer Mode. In the GPRS Packet Transfer Mode the UE sends a RA Update request message. The RA Update Request message sent from the UE contains an indication that GSM/GPRS need to continue an already established UTRAN UE context from the CN. This means that the RA Update request is always sent for the transition from UTRA RRC Connected Mode to GSM/GPRS regardless if the RA is changed or not.

NOTE: The reason for using RA update instead of a new message is to reduce the impact on the existing GSM/GPRS specification.

B.6 Inter-RAT handover with simultaneous ~~IP~~ PS and ~~PSTN/ISDN~~CS domain services

NOTE: This is an initial assumption that needs to be seen by SMG2 and requiring checking by SMG2, when the work on this item has progressed.

B.6.1 Inter-RAT handover UTRAN to GSM / BSS

For a UE in CELL_DCH state using both ~~PSTN / ISDN~~CS and ~~IP~~ PS Domain services the Inter-RAT handover procedure is based on measurement reports from the UE but initiated from UTRAN.

The UE performs the Inter-RAT handover from UTRA RRC Connected Mode to GSM Connected Mode first. When the UE has sent handover complete message to GSM / BSS the UE initiates a temporary block flow towards GPRS and sends a RA update request.

If the Inter-RAT handover from UTRA RRC Connected Mode to GSM Connected Mode was successful the handover is considered as successful regardless if the UE was able to establish a temporary block flow or not towards GPRS.

In case of Inter-RAT handover failure the UE has the possibility to go back to UTRA RRC Connected Mode and re-establish the connection in the state it originated from without attempting to establish a temporary block flow. If the UE has the option to try to establish a temporary block flow towards GSM / GPRS after Inter-RAT handover failure is FFS.

B.6.2 Inter-RAT handover GSM / BSS to UTRAN

For a UE in GSM Connected Mode using both ~~PSTN / ISDN~~CS and ~~IP~~ PS domain services the Inter-RAT handover procedure is based on measurement reports from the UE but initiated from GSM / BSS.

The UE performs the Inter-RAT handover from GSM Connected Mode to UTRA RRC Connected Mode.

In UTRA RRC Connected Mode both services are established in parallel.

If the Inter-RAT handover from GSM Connected mode to UTRA RRC Connected Mode was successful the handover is considered as successful.

In case of Inter-RAT handover failure the UE has the possibility to go back to GSM Connected Mode and re-establish the connection in the state it originated from.

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21st-25th, 2001

Tdoc R2-011233

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **748** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Various corrections
Source:	⌘	Ericsson, Philips
Work item code:	⌘	***Date:*** ⌘ 2001-05-25
Category:	⌘ **A**	***Release:*** ⌘ REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘ The specification contains some ambiguities and minor errors. For more details, see "Summary of change".

Backwards compatibility analysis:
This CR contains corrections to functions where the specification was either:
- ambiguous or not sufficiently explicit, or;
- containing some contradictions.

The changes would not affect implementations behaving like indicated in the CR, but would affect implementations supporting the corrected functionality otherwise.

Summary of change: ⌘
- New subclause summarizing the protocol specification notation and principles added as 4.3.
- Clarification of the term "signalling radio bearer" added in 6.3.
- Clarification on the introducation of the term "signalling connection" in 5.2. A clarification that RRC supports upper layer data transfer discriminated between two classes – "high priority" and "low priority" – added in 5.2.
- Clarifications on the UE processes used in different states including the usage of the name "UTRA RRC Connected mode"
- Added figures showing the messages involved in modification of system information (SYSTEM INFORMATION CHANGE INDICATION and PAGING TYPE 1)
- In the procedure Transmission of UE capability information, it is said in 8.1.6.6 "assume that radio link failure has occurred". This statement doesn't add any meaning, is confusing and is thus proposed to be removed.
- Clarification that the UE shall select a suitable UTRA cell at radio link failure where it is not specified already.
- Renamed the subclause "Radio link failure criteria" to "Radio link failure criteria and actions upon radio link failure" to reflect the content of the subclause and clarified the text.

- Corrected reference to URA update cause “change of URA” in 8.1.3, where it is named as “URA reselection” which is not in line with the value of the IE.
- Storage of the establishment cause in the variable ESTABLISHMENT_CAUSE added in the procedure Inter-RAT cell reselection and Inter-RAT cell change order to UTRAN at the point where a call is made to the RRC connection establishment procedure.
- The text on protocol extensions in 10.1.1 is clarified. “Revision” is changed to “version of this protocol”. The text about lack of extension possibilities in the SYSTEM INFORMATION message is confusing and is removed (no replacement text is proposed at this point, since no proposal exist on whether and how extensions to that message can be done).
- Corrections to “needed” tabular columns in a number of places where “Needed” is empty or included when it shall be empty (alignment with ASN.1).
- Corrections to the tabular on the IE “Downlink DPCH info common for all RL” 10.3.6.18:
  1) The IE “Downlink DPCH power control information” is present in ASN.1 (DL-DPCH-InfoCommon) but not in tabular. It is proposed to add it in the tabular.
  2) “CHOICE mode” and “>FDD” missing (the “>TDD” is already present). Mistake in CR implementation?
- Clarification of the purpose with the variable CIPHERING_STATUS: Scope is only a ciphering reconfiguration procedure ongoing in the RRC layer. So, the IE “Reconfiguration” variable could be set to FALSE, even if the reconfiguration in RLC is not ready yet.
- “system” is corrected to “Radio access technology” in a few locations.
- Correction on incorrect statement that the UE enters idle mode at radio link failure in subclause B.3.5.
- Which RLC modes possible to use for the ACTIVE SET UPDATE message is specified as RLC-AM or RLC-UM in 8.3.4 but only RLC-AM is mentioned in the message definition in 10.2.2. Since now any interactions between the active setup update procedure and other procedures should be specified, it is proposed that the correction is made by adding RLC-UM in 10.2.2.
- Alignment of subclauses 8.5.5, 8.3.1 and 13.1 to have a consistent specification regarding the behaviour in when detecting “out of service area” and “in service area”.
- The variable CONFIGURATION_INCOMPLETE is misspelled in a few places.
- In case a critical extension was present in a received message the transaction identifier could not be interpreted from the received message. In those cases, the message RRC STATUS and in numerous “FAILURE” type of messages, it is not defined how to set the IE “RRC transaction identifier”. To avoid a non-backward compatible change at this stage, it is proposed that the UE sets the “RRC transaction identifier” to zero in those cases. UTRAN will then know by the value of the IE “Protocol error cause” whether the IE “RRC transaction identifier” has a relevant value or not. The change is made in subclause 9.3b, where the message is included in the variable TRANSACTIONS as a rejected transaction entry for which the transaction identifier is set to zero.
- Definition of constant N302 corrected to also include URA UPDATE
- Initialisation of the variable UE_CAPABILITIES_TRANSFERRED added at inter-RAT handover to UTRAN. It is proposed that the variable is initialised to “which UE capabilities that have transferred to the network up to the point prior to the handover (if any)”. This goes for both the IE “UE radio access capability” and the IE “UE system specific capability”.
- Presence of the variable LATEST_CONFIGURED_CN_DOMAIN changed from “MP” to “OP” since the information is not always available (if no security reconfiguration has taken place yet).
- Initialisation of the variable CONFIGURATION_INCOMPLETE added at RRC connection establishment and inter-RAT handover to UTRAN.
- It is clarified further how to deal with timers and constants when entering

UTRA RRC connected mode and when receving updates of the values during connected mode. A new variable, TIMERS_AND_CONSTANTS has been added to facilitate this. For timers, the new values will be applied next time the timer is started (the value update will not affect already started timers).

- References updated due to change of location on the subclauses:
  8.6.1.1 -> 8.6.3.1a
  8.6.6.2 -> 8.5.17
  8.6.6.3 -> 8.5.18
  8.6.6.5 -> 8.5.19
- In the Reconfiguration procedures (8.2.2), the statement about that the UE may release the current physical channel configuration have been moved since the word “may” inside a “shall” is confusing. Also, the sentence about establishing the new physical channel configuration is misplaced and is removed since it is already covered elsewhere.
- The terms “PSTN/ISDN domain” and “IP domain” have been corrected into “CS domain” and “PS domain” in clause 7 and Annex B.
- Use of SRB delay and PC preamble (8.6.6.30): When the preamble period starts has been clarified (after the establishment of the uplink physical channel).
- State transition while still remaining in the same state (8.2.2.3): If the UE remains in CELL_DCH state after state transition, the UE shall" is a confusing statement.
- Indentation error (8.2.2.3): "- ignore that IE and stop using DRX;" is indented one more step.
- The UE actions on reception of the IE “Primary CPICH Info” may contradict the procedure text on cell selection upon transition to CELL_FACH. Since the intention is not to mandate the UE to select a particular cell, it is proposed that the current text in 8.6.6.18 on this IE is rewritten. Instead a general sentence is added about the usage of this IE as a cell identifier by means of the primary scrambling code for the downlink radio link.
- The text in 8.6.6.4 on the IE “Downlink information for each radio link” is corrected. It is clarified that the actions on the sub-IEs shall be applied on this radio link. Also, there is a missing statement that the UE shall act on the sub-IEs also in the non-CELL_DCH-case, and this has now been added.
- Downlink information for each radio link Post (10.3.6.28): IE "Downlink DPCH info for each RL" refers to 10.3.6.19, but it shall be 10.3.6.22
- Editorial (10.3.3.25): The ">" should be removed before the "FDD uplink physical channel capability"
- Editorial (14.12.3): Reference to 10.2.10 shall be 10.2.12
- Measurement capability (10.3.3.21):
  In the condition table, in the explanation field for Gsm900_sup it is stated "Presence is mandatory if IE Support of GSM900 has the value TRUE. Otherwise this field is not needed in the message." But there exists no IE "Support of GSM900". It is the same for GSM1800_sup and GSM1900_sup. The following change of text is suggested in the condition table: "Presence is needed if the IE “Inter-RAT UE radio access capability” indicates support for GSM900. Absence is needed if the IE “Inter-RAT UE radio access capability” indicates no support for GSM900." Corresponding changes are proposed for GSM1800 and GSM1900.
- PAGING TYPE 1 with BCCH modification info (8.1.2.3): The text says “If the IE "BCCH modification info" is included, any UE in idle mode, CELL_PCH or URA_PCH state shall perform the actions as specified in subclause 8.1.1 irrespective of IE "Paging record" occurrences in the message.” There is a risk of misinterpretation causing some UEs to ignore page at updated system information. The UE shall of course act on both the page and the updated system information as there is no risk for interactions.
- Editorial (12.1.3 / Fig 62a): In figure 62a, not all parts of the figure is visible
- An explaination added in the beginning of clause 8 about parallel procedures, since the UE shall be able to process several parallel RRC procedures. Since the subclause 8.6.3.11 (RRC transaction identifier) is the key chapter for the

specification acceptance or rejection of parallel procedures a reference to that chapter has been added as well as a clarification in that chapter itself.

- The error case “invalid configuration” is added in the Security Mode Control procedure. Checks are already made of information elements that would trigger this error case but what to do has not been specified. The new text is aligned to what happens in similar cases so there is no contradiction with other error cases.
- The term “SRB” is not defined and the occurences are replaced with a combination of “Signalling radio bearer” and “RB”.
- The abbreviation “RB” is present twice in the list of abbreviations (3.2) and one is therefore removed.
- The text in 8.6.8 “UE positioning GPS real-time integrity information” is moved to be a subclase of 8.6.7 since it is classified as a measurement information element.
- Editorial corrections from R2-010914:
  8.4.1.9.3: " is deleted: "inter-RAT cell info" instead of "inter-RAT" cell info"
  9.1 Format "Headline2" instead of "Headline1"
  10.3.7.11 Sign "-" is deleted: "0" instead of "-0"
  10.3.7.19 nomal e instead of small e
  10.3.7.38 "d" is added: "and" instead of "an"
  Blanks are inserted in 10.2.17, 10.3.7.3, 13.4.12
  11.3.7 CellSelectReselectInfoSIB-11-12-HCS-RSCP: "-RSCP" should be written in black instead of red color
  13.4.0 "0" instead of "("
  14.11 "an" instead of "a"
  "MEASUREMENT_IDENTITY" corrected into "MEASUREMENT IDENTITY" throughout the document.
- Correction from R2-010924: Currently section 8 states: “The RRC entity in the UE shall consider PDUs to have been transmitted when they are submitted to the lower layers”. Moreover, the sentence “when the successful transmission of the nnn COMPLETE message has been confirmed by the lower layers” is used for all the procedure when reconfiguration and state changes can be performed. On the other end, for most other procedures, it is stated: “When the nnn message has been submitted to lower layers for transmission the procedure ends” (e.g. for Uplink Direct Transfer and all the Failure messages). It is not completely clear what “successful transmission” means. A literal interpretation would be “successfully submitted to the lower layers”. This interpretation is wrong and we can list an example when this would not work. If UTRAN instructs the UE to transition to CELL_PCH/URA_PCH, the UE will send the complete message on the old configuration and terminate the procedure immediately after without waiting for Layer 2 ACK; RLC will try to send it again and it will cause the transition to CELL_FACH; then the problem will represent itself endlessly. Similar catastrophic scenarios can happen for the change of security parameters.In the beginning of clause 8, it is clearly stated that “successful transmission” is equivalent to “acknowledged by RLC” to avoid misinterpretations.
- Correction from R2-010924: In section 8.2.2.4 “Transmission of a response message by the UE, normal case” (Reconfiguration Procedures) it is stated: “If the new state is CELL_PCH or URA_PCH, the response message shall be transmitted using the old configuration before the state transition …”. It is clarified that, nevertheless, the new C-RNTI should always be used, if available.
- Correction from R2-010924: “**dcph**-FrameOffset” is corrected to “**dpch**-FrameOffset” in ASN.1 description. The correction results from the erroneous implementation of CR 385 (R2-001071)
- Correction from R2-010935: There are references to non-existing failure causes, so they are replaced with appropriate failure causes. Failure causes “cell selection”, “configuration unacceptable”, “incomplete configuration” are replaced with “cell update occurred”, “configuration unsupported”, “configuration incomplete”, respectively.
- Correction from R2-010935: Indentation missing from “Inter-RAT security

		capability" and is added to SECURITY MODE COMMAND. • Correction from R2-010935: In R2#19, the range of Qqualmin is changed in ASN.1 description, but it was not changed in tabular description. This CR proposes to align the range to ASN.1, in order to keep consistency with v.3.6.0. The range of Qualmin in tabular is therefore changed from –20..0 to –24..0. • Paging cause "Terminating - cause unknown": The UTRAN text on when this cause is set should be clarified. Currently it says when "no cause for paging is available", which is unclear. It should be when "UTRAN does not receive the cause from upper layers" to align with RANAP (paging cause is optional in RANAP). • Correction on the semantics for the IE Timer_RST, part of the IE "RLC Info" in 10.3.4.23. • Missing indentation added in the IE "UE positioning OTDOA assistance data" 10.3.7.103. • In the cell update procedure, "T315 elapsed" has replaced by "T314 elapsed" in 8.3.1.12 and vice versa, since this contradicts the similar cases in other subclauses in this procedure which are considered as correct. • Clarifications on T316 expiry in 8.5.5.3 and making the text consistent with the desciption in the cell update procedure. • Clarification on T305, T316 and T317 in 13.1 to making the rules consistent with the rest of the specification. • In the ASN.1, Ec-No has been changed into Ec-N0, and Ec-NO (letter "O") into Ec-N0.
Consequences if not approved:	⌘	Risk of wrong interpretation causing inter-operability problems.

Clauses affected:	⌘	3.2, 4.3 (new), 5.2, 6.3, 7.1, 7.2.2.1, 7.2.2.2, 7.2.2.3, 8, 8.1.1, 8.1.1.6.1, 8.1.2.2, 8.1.2.3, 8.1.3.6, 8.1.4.5, 8.1.4.6, 8.1.6.6, 8.1.8.2, 8.1.9.2, 8.1.10.2, 8.1.11.2, 8.1.12.3, 8.1.12.4c (new), 8.1.15.3, 8.2.2.2, 8.2.2.3, 8.2.2.4, 8.2.2.7, 8.3.1.2, 8.3.1.3, 8.3.1.6, 8.3.1.7a, 8.3.1.12, 8.3.3.3, 8.3.3.5, 8.3.4.3, 8.3.4.4, 8.3.6.2, 8.3.6.3, 8.3.8.2, 8.3.10.2, 8.4.1.4a, 8.5.5.2.2, 8.5.5.3, 8.5.6, 8.5.8, 8.5.10.1, 8.5.10.2, 8.5.10.3, 8.5.17, 8.5.18, 8.6.3.2, 8.6.3.5, 8.6.3.11, 8.6.6.4, 8.6.6.18, 8.6.6.30, 8.6.7.1, 8.6.7.4, 8.6.7.5, 8.6.7.10, 8.6.7.13, 8.6.7.14, 8.6.7.15, 8.6.7.16, 8.6.7.17, 8.6.7.18, 8.6.7.19 (new), 8.6.8, 9.1, 9.3b, 10.1.1, 10.1.1.1.1, 10.1.1.1.2, 10.1.1.2.1, 10.1.1.2.2, 10.2.1, 10.2.5, 10.2.6, 10.2.9, 10.2.12, 10.2.17, 10.2.26, 10.2.38, 10.2.43, 10.2.48, 10.3.2.3, 10.3.2.4, 10.3.3.1, 10.3.3.21, 10.3.3.25, 10.3.4.23, 10.3.5.8, 10.3.6.6, 10.3.6.18, 10.3.6.24, 10.3.6.28, 10.3.6.33, 10.3.6.34, 10.3.6.48, 10.3.6.56, 10.3.7.3, 10.3.7.11, 10.3.7.19, 10.3.7.26, 10.3.7.28, 10.3.7.38, 10.3.7.55, 10.3.7.59, 10.3.7.61, 10.3.7.88, 10.3.7.103, 10.3.7.105, 10.3.7.106, 10.3.7.108, 10.3.7.110, 11.3 12.1.3, 13.1, 13.3, 13.4.0, 13.4.1, 13.4.11a, 13.4.12, 13.4.26a (new), 13.6, 13.7, 14.11, 14.12.3, B.3.3, B.3.4, B.3.5, B.4, B.5, B.6, B.6.1, B.6.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	Changes compared to the draft CR with the same title submitted to RAN2#20 (R2-010891) are highlighted in yellow. Corrections from ther RAN2#20 draft CRs R2-010914, R2-010924 and R2-010935 are also merged into this CR. Changes made compared to the unrevised version of CR 747 highlighted in green.

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Abbreviations

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

ACK	Acknowledgement
AICH	Acquisition Indicator CHannel
AM	Acknowledged Mode
AS	Access Stratum
ASC	Access Service Class
ASN.1	Abstract Syntax Notation.1
BCCH	Broadcast Control Channel
BCFE	Broadcast Control Functional Entity
BER	Bit Error Rate
BLER	BLock Error Rate
BSS	Base Station Sub-system
CH	Conditional on history
CV	Conditional on value
CCPCH	Common Control Physical CHannel
CCCH	Common Control Channel
CN	Core Network
CM	Connection Management
CPCH	Common Packet CHannel
C-RNTI	Cell RNTI
CTCH	Common Traffic CHannel
CTFC	Calculated Transport Format Combination
DCA	Dynamic Channel Allocation
DCCH	Dedicated Control Channel
DCFE	Dedicated Control Functional Entity
DCH	Dedicated Channel
DC-SAP	Dedicated Control SAP
DGPS	Differential Global Positioning System
DL	Downlink
DRAC	Dynamic Resource Allocation Control
DSCH	Downlink Shared Channel
DTCH	Dedicated Traffic Channel
FACH	Forward Access Channel
FDD	Frequency Division Duplex
FFS	For Further Study
GC-SAP	General Control SAP
HCS	Hierarchical Cell Structure
HFN	Hyper Frame Number
ID	Identifier
IETF	Internet Engineering Task Force
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IE	Information element
IP	Internet Protocol
ISCP	Interference on Signal Code Power
LAI	Location Area Identity
L1	Layer 1
L2	Layer 2
L3	Layer 3
MD	Mandatory default
MP	Mandatory present
MAC	Media Access Control
MCC	Mobile Country Code
MM	Mobility Management
MNC	Mobile Network Code
NAS	Non Access Stratum
Nt-SAP	Notification SAP
NW	Network

OP	Optional
PCCH	Paging Control Channel
PCH	Paging Channel
PDCP	Packet Data Convergence Protocol
PDSCH	Physical Downlink Shared Channel
PDU	Protocol Data Unit
PLMN	Public Land Mobile Network
PNFE	Paging and Notification Control Functional Entity
PRACH	Physical Random Access CHannel
P-TMSI	Packet Temporary Mobile Subscriber Identity
PUSCH	Physical Uplink Shared Channel
QoS	Quality of Service
RAB	Radio access bearer
RAT	Radio Access Technology
~~RB~~	~~Radio Bearer~~
RAI	Routing Area Identity
RACH	Random Access CHannel
RB	Radio Bearer
RFE	Routing Functional Entity
RL	Radio Link
RLC	Radio Link Control
RNTI	Radio Network Temporary Identifier
RNC	Radio Network Controller
RRC	Radio Resource Control
RSCP	Received Signal Code Power
RSSI	Received Signal Strength Indicator
SAP	Service Access Point
SCFE	Shared Control Function Entity
SF	Spreading Factor
SHCCH	Shared Control Channel
SIR	Signal to Interference Ratio
SSDT	Site Selection Diversity Transmission
S-RNTI	SRNC - RNTI
TDD	Time Division Duplex
TF	Transport Format
TFCS	Transport Format Combination Set
TFS	Transport Format Set
TM	Transparent Mode
TME	Transfer Mode Entity
TMSI	Temporary Mobile Subscriber Identity
Tr	Transparent
Tx	Transmission
UE	User Equipment
UL	Uplink
UM	Unacknowledged Mode
URA	UTRAN Registration Area
U-RNTI	UTRAN-RNTI
USCH	Uplink Shared Channel
UTRAN	Universal Terrestrial Radio Access Network

4.2 RRC Layer Model

The functional entities of the RRC layer are described below:

- Routing of higher layer messages to different MM/CM entities (UE side) or different core network domains (UTRAN side) is handled by the Routing Function Entity (**RFE**)

- Broadcast functions are handled in the broadcast control function entity (**BCFE**). The BCFE is used to deliver the RRC services, which are required at the GC-SAP. The BCFE can use the lower layer services provided by the Tr-SAP and UM-SAP.

- Paging of UEs that do not have an RRC connection is controlled by the paging and notification control function entity (**PNFE**). The PNFE is used to deliver the RRC services that are required at the Nt-SAP. The PNFE can use the lower layer services provided by the Tr-SAP and UM-SAP.

- The Dedicated Control Function Entity (**DCFE**) handles all functions specific to one UE. The DCFE is used to deliver the RRC services that are required at the DC-SAP and can use lower layer services of UM/AM-SAP and Tr-SAP depending on the message to be sent and on the current UE service state.

- In TDD mode, the DCFE is assisted by the Shared Control Function Entity (SCFE) location in the C-RNC, which controls the allocation of the PDSCH and PUSCH using lower layers services of UM-SAP and Tr-SAP.

- The Transfer Mode Entity (TME) handles the mapping between the different entities inside the RRC layer and the SAPs provided by RLC.

NOTE: Logical information exchange is necessary also between the RRC sublayer functional entities. Most of that is implementation dependent and not necessary to present in detail in a specification.

Figure 2 shows the RRC model for the UE and Figure 3 and Figure 4 show the RRC model for the UTRAN.

NOTE: The figure shows only the types of SAPs that are used. Multiple instances of Tr-SAP, UM-SAP and AM-SAP are possible. Especially, different functional entities usually use different instances of SAP types.

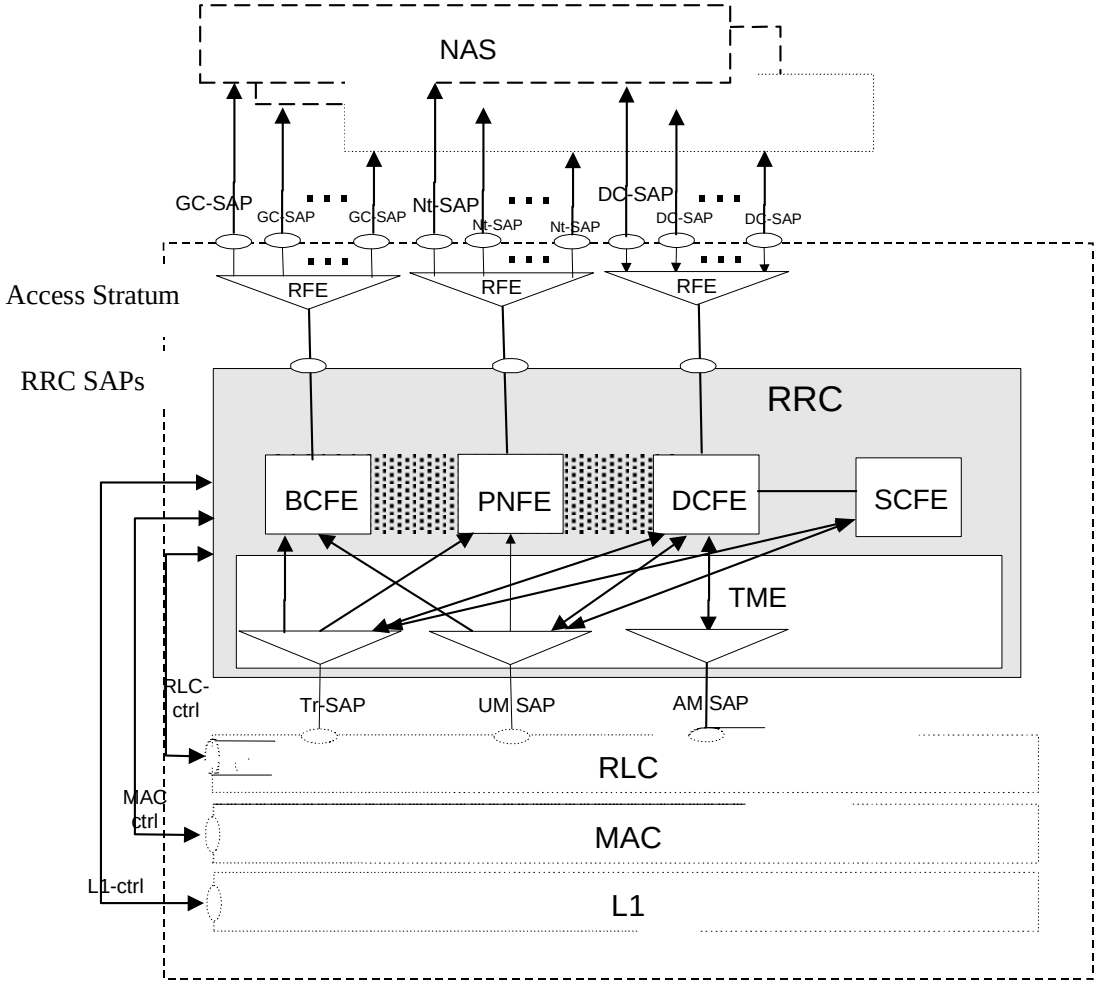

Figure 2: UE side model of RRC

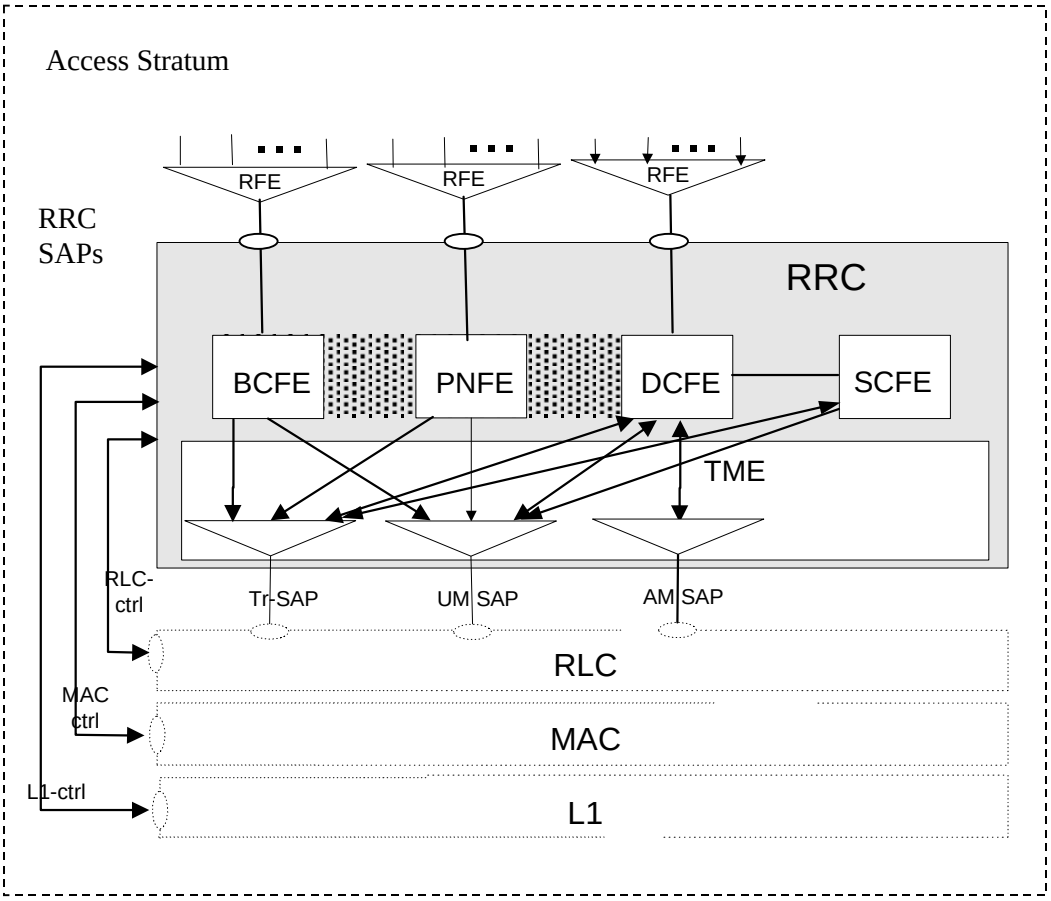

Figure 3: UTRAN side RRC model (DS-MAP system)

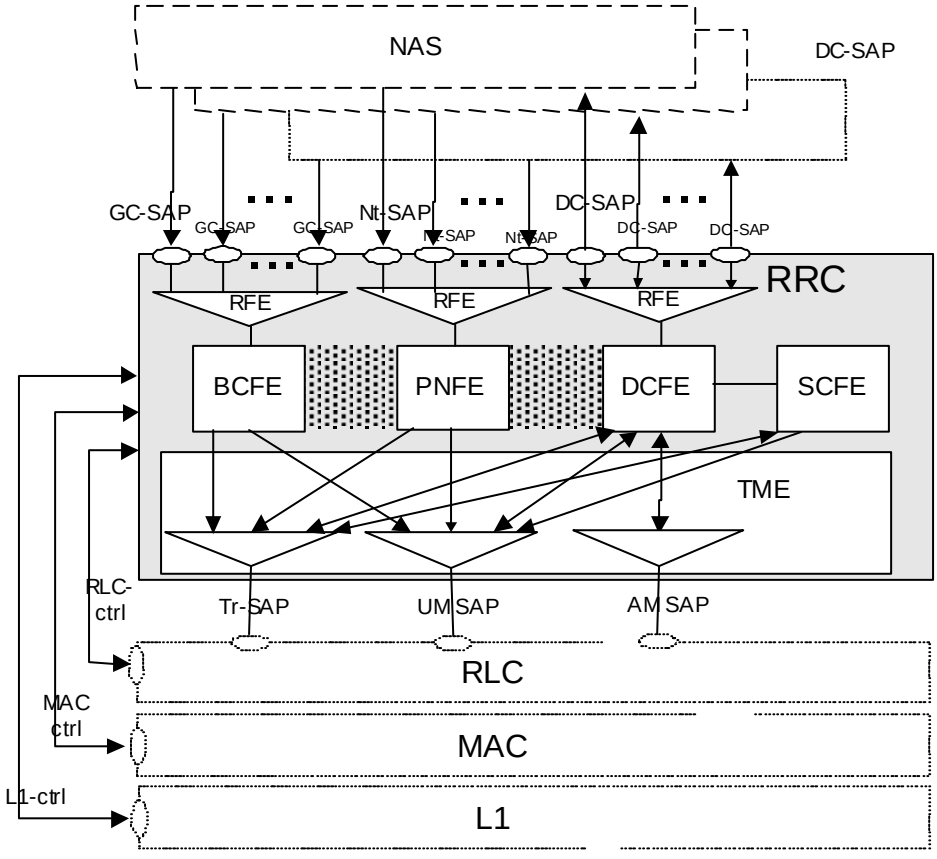

Figure 4: UTRAN side RRC model (DS-41 System)

4.3 Protocol specification principles

This protocol specification is based on the applicable general guidelines given in [14].

In this specification, a notation of variables is used. The variables are defined in subclause 13.4. Variables are typically used to represent a status or a result of an action, such as reception of an information element in a message, which is used to specify a behaviour somewhere else in the specification, such as when setting the value of an information element in a transmitted message. The variables serve only the purpose of specifying the protocol, and do therefore not impose any particular implementation.

When specifying the UE behaviour at reception of messages, the behaviour that is tied to reception or non-reception of individual information elements, and in some cases combinations of information elements, is specified in one location (subclause 8.6).

5 RRC Functions and Services provided to upper layers

5.1 RRC Functions

The RRC performs the functions listed below. A more detailed description of these functions is provided in [2]:

- Broadcast of information related to the non-access stratum (Core Network);
- Broadcast of information related to the access stratum;
- Establishment, maintenance and release of an RRC connection between the UE and UTRAN;
- Establishment, reconfiguration and release of Radio Bearers;
- Assignment, reconfiguration and release of radio resources for the RRC connection;
- RRC connection mobility functions;
- Control of requested QoS;
- UE measurement reporting and control of the reporting;
- Outer loop power control;
- Control of ciphering;
- Slow DCA (TDD mode);
- Paging;
- Initial cell selection and cell re-selection;
- Arbitration of radio resources on uplink DCH;
- RRC message integrity protection;
- Timing advance (TDD mode);
- CBS control.

5.2 RRC Services provided to upper layers

The RRC offers the following services to upper layers, a description and primitives of these services are provided in [2], [17].

- General Control;

- Notification;
- Dedicated control.

The RRC layer provides the UE-UTRAN portion of signalling connections to the upper layers to support the exchange of upper layer's information flow. The signalling connection is ~~an acknowledged mode link~~ used between the user equipment and the core network to transfer upper layer information. For each core network domain, at most one signalling connection may exist at the same time. The RRC layer maps the signalling connections for one UE on a single RRC connection. For the upper layer data transfer on signalling connections, the RRC layer supports the discrimination between two different classes, named "High priority" (corresponding to "SAPI 0" for a GSM-MAP based core network) and "Low priority" (corresponding to "SAPI 3" for a GSM-MAP based core network).

5.3 Primitives between RRC and upper layers

The primitives between RRC and the upper layers are described in [17].

6 Services expected from lower layers

6.1 Services expected from Layer 2

The services provided by layer 2 are described in [2], [15] and [16].

6.2 Services expected from Layer 1

The services provided by layer 1 are described in [2].

6.3 Signalling Radio Bearers

The Radio Bearers (RB) available for ~~usage by~~ transmission of RRC messages ~~using RLC-TM, RLC-UM and RLC-AM on the DCCH and CCCH~~ are defined as "signalling radio bearers" and are specified in the following. The UE and UTRAN shall select the signalling radio bearers for RRC messages using RLC-TM, RLC-UM or RLC-AM on the DCCH and CCCH, according to the following:

- Signalling radio bearer RB 0 shall be used for all messages sent on the CCCH (UL: RLC-TM, DL: RLC-UM).
- Signalling radio bearer RB 1 shall be used for all messages sent on the DCCH, when using RLC unacknowledged mode (RLC-UM).
- Signalling radio bearer RB 2 shall be used for all messages sent on the DCCH, when using RLC acknowledged mode (RLC-AM), except for except for the RRC messages carrying higher layer (NAS) signalling.
- Signalling radio bearer RB 3 and optionally signalling radio bearer RB 4 shall be used for the RRC messages carrying higher layer (NAS) signalling and sent on the DCCH in RLC acknowledged mode (RLC-AM), as specified in subclause 8.1.8., 8.1.9 and 8.1.10.
- Additionally, RBs whose identities shall be set between 5 and 31 may be used as signalling radio bearer for the RRC messages on the DCCH sent in RLC transparent mode (RLC-TM).
- RRC messages on the SHCCH are mapped either on RACH or on the USCH with the lowest assigned Transport Channel Id in the uplink and either on FACH or on the DSCH with the lowest assigned Transport Channel Id using RLC-TM.
  These messages are only specified for TDD mode.

The Radio Bearer configuration for signalling radio bearer ~~S~~RB0 is specified in 13.6.

When an RRC message is transmitted in DL on CCCH or SHCCH using RLC UM, RRC should indicate to RLC that a special RLC length indicator should be used [16]. The UE shall assume that this indication has been given. The special length indicator indicates that an RLC SDU begins in the beginning of an RLC PDU.

7 Protocol states

7.1 Overview of RRC States and State Transitions including GSM

Figure 5 shows the RRC states in UTRA RRC Connected Mode, including transitions between UTRA RRC connected mode and GSM connected mode for ~~PSTN/ISDN~~CS domain services, and between UTRA RRC connected mode and GSM/GPRS packet modes for ~~IP~~ PS domain services. It also shows the transitions between Idle Mode and UTRA RRC Connected Mode and further the transitions within UTRA RRC connected Mode.

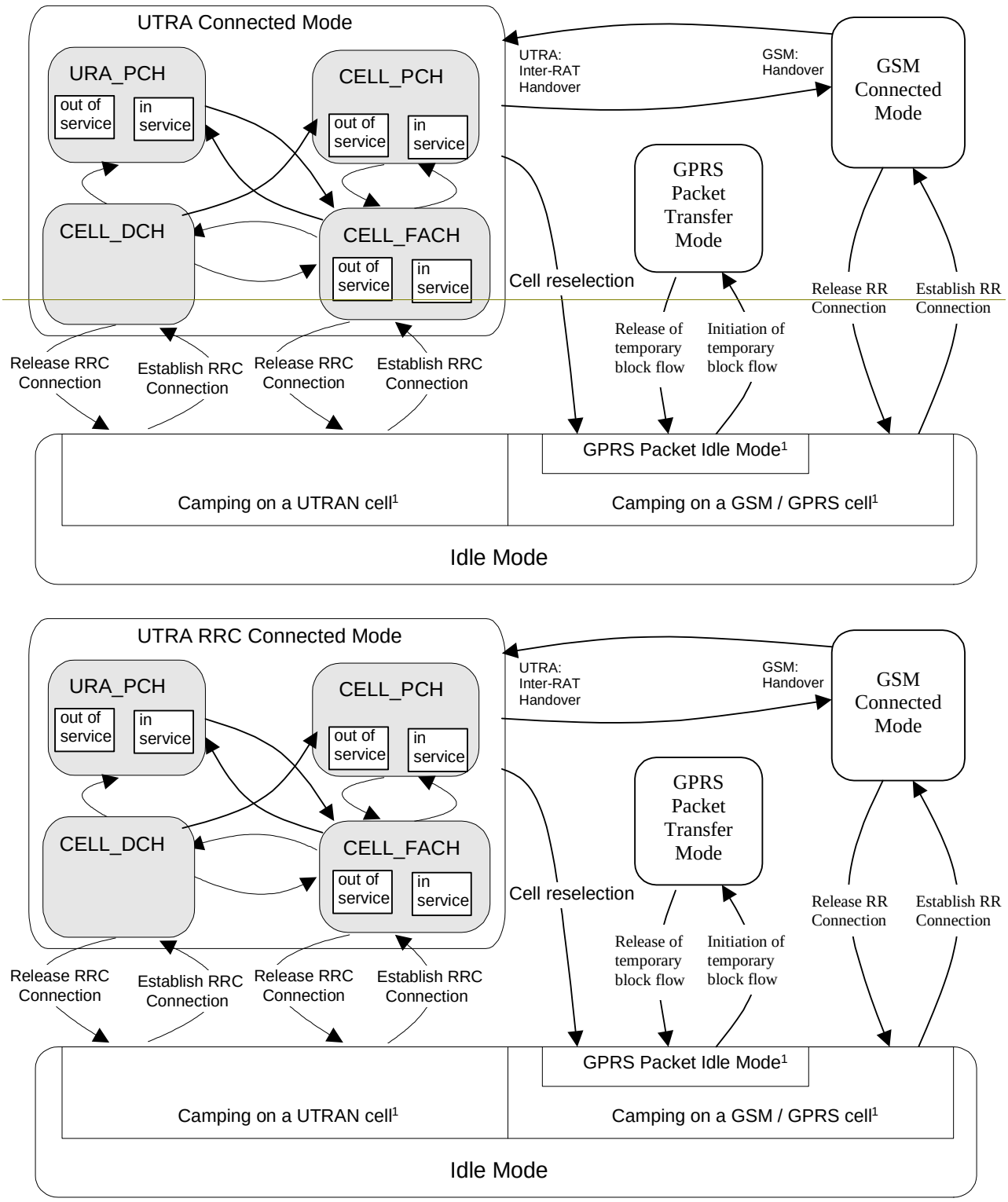

Figure 5: RRC States and State Transitions including GSM
[1: The indicated division within Idle Mode is only included for clarification and shall not be interpreted as states.]

The RRC connection is defined as a point-to-point bi-directional connection between RRC peer entities in the UE and the UTRAN characterised by the allocation of a U-RNTI. A UE has either zero or one RRC connection.

NOTE: The state transitions are specified in ~~sub~~clause 8.

7.2 Processes in UE modes/states

NOTE: This subclause specifies what processes shall be active in the UE in the different RRC modes/states. The related procedures and the conditions on which they are triggered are specified either in clause 8 or elsewhere in the relevant process definition.

7.2.1 UE Idle mode

UE processes that are active in UE Idle mode are specified in [4].

The UE shall perform a periodic search for higher priority PLMNs as specified in [25]

7.2.2 UTRA RRC Connected mode

In this specification unless otherwise mentioned "connected mode" shall refer to "UTRA RRC connected mode".

7.2.2.1 URA_PCH or CELL_PCH state

In the URA_PCH or CELL_PCH state the UE shall perform the following actions:

- if the UE is "in service area":
  - maintain up-to-date system information as broadcast by the serving cell as specified in the sub-clause 8.1.1;
  - perform cell reselection process as specified in [4];
  - perform a periodic search for higher priority PLMNs as specified in [25];
  - monitor the paging occasions and PICH monitoring occasions ~~according to the DRX cycle~~determined according to subclause 8.6.3.1a and 8.6.3.2 and receive paging information on the PCHmapped on the S-CCPCH selected by the UE according to the procedure in subclause 8.5.19;
  - perform measurements process according to measurement control information as specified in subclause 8.4 and in subclause 14.4;
  - maintain up-to-date BMC data if it supports Cell Broadcast Service (CBS) as specified in [37];
  - run timer T305 for periodical URA update if the UE is in URA_PCH or for periodical cell update if the UE is in CELL_PCH;
- if the UE is "out of service area":
  - perform cell reselection process as specified in [4];
  - run timer T316;
  - run timer T305

7.2.2.2 CELL_FACH state

In the CELL_FACH state the UE shall perform the following actions:

- if the UE is "in service area":
  - DCCH and DTCH are available;
  - perform cell reselection process as specified in [4];
  - perform measurements process according to measurement control information as specified in subclause 8.4 and in subclause 14.4;
  - run timer T305 (periodical cell update);

- listen to all FACH transport channels mapped on the S-CCPCH ~~assigned to this UE~~ selected by the UE according to the procedure in subclause 8.5.19;

- if the UE is "out of service area":

  - perform cell reselection process as specified in [4];

  - run timers T305 (periodical cell update), and T317 (cell update when re-entering "in service") or T307 (transition to Idle mode)

7.2.2.3 CELL_DCH state

In the CELL_DCH state the UE shall perform the following actions:

- if DCCH and DTCH are available:

  - read system information broadcast on FACH as specified in subclause 8.1.1.3 (applicable only to UEs with certain capabilities and ~~camping on~~in FDD ~~cells~~mode);

  - read the system information as specified in subclause 8.1.1 (for UEs ~~camping on~~in TDD ~~cells~~mode);

  - perform measurements process according to measurement control information as specified in subclause 8.4 and in clause 14;

8 RRC procedures

The UE shall be able to process several simultaneous RRC procedures. After the reception of a message which invoked a procedure, the UE shall be prepared to receive and act on another message which may invoke a second procedure. Whether this second invokation of a procedure (transaction) is accepted or rejected by the UE is specified in the subclauses of this clause, and in particular in subclause 8.6.3.11 (RRC transaction identifier).

On receiving a message the UE shall first apply integrity check as appropriate and then proceed with error handling as specified in clause 9 before continuing on with the procedure as specified in the relevant subclause. The RRC entity in the UE shall consider PDUs to have been transmitted when they are submitted to the lower layers. If the RRC entity in the UE submits a message for transmission using AM RLC, it shall consider the message successfully transmitted when UTRAN reception of all relevant PDUs is acknowledged by RLC. In the UE, timers are started when the PDUs are sent on the radio interface in the case of the transmission using the CCCH.

8.1 RRC Connection Management Procedures

8.1.1 Broadcast of system information

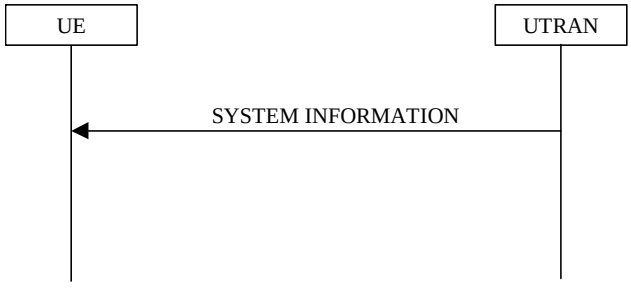

Figure 6: Broadcast of system information

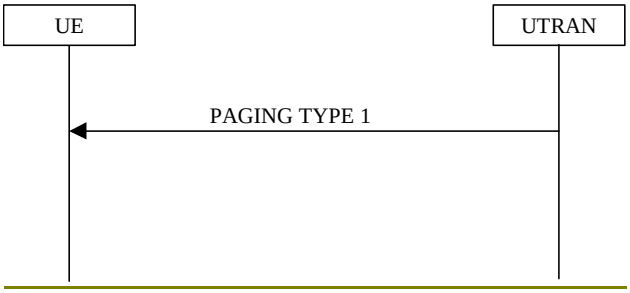

Figure 6a: Notification of system information modification for UEs in idle mode, CELL_PCH state and URA_PCH state

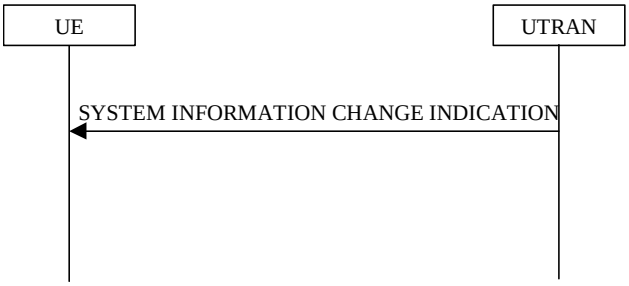

Figure 6b: Notification of system information modification for UEs in CELL_FACH state

8.1.1.6.1 System Information Block type 1

If in idle mode, the UE should store all relevant IEs included in this system information block if the "PLMN Type" in the variable SELECTED_PLMN has the value "GSM-MAP" and the IE "PLMN type" in the Master Information Block has the value "GSM-MAP" or "GSM-MAP and ANSI-41". The UE shall also:

- forward the content of the IE "CN common GSM-MAP NAS system information" to upper layers;
- for the IE "CN domain system information list":
  - for each IE "CN domain system information" that is present:
    - forward the content of the IE "CN domain specific NAS system information" and the IE "CN domain identity" to upper layers;
    - use the IE "CN domain specific DRX cycle length coefficient" to calculate frame number for the Paging Occasions and Page indicator as specified in [4];
  - if an IE "CN domain system information" is not present for a particular CN domain:
    - indicate to upper layers that no CN system information is available for that CN domain;
- use the values in the IE "UE Timers and constants in idle mode" for the relevant timers and ~~counters~~constants.
- store the values of the IE "UE Timers and constants in idle mode" in the variable TIMERS_AND_CONSTANTS;

If in connected mode the UE shall not use the values of the IEs in this system information block except for the timers and constant values given by the IE "UE timers and constants in connected mode".

If in idle mode and system information block type 1 is not scheduled on BCH, and system information block type 13 is not scheduled on BCH the UE shall:

- consider the cell to be barred according to [4]. The UE shall consider the barred cell as using the value "allowed" in the IE "Intra-frequency cell re-selection indicator", and the maximum value in the IE "T_{barred}".

If in idle mode and if

- system information block type 1 is not scheduled on BCH; and
- the "PLMN Type" in the variable SELECTED_PLMN has the value "GSM-MAP"; and
- the IE "PLMN type" in the Master Information Block has the value "GSM-MAP" or "GSM-MAP and ANSI-41":

the UE shall:

- indicate to upper layers that no CN system information is available.

8.1.2.2 Initiation

UTRAN initiates the paging procedure by transmitting a PAGING TYPE 1 message on an appropriate paging occasion on the PCCH.

UTRAN may repeat transmission of a PAGING TYPE 1 message to a UE in several paging occasions to increase the probability of proper reception of a page.

UTRAN may page several UEs in the same paging occasion by including one IE "Paging record" for each UE in the PAGING TYPE 1 message.

For CN originated paging, UTRAN should set the IE "Paging cause" to the cause for paging received from upper layers. If no cause for paging is ~~available~~received from upper layers, UTRAN should set the value "Terminating – cause unknown".

UTRAN may also indicate that system information has been updated, by including the value tag of the master information block in the IE "BCCH modification information" in the PAGING TYPE 1 message. In this case, UTRAN may omit the IEs "Paging record".

8.1.2.3 Reception of a PAGING TYPE 1 message by the UE

A UE in idle mode, CELL_PCH state or URA_PCH state shall receive the paging information for all its monitored paging occasions. For an UE in idle mode, the paging occasions are specified in [4] and depend on the IE "CN domain specific DRX cycle length coefficient", as specified in subclause ~~8.6.1.1~~8.6.3.1a. For a UE in CELL_PCH state or URA_PCH state, the paging occasions depend also on the IE "UTRAN DRX cycle length coefficient" and the IE "RRC State Indicator", as specified in subclauses 8.6.3.2 and 8.6.3.3 respectively.

When the UE receives a PAGING TYPE 1 message, it shall perform the actions as specified below.

If the UE is in idle mode, for each occurrence of the IE "Paging record" included in the message the UE shall:

- if the IE "Used paging identity" is a CN identity:
  - compare the IE "UE identity" with all of its allocated CN UE identities:
  - if one match is found:
    - indicate reception of paging; and
    - forward the IE "CN domain identity", the IE "UE identity" and the IE "Paging cause" to the upper layers;
- otherwise:
  - ignore that paging record.

If the UE is in connected mode, for each occurrence of the IE "Paging record" included in the message the UE shall:

- if the IE "Used paging identity" is a UTRAN identity and if this U-RNTI is the same as the U-RNTI allocated to the UE:
  - if the optional IE "CN originated page to connected mode UE" is included:
    - indicate reception of paging; and
    - forward the IE "CN domain identity", the IE "Paging cause" and the IE "Paging record type identifier" to the upper layers;
  - perform a cell update procedure with cause "paging response" as specified in subclause 8.3.1.2;
  - ignore any other remaining IE "Paging record" that may be present in the message;
- otherwise:
  - ignore that paging record.

If the IE "BCCH modification info" is included, any UE in idle mode, CELL_PCH or URA_PCH state shall perform the actions as specified in subclause 8.1.1 ~~irrespective of~~ in addition to any actions caused by the IE "Paging record" occurrences in the message as specified above.

8.1.3.6 Reception of an RRC CONNECTION SETUP message by the UE

The UE shall compare the value of the IE "Initial UE identity" in the received RRC CONNECTION SETUP message with the value of the variable INITIAL_UE_IDENTITY.

If the values are different, the UE shall:

- ignore the rest of the message;

If the values are identical, the UE shall:

- stop timer T300, and act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following;
  - if the UE will be in the CELL_FACH state at the conclusion of this procedure:
    - if the IE "Frequency info" is included:
      - select a suitable UTRA cell according to [4] on that frequency;
    - select PRACH according to subclause ~~8.6.6.2~~8.5.17;
    - select Secondary CCPCH according to subclause ~~8.6.6.5~~8.5.19;
- enter a state according to subclause 8.6.3.3;
- submit an RRC CONNECTION SETUP COMPLETE message to the lower layers on the uplink DCCH after successful state transition per subclause 8.6.3.3, with the contents set as specified below:
  - set the IE "RRC transaction identifier" to
    - the value of "RRC transaction identifier" in the entry for the RRC CONNECTION SETUP message in the table "Accepted transactions" in the variable TRANSACTIONS; and
    - clear that entry.
  - calculate START values for each CN domain according to subclause 8.5.9 and include the result in the IE "START list";
  - if the IE "UE radio access FDD capability update requirement" included in the RRC CONNECTION SETUP message has the value TRUE:

    include its UTRAN-specific FDD capabilities and its UTRAN –specific capabilities common to FDD and TDD in the IE "UE radio access capability";
- if the IE "UE radio access 3.84Mcps TDD capability update requirement" included in the RRC CONNECTION SETUP message has the value TRUE:

  include its UTRAN-specific 3.84Mcps TDD capabilities and its UTRAN –specific capabilities common to FDD and TDD in the IE "UE radio access capability";
- if the IE "UE radio access 1.28Mcps TDD capability update requirement" included in the RRC CONNECTION SETUP message has the value TRUE:

  include its UTRAN-specific 1.28Mcps TDD capabilities and its UTRAN –specific capabilities common to FDD and TDD in the IE "UE radio access capability";
- if the IE "System specific capability update requirement list" is present in the RRC CONNECTION SETUP message:
  - include its inter-RAT capabilities for the requested systems in the IE "UE system specific capability".

When of the RRC CONNECTION SETUP COMPLETE message has been submitted to lower layers for transmission the UE shall:

- if the UE has entered CELL_FACH state:

    - start timer T305 using its initial value if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;

- update its variable UE_CAPABILITY_TRANSFERRED which UE capabilities it has transmitted to the UTRAN;
- if the IE "Transport format combination subset" was not included in the RRC CONNECTION SETUP message:
    - set the IE "Current TFC subset" in the variable TFS_SUBSET to "Full transport format combination set";
- set the "Status" in the variable CIPHERING_STATUS to "Not started";
- set the "Reconfiguration" in the variable CIPHERING_STATUS to FALSE;
- set the "Status" in the variable INTEGRITY_PROTECTION_INFO to "Not started";
- set the "Historical status" in the variable INTEGRITY_PROTECTION_INFO to "Never been active";
- set the "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE;
- set the variable CELL_UPDATE_STARTED to FALSE;
- set the variable CONFIGURATION_INCOMPLETE to FALSE;
- set the variable ORDERED_RECONFIGURATION to FALSE;
- set the variable FAILURE_INDICATOR to FALSE;
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
- set the variable INVALID_CONFIGURATION to FALSE;
- set the variable PROTOCOL_ERROR_INDICATOR to FALSE;
- set the variable PROTOCOL_ERROR_REJECT to FALSE;
- set the variable TGSN_REPORTED to FALSE;
- set the variable UNSUPPORTED_CONFIGURATION to FALSE;
- clear all optional IEs in all variables, except those optional IEs that are set in this procedure;
- consider the procedure to be successful;

And the procedure ends.

8.1.4.5 Cell re-selection or radio link failure

If the UE performs cell re-selection or the radio link failure criteria in subclause 8.5.6 is met at any time during the RRC connection release procedure and the UE has not yet entered idle mode, the UE shall

- if cell re-selection occurred (CELL_FACH state), perform a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
- if radio link failure occurred (CELL_DCH state):
  - select a suitable UTRA cell according to [4];
  - perform a cell update procedure according to subclause 8.3.1 using the cause "radio link failure".

8.1.4.6 Expiry of timer T308, unacknowledged mode transmission

When in state CELL_DCH and the timer T308 expires, the UE shall:

- increment V308 by one;
- if V308 is equal to or smaller than N308:
  - retransmit the RRC CONNECTION RELEASE COMPLETE message, without incrementing "Uplink RRC Message sequence number" for signalling radio bearer RB#1 in the variable INTEGRITY_PROTECTION_INFO;
- if V308 is greater than N308:
  - release all its radio resources;
  - indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode;
  - perform the actions specified in subclause 8.5.2 when entering idle mode;
  - And the procedure ends.

8.1.6.6 T304 timeout

Upon expiry of timer T304, the UE shall check the value of V304 and:

- if V304 is smaller than or equal to N304:
  - retransmit a UE CAPABILITY INFORMATION message with the IEs as set in the last unsuccessful attempt, without incrementing "Uplink RRC Message sequence number" for signalling radio bearer RB#2 in the variable INTEGRITY_PROTECTION_INFO;
  - restart timer T304;
  - increment counter V304;
- if V304 is greater than N304:
  - ~~assume that radio link failure has occurred;~~
  - initiate the Cell update procedure as specified in subclause 8.3.1, using the cause "Radio link failure".

8.1.8.2 Initiation of Initial direct transfer procedure in the UE

In the UE, the initial direct transfer procedure shall be initiated, when the upper layers request establishment of a signalling connection. This request also includes a request for the transfer of a NAS message.

Upon initiation of the initial direct transfer procedure when the UE is in idle mode, the UE shall

- set the variable ESTABLISHMENT_CAUSE to the cause for establishment indicated by upper layers;
- perform an RRC connection establishment procedure, according to subclause 8.1.3;
- if the RRC connection establishment procedure was not successful:
  - indicate failure to establish the signalling connection to upper layers and end the procedure;
- when the RRC connection establishment procedure is completed successfully:
  - continue with the initial direct transfer procedure as below;

Upon initiation of the initial direct transfer procedure when the UE is in CELL_PCH or URA_PCH state, the UE shall:

- perform a cell update procedure, according to subclause 8.3.1, using the cause "uplink data transmission";
- when the cell update procedure completed successfully:
  - continue with the initial direct transfer procedure as below.

The UE shall, in the INITIAL DIRECT TRANSFER message:

- set the IE "NAS message" as received from upper layers; and
- set the IE "CN domain identity" as indicated by the upper layers; and
- set the IE "Intra Domain NAS Node Selector" as indicated by the upper layers.

In CELL_FACH state, the UE shall:

- if RACH measurement reporting has been requested in the IE "Intra-frequency reporting quantity for RACH reporting" and the IE "Maximum number of reported cells on RACH" in "System Information Block type 12" (or "System Information Block type 11" if "System Information Block type 12" is not being broadcast):
  - include IE "Measured results on RACH" in the INITIAL DIRECT TRANSFER message.

The UE shall:

- transmit the INITIAL DIRECT TRANSFER message on the uplink DCCH using AM RLC on signalling radio bearer RB 3;
- when the INITIAL DIRECT TRANSFER message has been submitted to lower layers for transmission:
  - confirm the establishment of a signalling connection to upper layers; and
  - add the signalling connection with the identity indicated by the IE "CN domain identity" in the variable ESTABLISHED_SIGNALLING_CONNECTIONS; and
  - The procedure ends.

When not stated otherwise elsewhere, the UE may also initiate the initial direct transfer procedure when another procedure is ongoing, and in that case the state of the latter procedure shall not be affected.

A new signalling connection request may be received from upper layers subsequent to the indication of the release of a previously established signalling connection to upper layers. From the time of the indication of release to upper layers until the UE has entered idle mode, any such upper layer request to establish a new signalling connection shall be queued. This request shall be processed after the UE has entered idle mode.

8.1.9.2 Initiation of downlink direct transfer procedure in the UTRAN

In the UTRAN, the direct transfer procedure is initiated when the upper layers request the transfer of a NAS message after the initial signalling connection is established. The UTRAN may also initiate the downlink direct transfer procedure when another RRC procedure is ongoing, and in that case the state of the latter procedure shall not be affected. The UTRAN shall transmit the DOWNLINK DIRECT TRANSFER message on the downlink DCCH using AM RLC on signalling radio bearer RB 3 or signalling radio bearer RB 4. The UTRAN should:

- if upper layers indicate "low priority" for this message:
  - select signalling radio bearer RB 4, if available. Specifically, for a GSM-MAP based CN, signalling radio bearer RB 4 should, if available, be selected when "SAPI 3" is requested;
  - select signalling radio bearer RB 3 when signalling radio bearer RB 4 is not available;
- if upper layers indicate "high priority" for this message:
  - select signalling radio bearer RB 3. Specifically, for a GSM-MAP based CN, signalling radio bearer RB 3 should be selected when "SAPI 0" is requested.

The UTRAN sets the IE "CN Domain Identity" to indicate, which CN domain the NAS message is originated from.

8.1.10.2 Initiation of uplink direct transfer procedure in the UE

In the UE, the uplink direct transfer procedure shall be initiated when the upper layers request a transfer of a NAS message on an existing signalling connection. When not stated otherwise elsewhere, the UE may initiate the uplink direct transfer procedure when another procedure is ongoing, and in that case the state of the latter procedure shall not be affected.

Upon initiation of the uplink direct transfer procedure in CELL_PCH or URA_PCH state, the UE shall:

- perform a cell update procedure, according to subclause 8.3.1, using the cause "uplink data transmission";
- when the cell update procedure has been completed successfully:
  - continue with the uplink direct transfer procedure as below.

The UE shall transmit the UPLINK DIRECT TRANSFER message on the uplink DCCH using AM RLC on signalling radio bearer RB 3 or signalling radio bearer RB 4. The UE shall:

- if upper layers indicate "low priority" for this message:
  - select signalling radio bearer RB 4, if available. Specifically, for a GSM-MAP based CN, signalling radio bearer RB 4 shall, if available, be selected when "SAPI 3" is requested;
  - select signalling radio bearer RB 3 when signalling radio bearer RB 4 is not available;
- if upper layers indicate "high priority" for this message:
  - select signalling radio bearer RB 3. Specifically, for a GSM-MAP based CN, signalling radio bearer RB 3 shall be selected when "SAPI 0" is requested.

The UE shall set the IE "NAS message" as received from upper layers and set the IE "CN domain identity" as indicated by the upper layers.

When the UPLINK DIRECT TRANSFER message has been submitted to lower layers for transmission the procedure ends.

8.1.10.3 Reception of UPLINK DIRECT TRANSFER message by the UTRAN

On reception of the UPLINK DIRECT TRANSFER message the NAS message should be routed using the value indicated in the IE "CN domain identity".

If the IE "Measured results on RACH" is present in the message, the UTRAN should extract the contents to be used for radio resource control.

When the UTRAN receives an UPLINK DIRECT TRANSFER message, it shall not affect the state of any other ongoing RRC procedures, when not stated otherwise elsewhere.

8.1.11 UE dedicated paging

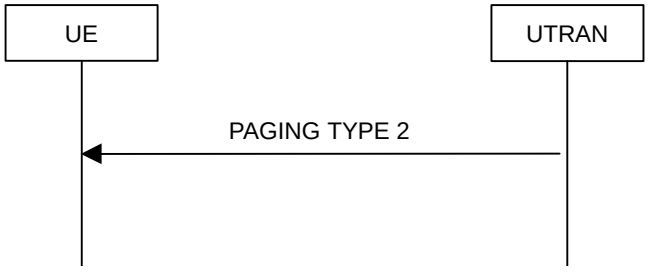

Figure 17: UE dedicated paging

8.1.11.1 General

This procedure is used to transmit dedicated paging information to one UE in connected mode in CELL_DCH or CELL_FACH state. Upper layers in the network may request initiation of paging.

8.1.11.2 Initiation

For a UE in CELL_DCH or CELL_FACH state, UTRAN initiates the procedure by transmitting a PAGING TYPE 2 message on the DCCH using AM RLC. When not stated otherwise elsewhere, the UTRAN may initiate the UE dedicated paging procedure also when another RRC procedure is ongoing, and in that case the state of the latter procedure shall not be affected.

UTRAN should set the IE "Paging cause" to the cause for paging received from upper layers. If no cause for paging is ~~available~~received from upper layers, UTRAN should set the value "Terminating – cause unknown".

8.1.12.3 Reception of SECURITY MODE COMMAND message by the UE

Upon reception of the SECURITY MODE COMMAND message, the UE shall perform the actions for the received information elements according to 8.6.

If the IE "Security capability" is the same as indicated by variable UE_CAPABILITY_TRANSFERRED, and the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- suspend all radio bearers and signalling radio bearers (except the signalling radio bearer used to receive the SECURITY MODE COMMAND message on the downlink DCCH in RLC-AM) using RLC-AM or RLC-UM that belong to the CN domain indicated in the IE "CN domain identity", with RLC sequence number greater than or equal to the number in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info";
- set the IE "RRC transaction identifier" in the SECURITY MODE COMPLETE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO, for the respective radio bearer and signalling radio bearer;
- if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- when the radio bearers and signalling radio bearers have been suspended:
  - send a SECURITY MODE COMPLETE message on the uplink DCCH in AM RLC, using the old ciphering configurations;
  - if the IE "Integrity protection mode info" was present in the SECURITY MODE COMMAND message:
    - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB#2 from and including the transmitted SECURITY MODE COMPLETE message;
- when the successful delivery of the SECURITY MODE COMPLETE message has been confirmed by RLC:
  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
  - if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info":
    - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
    - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - The procedure ends. If a RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been confirmed by RLC, but before the activation time for the new ciphering configuration has been reached, then the activation time shall be ignored and the new ciphering configuration shall be applied immediately after the RLC reset or RLC re-establishment;
  - notify upper layers upon change of the security configuration.

For radio bearers and signalling radio bearers used by the CN indicated in the IE "CN domain identity", the UE shall:

- if a new integrity protection key has been received or a new ciphering key has been received:
  - set the variable LATEST_CONFIGURED_CN_DOMAIN equal to the IE "CN domain identity";
- if a new integrity protection key has been received:
  - in the downlink:
    - use the new key;
    - set the HFN component of the downlink COUNT-I to zero at the RRC sequence number indicated in IE "Downlink integrity protection activation info" included in the IE "Integrity protection mode info";

    in the uplink:
    - use the new key;
    - set the HFN component of the uplink COUNT-I to zero at the RRC sequence number indicated in IE "Uplink integrity protection activation info";
- if a new ciphering key is available:
  - in the downlink:
    - use the new key;
    - set the HFN component of the downlink COUNT-C to zero at the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info";
  - in the uplink:
    - use the new key;
    - set the HFN component of the uplink COUNT-C to zero at the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info".

If the IE "Security capability" is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- release all its radio resources;
- indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- perform actions when entering idle mode as specified in subclause 8.5.2;
- And the procedure ends.

8.1.12.4 Void

8.1.12.4a Incompatible simultaneous security reconfiguration

If the variable INCOMPATIBLE_SECURITY_RECONFIGURATION becomes set to TRUE of the received SECURITY MODE CONTROL message, the UE shall:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "incompatible simultaneous reconfiguration";
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - And the procedure ends.

8.1.12.4b Cell update procedure during security reconfiguration

If:

- a cell update procedure according to subclause 8.3.1 is initiated; and
- the received SECURITY MODE CONTROL message causes either,
  - the IE "Reconfiguration" in the variable CIPHERING_STATUS to be set to TRUE; and/or
  - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to be set to TRUE:

the UE shall:

- abort the ongoing integrity and/or ciphering reconfiguration;
- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "cell update occurred";
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - if the SECURITY MODE CONTROL message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the SECURITY MODE CONTROL message contained the IE "Integrity protection mode info":
    - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
    - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received; and
  - The procedure ends.

8.1.12.4c Invalid configuration

If the variable INVALID_CONFIGURATION is set to TRUE the UE shall:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC setting the information elements as specified below;
  - set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to "invalid configuration";
- set the variable INVALID_CONFIGURATION to FALSE;
- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received.

The procedure ends.

8.1.12.5 Reception of SECURITY MODE COMPLETE message by the UTRAN

UTRAN should apply integrity protection on the received SECURITY MODE COMPLETE message and all subsequent messages with the new integrity protection configuration, if changed. When UTRAN has received a SECURITY MODE COMPLETE message and the integrity protection has successfully been applied, UTRAN shall:

- for radio bearers using RLC-AM or RLC-UM:
  - use the old ciphering configuration for received RLC PDUs with RLC sequence number less than the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
  - use the new ciphering configuration for received RLC PDUs with RLC sequence number greater than or equal to the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
  - if an RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been received by UTRAN before the activation time for the new ciphering configuration has been reached, ignore the activation time and apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment;
- for radio bearers using RLC-TM:
  - use the new ciphering configuration for the received RLC PDUs at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info";
- And the procedure ends.

8.1.15.3 Reception of a COUNTER CHECK message by the UE

When the UE receives a COUNTER CHECK message it shall compare the COUNT-C MSB values received in the IE "RB COUNT-C MSB information" in the COUNTER CHECK message to the COUNT-C MSB values of the corresponding radio bearers.

The UE shall:

- set the IE "RRC transaction identifier" in the COUNTER CHECK RESPONSE message to the value of "RRC transaction identifier" in the entry for the COUNTER CHECK message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry.

If

- there is one or more radio bearer(s) using UM or AM RLC mode stored in the variable ESTABLISHED_RABS, which is (are) not included in the IE "RB COUNT-C MSB information"; or
- there is one or more radio bearer(s) included in the IE "RB COUNT-C MSB information", which is (are) not stored in the variable ESTABLISHED_RABS; or
- for any radio bearer (excluding signalling radio bearers~~SRBs~~) using UM or AM RLC mode stored in the variable ESTABLISHED_RABS and included in the IE "RB COUNT-C MSB information" with COUNT-C MSB values different from the MSB part of the COUNT-C values in the UE

the UE shall:

- include these radio bearers in the IE "RB COUNT-C information" in the COUNTER CHECK RESPONSE message. For any RB which is included in the IE "RB COUNT-C MSB information" in the COUNTER CHECK message but not stored in the variable ESTABLISHED_RABS in the UE, the MSB part of COUNT-C values in the COUNTER CHECK RESPONSE message shall be set identical to COUNT-C-MSB values in the COUNTER CHECK message. The LSB part shall be filled by 0s;

The UE shall:

- submit a COUNTER CHECK RESPONSE message to lower layers for transmission on the uplink DCCH using AM RLC.

When the COUNTER CHECK RESPONSE message has been submitted to lower layers for transmission the procedure ends.

8.2.2.2 Initiation

To initiate any one of the reconfiguration procedures, UTRAN should:

- configure new radio links in any new physical channel configuration;
- start transmission and reception on the new radio links;
- for a radio bearer establishment procedure:
  - transmit a RADIO BEARER SETUP message on the downlink DCCH using AM or UM RLC;
- for a radio bearer reconfiguration procedure:
  - transmit a RADIO BEARER RECONFIGURATION message on the downlink DCCH using AM or UM RLC;
- for a radio bearer release procedure:
  - transmit a RADIO BEARER RELEASE message on the downlink DCCH using AM or UM RLC;
- for a transport channel reconfiguration procedure:
  - transmit a TRANSPORT CHANNEL RECONFIGURATION message on the downlink DCCH using AM or UM RLC;
- for a physical channel reconfiguration procedure:
  - transmit a PHYSICAL CHANNEL RECONFIGURATION message on the downlink DCCH using AM or UM RLC;
- if the reconfiguration procedure is simultaneous with SRNS relocation procedure, and ciphering and/or integrity protection are activated:
  - transmit new ciphering and/or integrity protection information to be used after reconfiguration.
- if transport channels are added, reconfigured or deleted in uplink and/or downlink:
  - set TFCS according to the new transport channel(s).
- if transport channels are added or deleted in uplink and/or downlink, and RB Mapping Info applicable to the new configuration has not been previously provided to the UE, the UTRAN should:
  - send the RB Mapping Info for the new configuration.

In the Radio Bearer Reconfiguration procedure UTRAN may indicate that uplink transmission shall be stopped or continued on certain radio bearers. Uplink transmission on a signalling radio bearer used by the RRC signalling (signalling radio bearer RB1 or signalling radio bearer RB2) should not be stopped.

If the IE "Activation Time" is included, UTRAN should set it to a value taking the UE performance requirements into account.

UTRAN should take the UE capabilities into account when setting the new configuration.

If the message is used to initiate a transition from CELL_DCH to CELL_FACH state, the UTRAN may assign a common channel configuration of a given cell and C-RNTI to be used in that cell to the UE.

8.2.2.3 Reception of RADIO BEARER SETUP or RADIO BEARER RECONFIGURATION or RADIO BEARER RELEASE or TRANSPORT CHANNEL RECONFIGURATION or PHYSICAL CHANNEL RECONFIGURATION message by the UE

The UE shall be able to receive any of the following messages:

- RADIO BEARER SETUP message; or

- RADIO BEARER RECONFIGURATION message; or
- RADIO BEARER RELEASE message; or
- TRANSPORT CHANNEL RECONFIGURATION message; or
- PHYSICAL CHANNEL RECONFIGURATION message

and perform a hard handover, even if no prior UE measurements have been performed on the target cell and/or frequency.

If the UE receives:

- a RADIO BEARER SETUP message; or
- a RADIO BEARER RECONFIGURATION message; or
- a RADIO BEARER RELEASE message; or
- a TRANSPORT CHANNEL RECONFIGURATION message; or
- a PHYSICAL CHANNEL RECONFIGURATION message

it shall:

- set the variable ORDERED_RECONFIGURATION to TRUE;
- ~~may first release the current physical channel configuration and~~
- ~~then establish a new physical channel configuration and~~ act upon all received information elements as specified in subclause 8.6, unless specified in the following and perform the actions below.~~:~~

The UE may first release the physical channel configuration used at reception of the reconfiguration message. The UE shall then:

  - in FDD, if the IE "PDSCH code mapping" is included but the IE "PDSCH with SHO DCH Info" is not included and if the DCH has only one link in its active set:
    - act upon the IE "PDSCH code mapping" as specified in subclause 8.6 and:
    - infer that the PDSCH will be transmitted from the cell from which the downlink DPCH is transmitted;
- enter a state according to subclause 8.6.3.3.

If the UE was in CELL_DCH state upon reception of the reconfiguration message and remains in CELL_DCH state ~~after state transition~~, the UE shall:

- if the IE "UL DPCH Info" is absent, not change its current UL Physical channel configuration;
- if the IE "DL DPCH Info for each RL" is absent, not change its current DL Physical channel configuration.

If after state transition the UE enters CELL_FACH state, the UE shall, after the state transition:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];
- if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE:
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:

- if the UE is in CELL_PCH or URA_PCH state:
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
  - proceed as below;

- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select PRACH according to subclause ~~8.6.6.2~~8.5.17;
- select Secondary CCPCH according to subclause ~~8.6.6.5~~8.5.19;
- use the transport format set given in system information;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;[Note to Hans: Indentation change +1]
- if the contents of the variable C_RNTI is empty:
  - perform a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:
    - if the UE is in CELL_PCH or URA_PCH state:
      - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
      - proceed as below;

The UE shall transmit a response message as specified in subclause 8.2.2.4, setting the information elements as specified below. The UE shall:

- if the received reconfiguration message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";
- if the received reconfiguration message did not include the IE "Downlink counter synchronisation info":
  - if the variable START_VALUE_TO_TRANSMIT is set:
    - include and set the IE "START" to the value of that variable;
  - if the variable START_VALUE_TO_TRANSMIT is not set and the IE "New U-RNTI" is included:
    - calculate the START value according to subclause 8.5.9;
    - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";
- if the received reconfiguration message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received reconfiguration message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the variable PDCP_SN_INFO is not empty:
  - include the IE "RB with PDCP information list" and set it to the value of the variable PDCP_SN_INFO;
- in TDD, if the procedure is used to perform a handover to a cell where timing advance is enabled, and the UE can calculate the timing advance value in the new cell (i.e. in a synchronous TDD network):
  - set the IE "Uplink Timing Advance" to the calculated value;
- if the IE "Integrity protection mode info" was present in the received reconfiguration message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB#2 from and including the transmitted response message;

If after state transition the UE enters CELL_PCH or URA_PCH state, the UE shall, after the state transition and transmission of the response message:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];
- prohibit periodical status transmission in RLC;
- remove any C-RNTI from MAC;
- clear the variable C_RNTI;
- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select Secondary CCPCH according to subclause ~~8.6.6.5~~8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2;
- if the UE enters CELL_PCH state, and the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE:
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
  - when the cell update procedure completed successfully:
    - The procedure ends;
- if the UE enters URA_PCH state, and after cell selection the criteria for URA update caused by "URA reselection" according to subclause 8.3.1 is fulfilled:
  - initiate a URA update procedure according to subclause 8.3.1 using the cause "URA reselection";
  - when the URA update procedure completed:
    - The procedure ends.

8.2.2.4 Transmission of a response message by the UE, normal case

In case the procedure was triggered by reception of a RADIO BEARER SETUP message, the UE shall:

- if the UE is not in CELL_DCH prior to this procedure and will be in CELL_DCH state at the conclusion of this procedure:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
- transmit a RADIO BEARER SETUP COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RECONFIGURATION message, the UE shall:

- if the UE will be in CELL_DCH state at the conclusion of this procedure:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
- transmit a RADIO BEARER RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RELEASE message, the UE shall:

- if the UE will be in CELL_DCH state at the conclusion of this procedure:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
- transmit a RADIO BEARER RELEASE COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a TRANSPORT CHANNEL RECONFIGURATION message, the UE shall:

- if the UE will be in CELL_DCH state at the conclusion of this procedure:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
- transmit a TRANSPORT CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a PHYSICAL CHANNEL RECONFIGURATION message, the UE shall:

- if the UE will be in CELL_DCH state at the conclusion of this procedure:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
- transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

If the new state is CELL_DCH or CELL_FACH, the response message shall be transmitted using the new configuration after the state transition, and the UE shall:

- if the variable PDCP_SN_INFO is empty:
  - if the received reconfiguration message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the response message:
      - notify upper layers upon change of the security configuration;
      - perform the actions below;

- if the received reconfiguration message did not contain the IE "Ciphering mode info":
  - when RLC has been requested to transmit the response message:
    - perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the response message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
        - configure the RLC entity for that radio bearer to "continue";
    - perform the actions below.

If the new state is CELL_PCH or URA_PCH, the response message shall be transmitted using the old configuration before the state transition, but the new C-RNTI shall be used if the IE "New C-RNTI" was included in the received reconfiguration message, and the UE shall:

- when RLC has confirmed the successful transmission of the response message:
  - for each radio bearer in the variable PDCP_SN_INFO:
    - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
      - configure the RLC entity for that radio bearer to "continue";
  - enter the new state (CELL_PCH or URA_PCH, respectively);
  - perform the actions below.

The UE shall:

- set the variable ORDERED_RECONFIGURATION to FALSE;
- if the received reconfiguration message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received reconfiguration message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- clear the variable PDCP_SN_INFO;
- clear the variable START_VALUE_TO_TRANSMIT.

8.2.2.5 Reception of a response message by the UTRAN, normal case

When UTRAN has received

- the RADIO BEARER SETUP COMPLETE message; or
- the RADIO BEARER RECONFIGURATION COMPLETE message; or
- the RADIO BEARER RELEASE COMPLETE message; or
- the TRANSPORT CHANNEL RECONFIGURATION COMPLETE message; or
- the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message;

UTRAN may delete the old configuration.

UTRAN may delete the C-RNTI of the UE if the procedure caused the UE to leave the CELL_FACH state.

If the IE "UL Timing Advance" is included, UTRAN shall evaluate the timing advance value that the UE has to use in the new cell after handover.

If the IE "COUNT-C activation time" is included, UTRAN should only begin incrementing the COUNT-C for radio bearers that are mapped on TM-RLC at the CFN indicated in this IE.

The procedure ends on the UTRAN side.

8.2.2.6 Unsupported configuration in the UE

If the UTRAN instructs the UE to use a configuration, which it does not support and/or if the received message causes the variable UNSUPPORTED_CONFIGURATION to be set to TRUE, the UE shall:

- transmit a failure response as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to "configuration unsupported";
- set the variable UNSUPPORTED_CONFIGURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received.

The procedure ends.

8.2.2.7 Physical channel failure

A physical channel failure occurs in case the criteria defined in subclause 8.5.4 are not fulfilled.

If the received message caused the UE to be in CELL_DCH state and the UE failed to establish the dedicated physical channel(s) indicated in the received message the UE shall:

- revert to the configuration prior to the reception of the message (old configuration);
- if the old configuration includes dedicated physical channels (CELL_DCH state) and the UE is unable to revert to the old configuration:
  - select a suitable UTRA cell according to [4];
  - initiate a cell update procedure according to subclause 8.3.1, using the cause "radio link failure";
  - after the cell update procedure has completed successfully:
    - proceed as below;
- if the old configuration does not include dedicated physical channels (CELL_FACH state):
  - select a suitable UTRA cell according to [4];
  - if the UE selects another cell than the cell the UE camped on upon reception of the reconfiguration message:
    - initiate a cell update procedure according to subclause 8.3.1, using the cause "Cell reselection";
    - after the cell update procedure has completed successfully:
      - proceed as below;

- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to "physical channel failure";
- set the variable ORDERED_RECONFURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received;

The procedure ends.

8.3.1.2 Initiation

A UE shall initiate the cell update procedure in the following cases:

- Uplink data transmission:
  - if the UE is in URA_PCH or CELL_PCH state; and
  - if the UE has uplink RLC data PDU or uplink RLC control PDU on RB 1 or upwards to transmit:
    - perform cell update using the cause "uplink data transmission".
- Paging response:
  - if the criteria for performing cell update with the cause specified above in the current subclause is not met; and
  - if the UE in URA_PCH or CELL_PCH state, receives a PAGING TYPE 1 message fulfilling the conditions for initiating a cell update procedure specified in subclause 8.1.2.3:
    - perform cell update using the cause "paging response".
- Re-entering service area:
  - if none of the criteria for performing cell update with the causes specified above in the current subclause is met; and
  - if the UE is in CELL_FACH or CELL_PCH state; and
  - if the UE has been out of service area and re-enters service area before T307 or T317 expires:
    - perform cell update using the cause "re-entering service area".
- Radio link failure:
  - if none of the criteria for performing cell update with the causes specified above in the current subclause is met; and
  - if the UE is in CELL_DCH state; and
  - if the criteria for radio link failure is met as specified in subclause 8.5.6:
    - perform cell update using the cause "radio link failure".
- RLC unrecoverable error:
  - if none of the criteria for performing cell update with the causes specified above in the current subclause is met; and
  - if the UE detects RLC unrecoverable error [16] in an AM RLC entity:
    - perform cell update using the cause "RLC unrecoverable error".
- Cell reselection:
  - if none of the criteria for performing cell update with the causes specified above in the current subclause is met; and
  - if the UE is in CELL_FACH or CELL_PCH state; and
  - if the UE performs cell re-selection or the variable C_RNTI is empty:
    - perform cell update using the cause "cell reselection".
- Periodical cell update:

- if none of the criteria for performing cell update with the causes specified above in the current subclause is met; and
- if the UE is in CELL_FACH or CELL_PCH state; and
- if the timer T305 expires; and
- if the criteria for "in service area" as specified in subclause 8.5.5.2 is fulfilled; and
- if periodic updating has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity":
  - perform cell update using the cause "periodical cell update".

A UE in URA_PCH state shall initiate the URA update procedure in the following cases:

- URA reselection:
  - if the UE detects that the current URA assigned to the UE, stored in the variable URA_IDENTITY, is not present in the list of URA identities in system information block type 2; or
  - if the list of URA identities in system information block type 2 is empty; or
  - if the system information block type 2 can not be found:
    - perform URA update using the cause "change of URA ~~reselection~~".
- Periodic URA update:
  - if the criteria for performing URA update with the causes as specified above in the current subclause are not met; and
  - if the timer T305 expires while the UE is in the service area; and
  - if periodic updating has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity":
    - perform URA update using the cause "periodic URA update".

When initiating the URA update or cell update procedure, the UE shall:

- stop timer T305;
- if the UE is in CELL_DCH state:
- in the variable RB_TIMER_INDICATOR, set the IE "T314 expired" and the IE "T315 expired" to FALSE;
  - if the stored values of the timer T314 and timer T315 are both equal to zero:
    - release all its radio resources;
    - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
    - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
    - clear the variable ESTABLISHED_RABS;
    - enter idle mode;
    - perform other actions when entering idle mode from connected mode as specified in subclause 8.5.2;
    - And the procedure ends.
  - if the stored value of the timer T314 is equal to zero:

- release all radio bearers, associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "useT314";
- in the variable RB_TIMER_INDICATOR set the IE "T314 expired" to TRUE;

- if the stored value of the timer T315 is equal to zero:
  - release all radio bearers associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "useT315";
  - in the variable RB_TIMER_INDICATOR set the IE "T315 expired" to TRUE;
- if the stored value of the timer T314 is greater than zero:
  - re-start timer T314;
- if the stored value of the timer T315 is greater than zero:
  - re-start timer T315;
- for the released radio bearer(s):
  - delete the information about the radio bearer from the variable ESTABLISHED_RABS;
  - when all radio bearers belonging to the same radio access bearer have been released:
    - indicate local end release of the radio access bearer to upper layers using the CN domain identity together with the RAB identity stored in the variable ESTABLISHED_RABS;
    - delete all information about the radio access bearer from the variable ESTABLISHED_RABS;

- set the variables PROTOCOL_ERROR_INDICATOR, FAILURE_INDICATOR, UNSUPPORTED_CONFIGURATION and INVALID_CONFIGURATION to FALSE;
- set the variable CELL_UPDATE_STARTED to TRUE;
- move to CELL_FACH state, if not already in that state;
- if the UE performs cell re-selection:
  - clear the variable C_RNTI; and
  - stop using that C_RNTI just cleared from the variable C_RNTI in MAC;
- set CFN in relation to SFN of current cell according to subclause 8.5.15;
- in case of a cell update procedure:
  - set the contents of the CELL UPDATE message according to subclause 8.3.1.3;
  - submit the CELL UPDATE message for transmission on the uplink CCCH;
- in case of a URA update procedure:
  - set the contents of the URA UPDATE message according to subclause 8.3.1.3;
  - submit the URA UPDATE message for transmission on the uplink CCCH;
- set counter V302 to 1;
- start timer T302 when the MAC layer indicates success or failure in transmitting the message.

8.3.1.3 CELL UPDATE / URA UPDATE message contents to set

In case of cell update procedure the UE shall transmit a CELL UPDATE message.

In case of URA update procedure the UE shall transmit a URA UPDATE message.

The UE shall set the IEs in the CELL UPDATE message as follows:

- set the IE "Cell update cause" corresponding to the cause specified in subclause 8.3.1.2 that is valid when the CELL UPDATE message is submitted to lower layers for transmission;

NOTE: During the time period starting from when a cell update procedure is initiated by the UE until when the procedure ends, additional CELL UPDATE messages may be transmitted by the UE with different causes.

- set the IE "U-RNTI" to the value of the variable U_RNTI;
- if the value of the variable PROTOCOL_ERROR_INDICATOR is TRUE:
  - include the IE "RRC transaction identifier"; and
    - set it to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - include and set the IE "failure cause" to the cause value "protocol error";
  - set the IE "Protocol error information" set to the value of the variable PROTOCOL_ERROR_INFORMATION;
- if the value of the variable FAILURE_INDICATOR is TRUE:
  - include the IE "RRC transaction identifier"; and
    - set it to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;
  - include and set the IE "failure cause" to the value of the variable FAILURE_CAUSE;
- include the START values for each CN domain, calculated according to subclause 8.5.9;
- if an unrecoverable error [16] in any of the AM RLC entities for the signalling radio bearer RB 2 or signalling radio bearer RB 3 is detected:
  - set the IE "AM_RLC error indication (RB2 or RB3)" to TRUE;
- otherwise:
  - set the IE "AM_RLC error indication (RB2 or RB3)" to FALSE;
- if an unrecoverable error [16] in any of the AM RLC entities for the RB 4 or upward is detected:
  - set the IE "AM_RLC error indication (RB>3)" to TRUE;
- otherwise:
  - set the IE "AM_RLC error indication (RB>3)" to FALSE;
- set the IE "RB Timer indicator" to the value of the variable RB_TIMER_INDICATOR;
- include an intra-frequency measurement report in the IE "Measured results on RACH", as specified in the IE "Intra-frequency reporting quantity for RACH reporting" and the IE "Maximum number of reported cells on RACH" in system information block type 12 (or System Information Block type 11, if System Information Block type 12 is not being broadcast).

The UE shall set the IEs in the URA UPDATE message as follows:

- set the IE "U-RNTI" to the value of the variable U_RNTI;
- set the IE "URA update cause" corresponding to which cause as specified in subclause 8.3.1.2 that is valid when the URA UPDATE message is submitted to lower layers for transmission;

NOTE: During the time period starting from when a URA update procedure is initiated by the UE until when the procedure ends, additional URA UPDATE messages may be transmitted by the UE with different causes, depending on which causes are valid for the respective URA UPDATE message.

- if the value of the variable PROTOCOL_ERROR_INDICATOR is TRUE:
  - include the IE "RRC transaction identifier"; and
    - set it to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - set the IE "Protocol error indicator" to TRUE;
  - include the IE "Protocol error information" set to the value of the variable PROTOCOL_ERROR_INFORMATION.
- if the value of the variable PROTOCOL_ERROR_INDICATOR is FALSE:
  - if the value of the variable INVALID_CONFIGURATION is TRUE:
    - include the IE "RRC transaction identifier"; and
    - set it to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;
    - set the IE "Protocol error indicator" to TRUE;
    - include the IE "Protocol error information" set to "Information element value not comprehended";
  - if the value of the variable INVALID_CONFIGURATION is FALSE:
    - set the IE "Protocol error indicator" to FALSE.

8.3.1.4 T305 expiry and the UE detects "out of service area"

When the T305 expires and the UE detects that it is "out of service area" as specified in subclause 8.5.5.1, the UE shall

- start timer T307;
- re-select to a new cell, as described in [4].

8.3.1.4.1 Re-entering "in service area"

If the UE detects "in service area" according to subclause 8.5.5.2 and timer T307 or T317 is running, the UE shall:

- check the value of V302; and
- if V302 is equal to or smaller than N302:
  - in case of a cell update procedure:
    - set the contents of the CELL UPDATE message according to subclause 8.3.1.3;
    - submit the CELL UPDATE message for transmission on the uplink CCCH;
  - in case of a URA update procedure:
    - set the contents of the URA UPDATE message according to subclause 8.3.1.3;
    - submit the URA UPDATE message for transmission on the uplink CCCH;
  - increment counter V302;
  - restart timer T302 when the MAC layer indicates success or failure to transmit the message.
- if V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- in case of a cell update procedure:
  - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- release all its radio resources;
- indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- perform other actions when entering idle mode from connected mode as specified in subclause 8.5.2;
- And the procedure ends.

8.3.1.4.2 Expiry of timer T307

When the T307 expires, the UE shall:

- move to idle mode;
- release all dedicated resources;
- indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- perform other actions when entering idle mode from connected mode as specified in subclause 8.5.2;
- And the procedure ends.

8.3.1.5 Reception of an CELL UPDATE/URA UPDATE message by the UTRAN

When the UTRAN receives a CELL UPDATE/URA UPDATE message, it may either:

- in case the procedure was triggered by reception of a CELL UPDATE:
  - transmit a CELL UPDATE CONFIRM message on the downlink DCCH or optionally on the CCCH but only if ciphering is not required; and
  - optionally include the IE "RLC re-establish indicator" to request a RLC re-establishment in the UE, in which case the corresponding RLC entities should also be re-established in UTRAN; or
- in case the procedure was triggered by reception of a URA UPDATE:
  - transmit a URA UPDATE CONFIRM message to the lower layers for transmission on the downlink CCCH or DCCH in which case the UTRAN should include the IE "URA identity" in the URA UPDATE CONFIRM message in a cell where multiple URA identifiers are broadcast; or
- initiate an RRC connection release procedure (see subclause 8.1.4) by transmitting an RRC CONNECTION RELEASE message on the downlink CCCH.

8.3.1.6 Reception of the CELL UPDATE CONFIRM/URA UPDATE CONFIRM message by the UE

When the UE receives a CELL UPDATE CONFIRM/URA UPDATE CONFIRM message; and

- if the message is received on the CCCH, and IE "U-RNTI" is present and has the same value as the variable U_RNTI, or;
- if the message is received on DCCH;

the UE shall:

- stop timer T302;
- set the variable CELL_UPDATE_STARTED to FALSE;
- in case of a cell update procedure and the CELL UPDATE CONFIRM message:
  - includes "RB information elements"; and/or
  - includes "Transport channel information elements"; and/or
  - includes "Physical channel information elements"; and
  - if the variable ORDERED_RECONFIGURATION is set to FALSE:
    - set the variable ORDERED_RECONFIGURATION to TRUE;
- act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following:
  - use the transport channel(s) applicable for the physical channel types that is used; and
  - if the IE "TFS" is neither included nor previously stored in the UE for that transport channel(s):
    - use the TFS given in system information.
  - if none of the TFS stored is compatible with the physical channel:
    - delete the stored TFS;
    - use the TFS given in system information.
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB2 and RB3)":
    - re-establish the RLC entities for signalling radio bearer RB 2 and signalling radio bearer RB 3;
    - if the variable CIPHERING_STATUS is set to "Started":
      - set the HFN values for AM RLC entities with RB identity 2 and 3 equal to the START value included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB>3)":
    - re-establish the AM RLC entities for RB with RB identity equal to or larger than 4;
    - if the variable CIPHERING_STATUS is set to "Started":
      - set the HFN values for AM RLC entities with RB identity equal to or larger than 4 equal to the START value included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
- enter a state according to subclause 8.6.3.3 applied on the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message.

If the UE after state transition enters CELL_DCH state, it shall:

- not prohibit periodical status transmission in RLC.

If the UE after state transition remains in CELL_FACH state, it shall

- start the timer T305 using its initial value if timer T305 is not running and periodical cell update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select PRACH according to subclause ~~8.6.6.2~~8.5.17;
- select Secondary CCPCH according to subclause ~~8.6.6.5~~8.5.19;
- not prohibit periodical status transmission in RLC;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;

If the UE after state transition enters URA_PCH or CELL_PCH state, it shall

- prohibit periodical status transmission in RLC;
- clear the variable C_RNTI;
- stop using that C_RNTI just cleared from the variable C_RNTI in MAC;
- start the timer T305 using its initial value if timer T305 is not running and periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select Secondary CCPCH according to subclause ~~8.6.6.5~~8.5.19.
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging Occasion and PICH Monitoring Occasion as specified in 8.6.3.2 in CELL_PCH state.

If the UE after the state transition remains in CELL_FACH state and;

- the contents of the variable C_RNTI are empty;

it shall check the value of V302 and

- If V302 is equal to or smaller than N302:
  - if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message,
    - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
    - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
      - abort the ongoing integrity and/or ciphering reconfiguration;
      - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
        - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
        - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
      - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
        - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
        - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a URA update procedure:

- stop the URA update procedure; and
- continue with a cell update procedure;

- set the contents of the CELL UPDATE message according to subclause 8.3.1.3, except for the IE "Cell update cause" which shall be set to "cell reselection";
- submit the CELL UPDATE message for transmission on the uplink CCCH;
- increment counter V302;
- restart timer T302 when the MAC layer indicates success or failure to transmit the message;

- If V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode;
  - other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;
  - And the procedure ends.

If the UE after the state transition remains in CELL_FACH state and

- a C-RNTI is stored in the variable C_RNTI;

or

the UE after the state transition moves to another state than the CELL_FACH state;

the UE shall:

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" in any response message transmitted below to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" in any response message transmitted below to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- in case of a cell update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry.
- in case of a cell update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in any response message transmitted below and set it to the value of the variable PDCP_SN_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in any response message transmitted below;
- transmit a response message as specified in subclause 8.3.1.7;
- if the IE "Integrity protection mode info" was present in the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB #2 from and including the transmitted response message;
- clear the variable PDCP_SN_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;

The procedure ends.

8.3.1.7 Transmission of a response message to UTRAN

If the CELL UPDATE CONFIRM message

- includes the IE "RB information to release list":

the UE shall:

- transmit a RADIO BEARER RELEASE COMPLETE as response message using AM RLC.

If the CELL UPDATE CONFIRM message

- does not include the IE "RB information to release list"; and
- includes the IE "RB information to reconfigure list "; or
- includes the IE "RB information to be affected list ":

the UE shall:

- transmit a RADIO BEARER RECONFIGURATION COMPLETE as response message using AM RLC.

If the CELL UPDATE CONFIRM message

- does not include "RB information elements"; and
- includes "Transport channel information elements":

the UE shall:

- transmit a TRANSPORT CHANNEL RECONFIGURATION COMPLETE as response message using AM RLC.

If the CELL UPDATE CONFIRM message

- does not include "RB information elements"; and
- does not include "Transport channel information elements"; and
- includes "Physical channel information elements":

the UE shall:

- transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE as response message using AM RLC.

If the CELL UPDATE CONFIRM message

- does not include "RB information elements"; and
- does not include "Transport channel information elements"; and
- does not include "Physical channel information elements"; and
- includes "CN information elements"; or
- includes the IE "Ciphering mode info"; or
- includes the IE "Integrity protection mode info"; or
- includes the IE "New C-RNTI"; or
- includes the IE "New U-RNTI":

the UE shall:

- transmit a UTRAN MOBILITY INFORMATION CONFIRM as response message using AM RLC.

If the CELL UPDATE CONFIRM message

- does not include "RB information elements"; and
- does not include "Transport channel information elements"; and
- does not include "Physical channel information elements"; and
- does not include "CN information elements"; and
- does not include the IE "Ciphering mode info"; and
- does not include the IE "Integrity protection mode info"; and
- does not include the IE "New C-RNTI"; and
- does not include the IE "New U-RNTI":

the UE shall:

- transmit no response message.

If the URA UPDATE CONFIRM message

- includes "CN information elements"; or
- includes the IE "Ciphering mode info"; or
- includes the IE "Integrity protection mode info"; or
- includes any one or both of the IEs "New C-RNTI" and "New U-RNTI":

the UE shall:

- transmit a UTRAN MOBILITY INFORMATION CONFIRM as response message using AM RLC.

If the URA UPDATE CONFIRM message

- does not include "CN information elements"; and
- does not include the IE "Ciphering mode info"; and
- does not include the IE "Integrity protection mode info"; and
- does not include the IE "New U-RNTI"; and
- does not include the IE "New C-RNTI":

the UE shall:

- transmit no response message.

If the new state is CELL_DCH or CELL_FACH, the response message shall be transmitted using the new configuration after the state transition., and the UE shall:

- if the variable PDCP_SN_INFO is empty:
  - if the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the response message:
      - continue with the remainder of the procedure;
  - if the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the response message,
      - continue with the remainder of the procedure;

- if the variable PDCP_SN_INFO non-empty:
  - when RLC has confirmed the successful transmission of the response message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
        - configure the RLC entity for that radio bearer to "continue";
    - continue with the remainder of the procedure;

If the new state is CELL_PCH or URA_PCH, the response message shall be transmitted in CELL_FACH state, and the UE shall:

- when RLC has confirmed the successful transmission of the response message:
  - for each radio bearer in the variable PDCP_SN_INFO:
    - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
      - configure the RLC entity for that radio bearer to "continue";
  - enter the new state (CELL_PCH or URA_PCH, respectively);
- continue with the remainder of the procedure.

8.3.1.7a Physical channel failure

If the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message would cause the UE to transit to CELL_DCH state; and

- in case of a received CELL UPDATE CONFIRM message:
  - if the UE failed to establish the physical channel(s) indicated in the received CELL UPDATE CONFIRM message according to the criteria defined in subclause 8.5.4 are not fulfilled; or
  - the received CELL UPDATE CONFIRM message does not contain dedicated physical channels;
- in case of the UE received a URA UPDATE CONFIRM message:

the UE shall:

- if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message
  - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
  - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
    - abort the ongoing integrity and/or ciphering reconfiguration;
    - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
      - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
      - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
    - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
      - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
      - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if V302 is equal to or smaller than N302:
  - in case of a URA update procedure:

- stop the URA update procedure; and
- continue with a cell update procedure;

- select a suitable UTRA cell according to [4];
- set the contents of the CELL UPDATE message according to subclause 8.3.1.3, except for the IE "Cell update cause" which shall be set to "Radio link failure";
- submit the CELL UPDATE message for transmission on the uplink CCCH;
- increment counter V302;
- restart timer T302 when the MAC layer indicates success or failure to transmit the message;

- if V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode.

8.3.1.12 T302 expiry or cell reselection

If any or several of the following conditions are true:

- expiry of timer T302;
- reselection to another UTRA cell (including the previously serving cell) before completion of the cell update or URA update procedure;

the UE shall:

- stop T302 if it is running;
- if the UE was in CELL_DCH state prior to the initiation of the procedure; and
  - if timers T314 and T315 have elapsed while T302 was running:
    - enter idle mode.
    - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.
    - and the procedure ends.
    - if timer T314 has elapsed while T302 was running and,
      - if "T314 expired" in the variable RB_TIMER_INDICATOR is set to FALSE and
      - if T315 is still running:
        - release locally all radio bearers which are associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "useT314";
        - indicate release of those radio access bearers to upper layers;
        - delete all information about those radio access bearers from the variable ESTABLISHED_RABS;
        - set "T3154 expired" in the variable RB_TIMER_INDICATOR to TRUE;
    - if timer T315 has elapsed while T302 was running and,
      - if "T315 expired" in the variable RB_TIMER_INDICATOR is set to FALSE and,
      - if T314 is still running:
        - release locally all radio bearers which are associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "~~useT314~~useT315";
        - indicate release of those radio access bearers to upper layers;
        - delete all information about those radio access bearers from the variable ESTABLISHED_RABS;
        - set "~~T314~~ T315 expired" in the variable RB_TIMER_INDICATOR to TRUE;
- check whether it is still in "in service area" (see subclause 8.5.5.2);
- if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE and/or the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
  - abort the ongoing integrity and/or ciphering reconfiguration;
  - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
- clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- in case of a cell update procedure:
  - clear any entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;

- in case of a URA update procedure:
  - clear any entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;

If the UE detects "in service area" if it has not entered idle mode, and:

- if V302 is equal to or smaller than N302, the UE shall:
  - if the UE performed cell re-selection:
    - delete its C-RNTI;
  - in case of a cell update procedure:
    - set the contents of the CELL UPDATE message according to subclause 8.3.1.3;
    - submit the CELL UPDATE message for transmission on the uplink CCCH;
  - in case of a URA update procedure:
    - set the contents of the URA UPDATE message according to subclause 8.3.1.3;
    - submit the URA UPDATE message for transmission on the uplink CCCH;
  - increment counter V302;
  - restart timer T302 when the MAC layer indicates success or failure to transmit the message;
- if V302 is greater than N302, the UE shall:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - clear the variable PDCP_SN_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;

- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;
- And the procedure ends.

If the UE does not detect "in service area", it shall:

- continue searching for "in service area".

8.3.3.3 Reception of UTRAN MOBILITY INFORMATION message by the UE

When the UE receives a UTRAN MOBILITY INFORMATION message, it shall:

- act on received information elements as specified in subclause 8.6;
- if the IE "UE Timers and constants in connected mode" is present:
- ~~use~~ store the values ~~in~~ of the IE "UE Timers and constants in connected mode" ~~for the relevant timers and constants~~in the variable TIMERS_AND_CONSTANTS, replacing any previously ~~used~~ stored value for each timer and constant~~s including those read in idle mode in system information block type 1~~, and;
  - for each updated timer value, start using the new value next time the timer is started;
  - for each updated constant values, start to use the new value directly;
- set the IE "RRC transaction identifier" in the UTRAN MOBILITY INFORMATION CONFIRM message to the value of "RRC transaction identifier" in the entry for the UTRAN MOBILITY INFORMATION message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in the UTRAN MOBILITY INFORMATION CONFIRM message and set it to the value of the variable PDCP_SN_INFO;
- if the received UTRAN MOBILITY INFORMATION message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in the UTRAN MOBILITY INFORMATION CONFIRM message;
- transmit a UTRAN MOBILITY INFORMATION CONFIRM message on the uplink DCCH using AM RLC;
- if the IE "Integrity protection mode info" was present in the UTRAN MOBILITY INFORMATION message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB #2 from and including the transmitted UTRAN MOBILITY INFORMATION CONFIRM message;
- if the variable PDCP_SN_INFO is empty; and
  - if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the UTRAN MOBILITY INFORMATION CONFIRM message, perform the actions below;
  - if the UTRAN MOBILITY INFORMATION message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the UTRAN MOBILITY INFORMATION CONFIRM message, perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:

- when RLC has confirmed the successful transmission of the UTRAN MOBILITY INFORMATION CONFIRM message:
  - for each radio bearer in the variable PDCP_SN_INFO:
    - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
    - configure the RLC entity for that radio bearer to "continue";
  - clear the variable PDCP_SN_INFO;

- if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

The procedure ends.

8.3.3.4 Reception of an UTRAN MOBILITY INFORMATION CONFIRM message by the UTRAN

When the network receives UTRAN MOBILITY INFORMATION CONFIRM message, UTRAN may delete any old U-RNTI. The procedure ends.

8.3.3.5 Cell re-selection

If the UE performs cell re-selection, the UE shall:

- initiate a cell update procedure according to subclause 8.3.1;
- if the UTRAN MOBILITY INFORMATION message contains the IE "New C-RNTI"; and
- if the UE has not yet submitted the UTRAN MOBILITY INFORMATION CONFIRM message to lower layers for transmission;
  - transmit a UTRAN MOBILITY INFORMATION FAILURE message on the uplink DCCH using AM RLC;
  - set the IE "RRC transaction identifier" in the UTRAN MOBILITY INFORMATION FAILURE message to the value of "RRC transaction identifier" in the entry for the UTRAN MOBILITY INFORMATION message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry.
  - set the IE "failure cause" to the cause value "cell update occured ~~cell reselection~~";
  - when the UTRAN MOBILITY INFORMATION FAILURE message has been submitted to lower layers for transmission:
    - continue with any ongoing processes and procedures as if the invalid UTRAN MOBILITY INFORMATION message has not been received and the procedure ends.
- otherwise:
  - continue the procedure normally.

8.3.4.3 Reception of an ACTIVE SET UPDATE message by the UE

Upon reception of an ACTIVE SET UPDATE message the UE shall act upon all received information elements as specified in 8.6, unless specified otherwise in the following. The UE shall:

- first add the RLs indicated in the IE "Radio Link Addition Information";
- remove the RLs indicated in the IE "Radio Link Removal Information". If the UE active set is full or becomes full, an RL, which is included in the IE "Radio Link Removal Information" for removal, shall be removed before adding RL, which is included in the IE "Radio Link Addition Information" for addition;
- if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in the ACTIVE SET UPDATE COMPLETE message; and
  - set it to the value of the variable PDCP_SN_INFO;
- if the ACTIVE SET UPDATE message includes the IE "TFCI combining indicator" associated with a radio link to be added:
  - configure Layer 1 to soft combine TFCI (field 2) of this new link with those links already in the TFCI (field 2) combining set;
- if the received ACTIVE SET UPDATE message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in the ACTIVE SET UPDATE COMPLETE message;
- set the IE "RRC transaction identifier" in the ACTIVE SET UPDATE COMPLETE message to the value of "RRC transaction identifier" in the entry for the ACTIVE SET UPDATE message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- transmit an ACTIVE SET UPDATE COMPLETE message on the uplink DCCH using AM RLC without waiting for the Physical Layer synchronization;
- if the IE "Integrity protection mode info" was present in the ACTIVE SET UPDATE message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB# 2 from and including the transmitted ACTIVE SET UPDATE COMPLETE message;
- if the variable PDCP_SN_INFO is empty:
  - if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the ACTIVE SET UPDATE COMPLETE message:
      - perform the actions below;
  - if the ACTIVE SET UPDATE message did not contain the IE "Ciphering mode info":

- when RLC has been requested to transmit the ACTIVE SET UPDATE COMPLETE message:
  - perform the actions below;

- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the ACTIVE SET UPDATE COMPLETE message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
        - configure the RLC entity for that radio bearer to "continue";
    - clear the variable PDCP_SN_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- The procedure ends on the UE side.

8.3.4.4 Unsupported configuration in the UE

If UTRAN instructs the UE to use a configuration that it does not support, the UE shall:

- keep the active set as it was before the ACTIVE SET UPDATE message was received;
- transmit an ACTIVE SET UPDATE FAILURE message on the DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the ACTIVE SET UPDATE FAILURE message to the value of "RRC transaction identifier" in the entry for the ACTIVE SET UPDATE message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to "~~configuration unacceptable~~configuration unsupported";
- when the ACTIVE SET UPDATE FAILURE message has been submitted to lower layers for transmission:
  - The procedure ends on the UE side.

8.3.6.2 Initiation

The procedure is initiated when a radio access technology other than UTRAN, e.g. GSM, using ~~system~~ radio access technology specific procedures, orders the UE to make a handover to UTRAN.

A HANDOVER TO UTRAN COMMAND message is sent to the UE via the radio access technology from which inter-~~system~~ RAT handover is performed.

In case UTRAN decides to uses a predefined or default radio configuration that is stored in the UE, it should include the following information in the HANDOVER TO UTRAN COMMAND message.

- the IE "U-RNTI" to be assigned;
- the IE "Predefined configuration identity", to indicate which pre-defined configuration of RB, transport channel and physical channel parameters shall be used; or
- the IE "Default configuration mode" and IE "Default configuration identity", to indicate which default configuration of RB, transport channel and physical channel parameters shall be used;
- PhyCH information elements.

NOTE: When using a predefined or default configuration during handover to UTRAN, UTRAN can only assign values of IEs "U-RNTI" and "scrambling code" that are within the special subranges defined exclusively for this procedure. UTRAN may re- assign other values after completion of the handover procedure.

In case UTRAN does not use a predefined radio configuration that is stored in the UE, it should include the following information in the HANDOVER TO UTRAN COMMAND message.

- the IE "U-RNTI" to be assigned;
- the complete set of RB, TrCH and PhyCH information elements to be used.

8.3.6.3 Reception of HANDOVER TO UTRAN COMMAND message by the UE

The UE shall be able to receive a HANDOVER TO UTRAN COMMAND message and perform an inter-RAT handover, even if no prior UE measurements have been performed on the target UTRAN cell and/or frequency.

The UE shall act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following. The UE shall:

- store a U-RNTI value (32 bits), which is derived by the IEs "SRNC identity" (12 bits) and "S-RNTI 2" (10 bits) included in IE "U-RNTI-short". In order to produce a full size U-RNTI value, a full size "S-RNTI" (20 bits) shall be derived by padding the IE "S-RNTI 2" with 10 zero bits in the most significant positions; and
- initialise the variable ESTABLISHED_SIGNALLING_CONNECTIONS with the signalling connections that remains after the handover according to the specifications of the source RAT;
- initialise the variable UE_CAPABILITIES_TRANSFERRED to which UE capabilities that have been transferred to the network up to the point prior to the handover (if any);
- initialise the variable TIMERS_AND_CONSTANTS to the default values and start to use those timer and constants values;
- if IE "Specification mode" is set to "Preconfiguration" and IE "Preconfiguration mode" is set to "Predefined configuration":
  - initiate the radio bearer and transport channel configuration in accordance with the predefined parameters identified by the IE "Predefined configuration identity";
  - initiate the physical channels in accordance with the predefined parameters identified by the IE "Predefined radio configuration identity" and the received physical channel information elements;
  - store information about the established radio access bearers and radio bearers according to the IE "Predefined configuration identity"; and

- set the IE "RAB Info Post" in the variable ESTABLISHED_RABS and the IE "Re-establishment timer" in the IE "RAB Info" in the variable ESTABLISHED_RABS to "useT314";

- if IE "Specification mode" is set to "Preconfiguration" and IE "Preconfiguration mode" is set to "Default configuration":

  - initiate the radio bearer and transport channel configuration in accordance with the default parameters identified by the IE "Default configuration mode" and IE "Default configuration identity";

  - initiate the physical channels in accordance with the default parameters identified by the IE "Default configuration mode" and IE "Default configuration identity" and the received physical channel information elements;

  NOTE IE "Default configuration mode" specifies whether the FDD or TDD version of the default configuration shall be used

  - set the IE "RAB Info Post" in the variable ESTABLISHED_RABS and the IE "Re-establishment timer" in the IE "RAB Info" in the variable ESTABLISHED_RABS to "useT314";

- if IE "Specification mode" is set to "Complete specification":

  - initiate the radio bearer, transport channel and physical channel configuration in accordance with the received radio bearer, transport channel and physical channel information elements;

- perform an open loop estimation to determine the UL transmission power according to subclause 8.5.3;

- apply the same ciphering (ciphered/unciphered, algorithm) as prior to inter--RAT handover, unless a change of algorithm is requested by means of the "Ciphering algorithm".

If the UE succeeds in establishing the connection to UTRAN, it shall:

- transmit a HANDOVER TO UTRAN COMPLETE message on the uplink DCCH;

- when the HANDOVER TO UTRAN COMPLETE message has been submitted to lower layers for transmission,:

  - if the IE "Transport format combination subset" was not included in the HANDOVER TO UTRAN COMMAND message or in the predefined parameters;

    - set the IE "Current TFC subset" in the variable TFS_SUBSET to "Full transport format combination set";

  - set the IE "Status" in the variable CIPHERING_STATUS to "Not started";

  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE;

  - set the IE "Status" in the variable INTEGRITY_ PROTECTION_INFO to "Not started";

  - set the IE "Historical status" in the variable INTEGRITY_ PROTECTION_INFO to "Never been active";

  - set the IE "Reconfiguration" in the variable INTEGRITY_ PROTECTION _INFO to FALSE;

  - set the variable CELL_UPDATE_STARTED to FALSE;

  - set the variable CONFIGURATION_INCOMPLETE to FALSE;

  - set the variable ORDERED_RECONFIGURATION to FALSE;

  - set the variable FAILURE_INDICATOR to FALSE;

  - set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;

  - set the variable INVALID_CONFIGURATION to FALSE;

  - set the variable PROTOCOL_ERROR_INDICATOR, TFC_SUBSET to FALSE;

  - set the variable PROTOCOL_ERROR_REJECT to FALSE;

- set the variable TGSN_REPORTED to FALSE;
- set the variable UNSUPPORTED_CONFIGURATION to FALSE;
- clear all optional IEs in all variables, except those optional IEs that are set in this procedure;

- And the procedure ends.

8.3.8.2 Initiation

When the UE makes an inter-RAT cell reselection to UTRAN according to the criteria specified in [4], it shall initiate this procedure. The inter-RAT cell reselection made by the UE may use system information broadcast from the source radio access technology or UE dedicated information.

The UE shall:

- set the variable ESTABLISHMENT_CAUSE to “Inter-RAT cell reselection";
- initiate an RRC connection establishment procedure as specified in subclause 8.1.3 ~~except that the IE "establishment cause" in the RRC CONNECTION REQUEST message shall be set to "Inter-RAT cell reselection"~~;
- after initiating an RRC connection establishment:
  - release all resources specific to the other radio access technology.

8.3.10.2 Initiation

The procedure is initiated when a radio access technology other than UTRAN, e.g. GSM/GPRS, using procedures specific for that RAT, orders the UE to change to a UTRAN cell.

NOTE: Within the message used to order the UE to change to a UTRAN cell, the source RAT should specify the identity of the target UTRAN cell as specified in the specifications for that RAT.

The UE shall:

- set the variable ESTABLISHMENT_CAUSE to “Inter-RAT cell reselection";
- initiate an RRC connection establishment procedure as specified in subclause 8.1.3 ~~except that the IE "establishment cause" in the RRC CONNECTION REQUEST message shall be set to "Inter-RAT cell change order"~~.

8.4.1.4a Configuration Incomplete

If the variable CONFIGURATION_INCOMPLETE is set to TRUE, the UE shall:

- retain the measurement configuration that was valid before the MEASUREMENT CONTROL message was received;
- set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS and clear that entry;
- clear the variable CONFIGURATION_INCOMPLETE;
- set the cause value in IE "failure cause" to "~~incomplete~~ configuration incomplete";
- submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;
- continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;
- And the procedure ends.

8.5.5.2.2 Actions following re-entry into "in service area" in CELL_FACH state

If the UE detects "in service area" before T317 expiry the UE shall perform the following actions. If ~~T~~no cell update procedure or URA update procedure is ongoing, the UE shall:

- stop T317;
- initiate the cell update procedure using as cause "Re-entering service area" as specified in subclause 8.3.1;
- perform processes described in subclause 7.2.2.

If an cell update procedure or URA update procedure is ongoing, the UE shall perform the actions as specified in 8.3.1.

8.5.5.3 T316 expiry

On T316 expiry the UE shall perform the following actions. The UE shall:

- if "out of service area" is detected:
  - start timer T317; [Note to Hans: indentation increased to B2]
  - move to CELL_FACH state;
  - perform processes described in subclause 7.2.2;
- if "in service area" is detected:
  - initiate the cell update procedure using as cause "Re-entering service area" as specified in subclause 8.3.1; [Note to Hans: indentation increased to B2]
  - perform processes described in subclause 7.2.2.

8.5.5.4 T317 expiry

When the T317 expires, the UE shall:

- move to idle mode;
- release all dedicated resources;
- indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- perform actions specified in subclause 8.5.2 when entering idle mode from connected mode.

8.5.6 Radio link failure criteria and actions upon radio link failure

In CELL_DCH State, after receiving N313 consecutive "out of sync" indications from layer 1 for the established DPCCH physical channel in FDD, and the DPCH associated with mapped DCCHs in TDD, the UE shall:

- start timer T313;
- upon receiving N315 successive "in sync" indications from layer 1 and upon change of UE state:
  - stop and reset timer T313;
- if T313 expires:
  - consider it as a "Radio link failure";

~~-~~ W~~w~~hen a radio link failure occurs, the UE shall: [Note to Hans: changed indentation to “Normal”]

- clear the dedicated physical channel configuration; ~~and;~~
- select a suitable UTRA cell according to [4];
- perform actions as specified for the ongoing procedure ~~elsewhere.~~
- if no procedure is ongoing or no actions are specified for the ongoing procedure:
  - select a suitable UTRA cell according to [4];
  - perform a cell update procedure according to subclause 8.3.1 using the cause “radio link failure”.

8.5.8 Hyper Frame Numbers

The hyper frame numbers (HFN) are used as MSBs of both the ciphering sequence number (COUNT-C) and the integrity sequence number (COUNT-I) for the ciphering and integrity protection algorithms, respectively. For non-transparent mode RLC radio bearers there is an uplink and downlink COUNT-C per radio bearer and an uplink and downlink COUNT-I per signalling radio bearer. For all transparent mode RLC radio bearers of the same CN domain, COUNT-C is the same, and COUNT-C is also the same for uplink and downlink. For transparent mode RLC radio bearers there is an uplink and a downlink COUNT-I per signalling radio bearer. COUNT-C and COUNT-I are defined in [40], with the following supplement for COUNT-C: for transparent mode RLC radio bearers with a transmission time interval of x radio frames (x = 2, 4, 8), the MAC PDU is carried by L1 in x consecutive radio frames due to radio frame segmentation. In this case, the CFN of the first segment of the MAC PDU is used as the CFN component of COUNT-C.

NOTE: In this release of the specification there is only an uplink transparent mode COUNT-I, which is used for signalling radio bearer RB 0.

The following hyper frame numbers are defined:

MAC-d HFN	24 bits	MSB of COUNT-C for data sent over RLC TM
RLC UM HFN	25 bits	MSB of COUNT-C for data sent over RLC UM
RLC AM HFN	20 bits	MSB of COUNT-C for data sent over RLC AM
RRC HFN	28 bits	MSB of COUNT-I

The START value is used to initialise the 20 most significant bits of all the hyper frame numbers and the remaining bits of the hyper frame numbers are set equal to zero.

8.5.10.1 Integrity protection in downlink

If the UE receives an RRC message on signalling radio bearer with RB identity n, the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" and the IE 'Integrity check info' is present the UE shall:

- perform the actions in subclause 8.6.3.5; and
- apply the new integrity protection configuration;
- check the value of the IE "RRC message sequence number" included in the IE "Integrity check info";
  - if the "Downlink RRC Message sequence number" is not present in the variable INTEGRITY_PROTECTION_INFO:
    - initialise the "Downlink RRC Message sequence number" in the variable INTEGRITY_CHECK_INFO with the value of the IE "RRC message sequence number" included in the IE "Integrity check info" of the received message;
  - if the "Downlink RRC Message sequence number" is present in the variable INTEGRITY_PROTECTION_INFO:
    - if the RRC message sequence number is lower than the "Downlink RRC Message sequence number" for signalling radio bearer RB #n in the variable INTEGRITY_PROTECTION_INFO:
      - increment "Downlink RRC HFN" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO with one;
    - if the RRC message sequence number is equal to the "Downlink RRC Message sequence number" for signalling radio bearer RB #n in the variable INTEGRITY_PROTECTION_INFO:
      - discard the message;
- calculate an expected message authentication code in accordance with subclause 8.5.10.3;
- compare the expected message authentication code with the value of the received IE "message authentication code" contained in the IE "Integrity check info";
  - if the expected message authentication code and the received message authentication code are the same, the integrity check is successful:
    - update the "Downlink RRC Message sequence number" for signalling radio bearer RB #n in the variable INTEGRITY_PROTECTION_INFO with the value of the IE "RRC message sequence number" included in the IE "Integrity check info" of the received RRC message;
  - if the calculated expected message authentication code and the received message authentication code differ:
    - if the IE "RRC message sequence number" included in the IE "Integrity check info" is lower than the "Downlink RRC Message sequence number" for signalling radio bearer RB #n in the variable INTEGRITY_PROTECTION_INFO (in this case the "Downlink RRC HFN" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO was incremented by one, as stated above):
      - decrement "Downlink RRC HFN" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO by one;
    - discard the message.

If the UE receives an RRC message on signalling radio bearer with identity n, the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" and the IE 'Integrity check info' is not present the UE shall:

- discard the message.

8.5.10.2 Integrity protection in uplink

Upon transmitting an RRC message using the signalling radio bearer with radio bearer identity n, and the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" the UE shall:

- increment "Uplink RRC Message sequence number" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO with 1. When "Uplink RRC Message sequence number" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO becomes 0, the UE shall increment "Uplink RRC HFN" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO with 1

- calculate the message authentication code in accordance with subclause 8.5.10.3

- replace the "Message authentication code" in the IE "Integrity check info" in the message with the calculated message authentication code.

- replace the "RRC Message sequence number" in the IE "Integrity check info" in the message with contents set to the new value of the "Uplink RRC Message sequence number" for signalling radio bearer RB# n in the variable INTEGRITY_PROTECTION_INFO

During an ongoing reconfiguration of the integrity protection, UTRAN should, for all signalling radio bearers, apply the old configuration (that is, the configuration that was applied before the reconfiguration) for the integrity protection. In the response message for the procedure ordering the reconfiguration, the UE indicates the activation time, for each signalling radio bearer except RB2, when the new configuration is to be applied in uplink. UTRAN should then start to apply the new configuration according to the activation time for each signalling radio bearer (for signalling radio bearer RB 2 the new configuration is applied starting from reception of the response message).

8.5.10.3 Calculation of message authentication code

The UE shall calculate the message authentication code in accordance with [40]. The input parameter MESSAGE [40] for the integrity algorithm shall be constructed by:

- setting the "Message authentication code" in the IE "Integrity check info" in the message to the ~~signalling~~ radio bearer identity for the signalling radio bearer

- setting the "RRC Message sequence number" in the IE "Integrity check info" in the message to zero

- encoding the message

- appending RRC padding (if any) as a bitstring to the encoded bitstring as the least significant bits

8.5.17 PRACH selection

For this version of the specification, when a UE selects a cell, the uplink frequency to be used for the initial PRACH transmission shall have a default duplex frequency spacing offset from the downlink frequency that the cell was selected on. The default duplex frequency separation to be used by the UE is specified in [35] (for FDD only).

The UE shall select a "PRACH system information" according to the following rule. The UE shall:

- select a default "PRACH system information" from the ones indicated in the IE "PRACH system information list" in System Information Block type 5 (applicable in Idle Mode and Connected Mode) or System Information Block type 6 (applicable in Connected Mode only), as follows:
  - if both RACH with 10 ms and 20 ms TTI are indicated in System Information Block type 5 or System Information Block type 6:
    - select the appropriate TTI based on power requirements, as specified in subclause ~~8.6.6.3~~8.5.18;
  - select a "PRACH system information" randomly from the ones listed in System Information Block type 5 or System Information Block type 6 as follows:

    "Index of selected PRACH" = floor (rand * K)

    where K is equal to the number of listed PRACH system informations that carry an RACH with the above selected TTI, "rand" is a random number uniformly distributed in the range 0,...,1, and "floor" refers to rounding down to nearest integer. PRACH system informations carrying RACHs with 10 and 20 ms TTI shall be counted separately. These PRACH system informations shall be indexed from 0 to K-1 in the order of their occurrence in SIB 5 or SIB 6. The random number generator is left to implementation. The scheme shall be implemented such that one of the available PRACH system informations is randomly selected with uniform probability. At start-up of the random number generator in the UE the seed shall be dependent on the IMSI of the UE or time, thereby avoiding that all UEs select the same RACH;
  - in Connected mode:
    - select the PRACH according to the following preference:
      - if SIB 6 is defined and PRACH info is included:
        - select PRACH from the PRACHs listed in SIB 6;
      - if SIB 6 is defined and no PRACH info is included:
        - select PRACH from the PRACHs listed in SIB 5;
      - if no SIB 6 is defined:
        - select PRACH from the PRACHs listed in SIB 5.
    - reselect the default PRACH system information when a new cell is selected. RACH reselection may also be performed after each transmission of a Transport Block Set on RACH;
- for emergency call, the UE is allowed to select any of the available PRACH system informations.

After selecting a PRACH system information, the RRC in the UE shall configure the MAC and the physical layer for the RACH access according to the parameters included in the selected "PRACH system information" IE.

8.5.18 Selection of RACH TTI

In FDD mode, a RACH may employ either 10 or 20 ms TTI. The supported TTI is indicated as a semi-static parameter of the RACH Transport Format in system information. If in one cell RACHs for both 10 and 20 ms TTI are supported, the UE shall select an appropriate RACH according to the following rule:

The UE shall first check whether a RACH Transport Format is available which is suitable for the transmission of the current transport Block Set for both 10 and 20 ms TTI. The UE shall:

- if the required transport format is available only for one particular TTI:

- select this TTI;
- identify the corresponding RACHs;
- proceed with RACH selection as specified in subclause ~~8.6.6.2~~8.5.17.

- if the required transport format is available on both types of RACH, 10 and 20 ms TTI:
  - perform TTI selection as follows:
    - when the UE calculates the initial preamble transmit power ("Preamble_Initial_Power") as specified in subclause 8.5.7:
      - calculate a transmit power margin,

$$\text{Margin} = \{\min(\text{Maximum allowed UL tx power}, P\_MAX) - \max(\text{Preamble\_Initial\_Power}, \text{Preamble\_Initial\_Power} + \Delta Pp\text{-}m + 10*\log_{10}(1 + (\beta_d/\beta_c)^2)\}$$

      where "Maximum allowed UL tx power" is the maximum allowed uplink transmit power indicated in system information (in dBm), and P_MAX is the maximum RF output power of the UE (dBm). The margin shall be calculated for 10 ms TTI RACH message gain factors β_d and β_c.

NOTE: the expression Preamble_Initial_Power + $\Delta Pp\text{-}m + 10*\log_{10}(1 + (\beta_d/\beta_c)^2)$ represents the total RACH message power if the message would be sent after the initial preamble.

    - if the value of "Margin" calculated for RACH with 10 ms TTI is less than 6 dB:
      - select RACH with 20 ms TTI, and proceed as specified in subclause ~~8.6.6.2~~8.5.17.
    - perform reselection of the RACH TTI only after successful transmission of one Transport Block Set. However in case L1 message transmission on PRACH has failed at least once while using 10 ms TTI, the UE may use the 20 ms TTI RACH for the retransmission. Handling of RACH Message transmission failure is part of general error handling procedure.

8.6.3.2 UTRAN DRX Cycle length coefficient

If the IE "UTRAN DRX cycle length coefficient" is present, the UE shall use it to calculate the UTRAN DRX cycle length, according to the following:

- set k to the value of the IE "UTRAN DRX cycle length coefficient";
- store the result of MAX(2^k,PBP), where PBP is the Paging Block Periodicity, as the DRX cycle length.

The UE shall determine its connected mode paging occasions and PICH monitoring occasions in the same way as for idle mode, according to [4].

The DRX cycle length to use in connected mode is the shorter of the following two parameters:

- UTRAN DRX cycle length;
- CN domain specific DRX cycle length stored for any CN domain, when using Discontinuous Reception (DRX) in CELL_PCH and URA_PCH state.

The CN domain specific DRX cycle length stored for any CN domain is only used in Cell_PCH state and URA_PCH state if the UE is registered to that CN domain and no signalling connection stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS exists to that CN domain.

8.6.3.3 Generic state transition rules depending on received information elements

The IE "RRC State Indicator" indicates the state the UE shall enter. The UE shall, if the IE "RRC State Indicator" in the received message has the value:

- "CELL_FACH":
  - enter CELL_FACH state as dictated by the procedure governing the message received;
- "CELL_DCH":
  - if neither DPCH is assigned in the message nor is the UE is CELL_DCH:
    - set the variable INVALID_CONFIGURATION to TRUE;
  - else:
    - enter CELL_DCH state as dictated by the procedure governing the message received;
- "CELL_PCH":
  - if the received message is RRC CONNECTION SETUP and IE "RRC State Indicator" is set to CELL_PCH:
    - set the variable INVALID_CONFIGURATION to TRUE;
  - else:
    - enter CELL_PCH state as dictated by the procedure governing the message received;
- "URA_PCH":
  - if the received message is RRC CONNECTION SETUP and IE "RRC State Indicator" is set to URA_PCH:
    - set the variable INVALID_CONFIGURATION to TRUE;
  - else:
    - enter URA_PCH state as dictated by the procedure governing the message received.

8.6.3.5 Integrity protection mode info

The IE "Integrity protection mode info" defines the new integrity protection configuration. If the IE "Integrity protection mode info" is present and if the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_STATUS is set to FALSE, the UE shall check the IE "Integrity protection mode command" as part of the IE "Integrity protection mode info", and perform the following. The UE shall:

- if the IE "Integrity protection mode command" has the value "start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Started"; or if the IE "Integrity protection mode command" has the value "Modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not Started":
  - ignore this attempt to change the integrity protection configuration; and
  - set the variable INVALID_CONFIGURATION to TRUE;
- else:
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_STATUS to TRUE;
  - if IE "Integrity protection mode command" has the value "start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not started":
    - if the IE "Historical status" in the variable INTEGRITY_PROTECTION_INFO has the value "Never been active":
      - initialise the information for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO according to the following:
        - set the IE "Uplink RRC Message sequence number" to zero;
        - do not include the IE "Downlink RRC Message sequence number";
      - set the IE "Historical status" in the variable INTEGRITY_PROTECTION_INFO to the value "Has been active";
    - set the IE "Status" in the variable INTEGRITY_PROTECTION_INFO to the value "Started";
    - perform integrity protection on the received message as described in subclause 8.5.10.1;
    - use the algorithm (UIA [40]) indicated by the IE "Integrity protection algorithm" contained in the IE "Integrity protection mode info";
    - use the IE "Integrity protection initialisation number", contained in the IE "Integrity protection mode info" as the value of FRESH [40];
  - if IE "Integrity protection mode command" has the value "modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Started":
    - start applying the new integrity protection configuration in the downlink at the RRC sequence number, for each radio bearer n, indicated by the entry for radio bearer n in the "RRC message sequence number list" in the IE "Downlink integrity protection activation info", included in the IE "Integrity protection mode info";
    - perform integrity protection on the received message as described in subclause 8.5.10.1;
    - if present, use the algorithm indicated by the IE "Integrity protection algorithm" (UIA [40]);
    - set the content of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO according to the following:
      - for each established signalling radio bearer, stored in the variable ESTABLISHED_RABS:
        - include a value of the RRC sequence number, when the new integrity protection in uplink is to be applied;

- for signalling radio bearer RB #0:
  - set the value of the included RRC sequence number to greater than or equal to the current value of the RRC sequence number for signalling radio bearer RB #0 in the variable INTEGRITY_PROTECTION_INFO, plus the value of the constant N302 plus one;
- start applying the new integrity protection configuration in the uplink at the RRC sequence number, for each radio bearer n, except for signalling radio bearer RB #2, indicated by the entry for radio bearer n in the "RRC message sequence number list" in the IE "Uplink integrity protection activation info", included in the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- start applying the new integrity protection configuration in the uplink at the RRC sequence number for signalling radio bearer RB #2, as specified for the procedure initiating the integrity protection reconfiguration;
- set the values of the IE "Uplink integrity protection activation info".

If the IE "Integrity protection mode info" is present and if the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_STATUS is set to TRUE, the UE shall:

- ignore this second attempt to change the integrity protection configuration; and
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.

If the IE "Integrity protection mode info" is not present, the UE shall not change the integrity protection configuration.

8.6.3.11 RRC transaction identifier

The IE “RRC transaction identifier” may be used, together with the message type, for identification of an invokation of a downlink procedure (transaction). The UE behaviour for accepting or rejecting transactions based on the message type and the IE “RRC transaction identifier” is specified below.

If the IE "RRC transaction identifier" is included in a received message, the UE shall perform the actions below. The UE shall:

If the received message is any of the messages:

- RADIO BEARER SETUP; or
- RADIO BEARER RECONFIGURATION; or
- RADIO BEARER RELEASE; or
- TRANSPORT CHANNEL RECONFIGURATION; or
- PHYSICAL CHANNEL RECONFIGURATION:

the UE shall:

- if the variable ORDERED_RECONFIGURATION is set to FALSE; and
- if the variable CELL_UPDATE_STARTED is set to FALSE; and
- if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
  - accept the transaction; and
  - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
- else:
- if the variable ORDERED_RECONFIGURATION is set to TRUE; or
- if the variable CELL_UPDATE_STARTED is set to TRUE; or
- if the table "Accepted transactions" in the variable TRANSACTIONS contains an entry with an IE "Message Type" set to ACTIVE SET UPDATE; or
- if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored for the same "Message Type" as the received message in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received;
    - and end the procedure;
  - else:
    - reject the transaction; and
    - if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

Else:

If the received message is any of the messages:

- RRC CONNECTION SETUP; or
- CELL UPDATE CONFIRM; or
- URA UPDATE CONFIRM:

the UE shall:

- if the IE "Message Type" of the received message is not present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
    - accept the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
  - else:
  - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
    - reject the transaction; and
    - if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.
- else:
- if the IE "Message Type" of the received message is present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received; and
    - end the procedure;
  - else:
  - if the IE "RRC transaction identifier" of the received message is different from the "RRC transaction identifier" stored for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
      - ignore the once accepted transaction and instead accept the new transaction; and
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS, replacing the previous entry;
    - else:
    - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:

- reject the transaction; and
- if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:
  - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

Else:

If the received message is any other message, the UE shall:

- if the IE "Message Type" of the received message is not present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
    - accept the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS;
  - else:
  - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:
    - reject the transaction; and
    - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.
- else:
- if the IE "Message Type" of the received message is present in the table "Accepted transactions" in the variable TRANSACTIONS:
  - if the IE "RRC transaction identifier" of the received message is identical to the "RRC transaction identifier" stored in any entry for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - ignore the transaction; and
    - continue with any ongoing processes and procedures as the message was not received; and
    - end the procedure;
  - else:
  - if the IE "RRC transaction identifier" of the received message is different from the "RRC transaction identifier" stored in all entries for the "Message Type" in the table "Accepted transactions" in the variable TRANSACTIONS:
    - if the received message does not contain a protocol error according to clause 9 and the variable PROTOCOL_ERROR_REJECT is set to FALSE:
      - accept the additional transaction; and
      - store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Accepted transactions" in the variable TRANSACTIONS, in addition to the already existing entries;
    - else:
    - if the received message contains a protocol error according to clause 9 causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE:

- reject the transaction; and
- store the IE "Message type" and the IE "RRC transaction identifier" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS.

8.6.6.4 Downlink information for each radio link

If the IE "Downlink information for each radio link" is included in a received message, the UE shall:

- if the UE would enter CELL_DCH state according to subclause 8.6.3.3 applied on the received message:
  - if the IE "Secondary CCPCH info" is included; and
  - if the UE is not capable of simultaneous reception of DPCH and Secondary CCPCH:
    - set the variable UNSUPPORTED_CONFIGURATION to TRUE;
  - else:
    - if the UE is capable of simultaneous reception of DPCH and SCCPCH:
      - start to receive the indicated Secondary CCPCH;
  - act on the other IEs contained in the IE "Downlink information for each radio link" as specified in subclause 8.6 applied on this radio link;
- if the UE would enter either the CELL_FACH, CELL_PCH or URA_PCH state according to subclause 8.6.3.3 applied on the received message:
  - if the received message is CELL UPDATE CONFIRM:
    - set the variable INVALID_CONFIGURATION to TRUE;
  - if the received message is any other message than CELL UPDATE CONFIRM; and
  - if other IEs than the IE "Primary CPICH info" (for FDD) or the IE "Primary CCPCH info" (for TDD) are included in the IE "Downlink information for each radio link":
    - set the variable INVALID_CONFIGURATION to TRUE.
  - act on the other IEs contained in the IE "Downlink information for each radio link" as specified in subclause 8.6 applied on this radio link;

8.6.6.18 Primary CPICH info

If the IE "Primary CPICH info" in FDD ~~and the IE "New C-RNTI" a are~~ is included ~~and the message including these IEs is used to initiate a state transition to CELL_FACH~~, the UE shall:

- use the value of this IE as the primary scrambling code for the downlink radio link;

- ~~select the cell indicated by the IE "Primary CPICH info";~~

- ~~use the given C-RNTI when using common transport channels of type RACH, FACH and CPCH in that given cell after having completed the transition to that cell.~~

8.6.6.30 SRB delay, PC preamble

When the IE "SRB delay" and IE "PC preamble" is received in a message that results in a configuration of uplink DPCH, the UE shall:

- after the establishment of the uplink physical channel, send DPCCH and no DPDCH according to [26] during the number of frames indicated in the IE "PC preamble"; and
- then not send any data on signalling radio bearers ~~S~~RB 0 to ~~S~~RB 4 during the number of frames indicated in the IE "SRB delay".

8.6.7 Measurement information elements

8.6.7.1 Measurement validity

If the optional IE "measurement validity" for a given measurement has not been included in measurement control information, the UE shall delete the measurement associated with the variable MEASUREMENT_IDENTITY after the UE makes a transition to a new state.

If the IE "measurement validity" for this measurement has been included in measurement control information, the UE shall save the measurement associated with the variable MEASUREMENT_IDENTITY. The IE "UE state" defines the scope of resuming the measurement.

If the "UE state" is defined as "all states", the UE shall continue the measurement after making a transition to a new state. This scope is assigned only for traffic volume type measurements and can only be applied by the UE if the IE "measurement object" has not been included in measurement control information. If the IE "measurement object" has been included in measurement control information, the UE shall not save the measurement control information in variable MEASUREMENT_IDENTITY, but shall send a MEASUREMENT CONTROL FAILURE message to the UTRAN with failure cause "incomplete configuration".

If the "UE state" is defined as "all states except CELL_DCH", the UE shall store the measurement to be resumed after a subsequent transition from CELL_DCH state to any of the other states in connected mode. This scope is assigned only for traffic volume type measurements.

If the "UE state" is defined as "CELL_DCH", the UE shall store the measurement to be resumed after a subsequent transition to CELL_DCH state. After cell re-selection, the UE shall delete any ongoing intra-frequency or inter-frequency and inter-RAT type measurement associated with the variable MEASUREMENT_IDENTITY. Other measurement types shall, however, be continued regardless of cell reselection.

8.6.7.4 Intra-frequency measurement quantity

If the IE "Intra-frequency measurement quantity" is received in a MEASUREMENT CONTROL message, the UE shall:

- if the IE "Measurement quantity" is set to "pathloss"; and
- for any intra-frequency cell indicated by the IE "Cells for measurement", the IE "Primary CPICH Tx power" in FDD or the IE "Primary CCPCH TX Power" in TDD in the intra frequency cell info list in the variable CELL_INFO_LIST is not present:
  - set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE;
- else:
  - configure the measurement quantity accordingly.

8.6.7.5 Inter-RAT measurement quantity

If the IE "Inter-RAT measurement quantity" is received in a MEASUREMENT CONTROL message and CHOICE system is GSM, the UE shall:

- if IE "BSIC verification required" is set to "required", for cells that match any of the BCCH ARFCN and BSIC combinations in the list of inter-RAT cells that the UE has received in IE "Inter-RAT cell info list", and that has a "verified" BSIC:
  - report measurement quantities according to IE "inter-RAT reporting quantity";
  - trigger inter-RAT events according to IE "inter-RAT measurement reporting criteria";
- if IE "BSIC verification required" is set to "not required", for cells that match any of the BCCH ARFCN in the list of inter-RAT cells that the UE has received in IE "Inter-RAT cell info list", regardless if the BSIC is "verified" or "non-verified":
  - report measurement quantities according to IE "inter-RAT reporting quantity";
  - trigger inter-RAT events according to IE "inter-RAT measurement reporting criteria";
- if the IE "Measurement quantity" is set to "pathloss"; and
- for any inter-RAT cell indicated by the IE "Cells for measurement", the IE "Output power" in the inter-RAT cell info list in the variable CELL_INFO_LIST is not present:
  - set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

NOTE: The requirements for a cell to be considered "verified" or "non-verified" can be found in [19].

8.6.7.10 Traffic Volume Measurement

If the IE "Traffic Volume Measurement" is received by the UE, the UE shall:

- store the content of the IE to the variable MEASUREMENT_IDENTITY.

If the IE "Traffic volume measurement Object" is not included, the UE shall:

- apply the measurement reporting criteria to all uplink transport channels.

If IE "Traffic volume measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", and if the IE "traffic volume reporting quantity" is included, the UE shall:

- report the measured quantities specified in the IE "traffic volume reporting quantity";
- if the parameter "Average of RLC Buffer Payload for each RB" or the parameter "Variance of RLC Buffer payload for each RB" is set:
  - if the IE "Traffic volume measurement quantity" is not included:
    - set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE;
  - if the IE "Traffic volume measurement quantity" is included;
    - if the parameter "time interval to take an average or a variance" is included:
      - use the time specified in the parameter "time interval to take an average or a variance" to calculate the average and/or variance of RLC Buffer Payload according to the IE "traffic volume reporting quantity";
    - if the parameter "time interval to take an average or a variance" is not included:
      - set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

If IE "Traffic volume measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Traffic volume measurement quantity", IE "Traffic volume reporting quantity" or "CHOICE Report criteria" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.13 Measurement Reporting Mode

If IE "Measurement Reporting Mode" is received by the UE, the UE shall:

- store the contents of the IE "Measurement Report Transfer Mode" in the variable MEASUREMENT_IDENTITY;
- use the indicated RLC mode when sending MEASUREMENT REPORT message(s) related to this measurement;
- ignore IE "Periodical Reporting / Event Trigger Reporting Mode".

If IE "Measurement Reporting Mode" is not received by the UE in MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.14 Inter-frequency measurement

If IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Inter-frequency measurement quantity", IE "Inter-frequency reporting quantity" or "CHOICE Report criteria" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.15 Inter-RAT measurement

If IE "Inter-RAT measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Inter-RAT measurement quantity", IE "Inter-RAT reporting quantity" or "CHOICE Report criteria" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.16 Intra-frequency measurement

If IE "Intra-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Intra-frequency measurement quantity", IE "Intra-frequency reporting quantity" or "CHOICE Report criteria" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.17 Quality measurement

If IE "Quality measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Quality reporting quantity" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.18 UE internal measurement

If IE "UE internal measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "UE internal measurement quantity" or IE "UE internal reporting quantity" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable ~~CONFIGURATION_INCOMPETE~~CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.19 UE positioning GPS real-time integrity

The GPS real-time integrity information element specified in 10.3.7.95 is primarily intended for non-differential applications. The real-time integrity of the satellite constellation is of importance as there is no differential correction data by which the UE can determine the soundness of each satellite signal. The Real-Time GPS Satellite Integrity data communicates the health of the constellation to the mobile via a list of bad satellites. The UE shall consider the data associated with the satellites identified in this IE as invalid.

8.6.8 Void~~UE positioning GPS real-time integrity information~~

~~The GPS real-time integrity message specified in 10.3.7.95 is primarily intended for non-differential applications. The real-time integrity of the satellite constellation is of importance as there is no differential correction data by which the UE can determine the soundness of each satellite signal. The Real-Time GPS Satellite Integrity data communicates the health of the constellation to the mobile via a list of bad satellites. The UE shall consider the data associated with the satellites identified in this IE as invalid.~~

9 Handling of unknown, unforeseen and erroneous protocol data

9.1 General [Note to Hans: Paragraph type changed to Heading 2]

This subclause specifies procedures for the handling of unknown, unforeseen, and erroneous protocol data by the receiving entity. These procedures are called "error handling procedures", but in addition to provide recovery mechanisms for error situations they define a compatibility mechanism for future extensions of the protocol.

The error handling procedures specified in this subclause shall apply to all RRC messages. When there is a specific handling for messages received on different logical channels this is specified.

When the UE receives an RRC message, it shall set the variable PROTOCOL_ERROR_REJECT to FALSE and then perform the checks in the order as defined below.

The procedures specified in clause 8 are applied only for the messages passing the checks as defined below, except when procedure specific handling is used to recover from the error.

9.3b Unexpected critical message extension

If the UE receives a message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, containing an undefined critical message extension, the UE shall:

- set the variable PROTOCOL_ERROR_REJECT to TRUE;
- set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "Message extension not comprehended";

- if the IE "Message Type" of the received message is not present in the table "Rejected transactions" in the variable TRANSACTIONS:

  - store the IE "Message type" of the received message in the table "Rejected transactions" in the variable TRANSACTIONS, and;

  - set the IE "RRC transaction identifier" to zero in that table entry;

- perform procedure specific error handling according to clause 8.

If the UE receives a message on the BCCH or PCCH, containing an undefined critical message extension, the UE shall:

- ignore the message.

10.1.1 Protocol extensions

RRC messages may be extended in future ~~releases~~versions of this protocol, either by adding values for choices, enumerated and size constrained types or by adding information elements. An important aspect concerns the behaviour of a UE, conforming to this revision of the standard, upon receiving a not comprehended future extension. The details of this error handling behaviour are provided in clause 9.

NOTE 1: By avoiding the need for partial decoding (skipping uncomprehended IEs to continue decoding the remainder of the message), the RRC protocol extension mechanism also avoids the overhead of length determinants for extensions.

Two kinds of protocol extensions are distinguished: non-critical and critical extensions. In general, a receiver shall process a message including not comprehended non-critical extensions as if the extensions were absent. However, a receiver shall entirely reject a message including not comprehended critical extensions (there is no partial rejection) and notify the sender, as specified in clause 9.

The general mechanism for adding critical extensions is by defining a new version of the message, which is indicated at the beginning of the message.

The UE shall always comprehend the complete transfer syntax specified for the protocol version it supports; if the UE comprehends the transfer syntax defined within protocol version A for message 1, it shall also comprehend the transfer syntax defined within protocol version A for message 2.

The following table shows for which messages only non-critical extensions may be added while for others both critical and non-critical extensions may be added.

NOTE 2: Critical extensions can only be added to ~~the~~ certain downlink messages~~, with the exception of the SYSTEM INFORMATION message~~.

Extensions	Message
Critical and non-critical extensions	ACTIVE SET UPDATE 10.2.1 ASSISTANCE DATA DELIVERY 10.2.4 CELL CHANGE ORDER FROM UTRAN 10.2.5 CELL UPDATE CONFIRM 10.2.8 COUNTER CHECK 10.2.9 DOWNLINK DIRECT TRANSFER 10.2.11 HANDOVER TO UTRAN COMMAND 10.2.12 HANDOVER FROM UTRAN COMMAND 10.2.15 MEASUREMENT CONTROL 10.2.17 PHYSICAL CHANNEL RECONFIGURATION 10.2.22 PHYSICAL SHARED CHANNEL ALLOCATION 10.2.25 RADIO BEARER RECONFIGURATION 10.2.27 RADIO BEARER RELEASE 10.2.30 RADIO BEARER SETUP 10.2.33 RRC CONNECTION REJECT 10.2.36 RRC CONNECTION RELEASE 10.2.37 RRC CONNECTION SETUP 10.2.40 SECURITY MODE COMMAND 10.2.43 SIGNALLING CONNECTION RELEASE 10.2.46 TRANSPORT CHANNEL RECONFIGURATION 10.2.50 TRANSPORT FORMAT COMBINATION CONTROL 10.2.53 UE CAPABILITY ENQUIRY 10.2.55 UE CAPABILITY INFORMATION CONFIRM 10.2.57 UPLINK PHYSICAL CHANNEL CONTROL 10.2.59 URA UPDATE CONFIRM 10.2.61 UTRAN MOBILITY INFORMATION 10.2.62
Non-critical extensions only	ACTIVE SET UPDATE COMPLETE 10.2.2 ACTIVE SET UPDATE FAILURE 10.2.3 CELL CHANGE ORDER FROM UTRAN FAILURE 10.2.6 CELL UPDATE 10.2.7 COUNTER CHECK RESPONSE 10.2.10 HANDOVER TO UTRAN COMPLETE 10.2.13 INITIAL DIRECT TRANSFER 10.2.14 HANDOVER FROM UTRAN FAILURE 10.2.16 MEASUREMENT CONTROL FAILURE 10.2.18 MEASUREMENT REPORT 10.2.19 PAGING TYPE 1 10.2.20 PAGING TYPE 2 10.2.21 PHYSICAL CHANNEL RECONFIGURATION COMPLETE 10.2.23 PHYSICAL CHANNEL RECONFIGURATION FAILURE 10.2.24 PUSCH CAPACITY REQUEST 10.2.26 RADIO BEARER RECONFIGURATION COMPLETE 10.2.28 RADIO BEARER RECONFIGURATION FAILURE 10.2.29 RADIO BEARER RELEASE COMPLETE 10.2.31 RADIO BEARER RELEASE FAILURE 10.2.32 RADIO BEARER SETUP COMPLETE 10.2.34 RADIO BEARER SETUP FAILURE 10.2.35 RRC CONNECTION RELEASE COMPLETE 10.2.38 RRC CONNECTION REQUEST 10.2.39 RRC CONNECTION SETUP COMPLETE 10.2.41 RRC STATUS 10.2.42 SECURITY MODE COMPLETE 10.2.44 SECURITY MODE FAILURE 10.2.45 SIGNALLING CONNECTION RELEASE REQUEST10.2.47 Master Information Block 10.2.48.8.1 System Information Block type 1 to System Information Block type 17 10.2.48.8.2 to 10.2.48.8.19 SYSTEM INFORMATION CHANGE INDICATION 10.2.49 TRANSPORT CHANNEL RECONFIGURATION COMPLETE 10.2.51 TRANSPORT CHANNEL RECONFIGURATION FAILURE 10.2.52 TRANSPORT FORMAT COMBINATION CONTROL FAILURE 10.2.54 UE CAPABILITY INFORMATION 10.2.56 UPLINK DIRECT TRANSFER 10.2.58 URA UPDATE 10.2.60 UTRAN MOBILITY INFORMATION CONFIRM 10.2.63 UTRAN MOBILITY INFORMATION FAILURE 10.2.64
No extensions	SYSTEM INFORMATION 10.2.48

Extensions	Message
	First Segment 10.2.48.1 Subsequent or last Segment 10.2.48.3 Complete SIB 10.2.48.5 SIB content 10.2.48.8.1

NOTE: For the SYSTEM INFORMATION message protocol extensions are only possible at the level of system information blocks. ~~If extension is needed at the level of SYSTEM INFORMATION, another message should be defined.~~

10.1.1.1 Non critical extensions

10.1.1.1.1 Extension of an information element with additional values or choices

In future ~~releases~~versions of this protocol, non critical values may be added to choices, enumerated and size constrained types.

For choices, enumerated and size constrained types it is possible to indicate how many non critical spare values need to be reserved for future extension. The number of spare values is specified within the ASN.1 type definitions; the tabular format only indicates that at least one spare value is needed. This kind of extension is allowed only for items with need set to OP or MD, and the receiver shall interpret the reception of a spare as absence of the IE and as reception of the default value respectively.

Information elements applicable to choices reserved for future releases of the protocol shall be added to the end of the message.

10.1.1.1.2 Extension of a message with additional information elements

In future ~~releases~~versions of this protocol, non critical information elements may be added to RRC messages. These additional information elements shall be appended at the end of the message; the transfer syntax specified in this revision of the standard facilitates this. A receiver conformant to this revision of the standard shall accept such extension, and proceed as if it was not included.

10.1.1.2 Critical extensions

10.1.1.2.1 Extension of an information element with additional values or choices

~~All~~ In future versions of this protocol, choices, enumerated and size constrained types ~~can~~ may be extended with critical values. For extension with critical values the general critical extension mechanism is used, i.e. for this no spare values are reserved since backward compatibility is not required.

10.1.1.2.2 Extension of a message with additional information elements

In future ~~releases~~ versions of this protocol, RRC messages may be extended with new information elements. Since messages including critical extensions are rejected by receivers not comprehending them, these messages may be modified completely, e.g. IEs may be inserted at any place and IEs may be removed or redefined.

10.2 Radio Resource Control messages

10.2.1 ACTIVE SET UPDATE

NOTE: Only for FDD.

This message is used by UTRAN to add, replace or delete radio links in the active set of the UE.

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	
Activation time	MD		Activation time 10.3.3.1	Default value is "now".
New U-RNTI	OP		U-RNTI 10.3.3.47	
CN information elements				
CN Information info	OP		CN Information info 10.3.1.3	
RB information elements				
Downlink counter synchronisation info	OP			
>RB with PDCP information list	OP	1 to <maxRBallRABs>		This IE is needed for each RB having PDCP in the case of lossless SRNS relocation
>>RB with PDCP information	MP		RB with PDCP information 10.3.4.22	
Phy CH information elements				
Uplink radio resources				
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing "maximum UL TX power.
Downlink radio resources				
Radio link addition information	OP	1 to <maxRL-1>		Radio link addition information required for each RL to add
>Radio link addition information	MP		Radio link addition information 10.3.6.68	
Radio link removal information	OP	1 to <maxRL>		Radio link removal information required for each RL to remove
>Radio link removal information	MP		Radio link removal information 10.3.6.69	
TX Diversity Mode	MD		TX Diversity Mode 10.3.6.86	Default value is the existing TX diversity mode.
SSDT information	OP		SSDT information 10.3.6.77	

10.2.5 CELL CHANGE ORDER FROM UTRAN

This message is used to order a cell change from ~~UMTS~~ UTRA to another ~~system~~ radio access technology e.g. GSM.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN→UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"
RB Information elements				
RAB information list	OP	1 to <maxRABsetup>		For each RAB to be handed over
>RAB info	MP		RAB info 10.3.4.8	
Other information elements				
Target cell description	MP			
>CHOICE *Radio Access Technology*	MP			At least one spare choice, Criticality: Reject, is needed.
>>GSM				
>>>BSIC	MP		BSIC 10.3.8.2	
>>>Band Indicator	MP		Enumerated (DCS 1800 band used, PCS 1900 band used)	Indicates how to interpret the BCCH ARFCN
>>>BCCH ARFCN	MP		Integer (0..1023)	[45]
>>>NC mode	OP		Bitstring(3)	[43]
>>IS-2000				

10.2.6 CELL CHANGE ORDER FROM UTRAN FAILURE

This message is sent on the RRC connection used before the Cell change order from UTRAN was executed. The message indicates that the UE has failed to seize the new channel in the other ~~system~~radio access technology.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE→UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Other information elements				
Inter-RAT change failure	MD		Inter-RAT change failure 10.3.8.5	

10.2.9 COUNTER CHECK

This message is used by the UTRAN to indicate the current COUNT-C MSB values associated to each radio bearer utilising UM or AM RLC mode and to request the UE to compare these to its COUNT-C MSB values and to report the comparison results to UTRAN.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN→UE

Information Element/Group name	Presence	Multi	IE type and reference	Semantics description
Message Type	MP			
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
RB information elements				
RB COUNT-C MSB information	MP	1 to < maxRBallRABs >		For each RB (excluding ~~SRBs~~signalling radio bearers) using UM or AM RLC.
>RB COUNT-C MSB information	MP		RB COUNT-C MSB information 10.3.4.14	

10.2.12 HANDOVER TO UTRAN COMMAND

This message is sent to the UE via other system to make a handover to UTRAN.

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

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

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
New U-RNTI	MP		U-RNTI Short 10.3.3.48	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"
Ciphering algorithm	OP		Ciphering algorithm 10.3.3.4	
CHOICE specification mode	MP			
>Complete specification				
~~**UE information elements**~~				
RB information elements				
>>Signalling RB information to setup list	MP	1 to <maxSRBsetup>		For each signalling radio bearer established
>>>Signalling RB information to setup	MP		Signalling RB information to setup 10.3.4.24	
>>RAB information to setup list	OP	1 to <maxRABsetup>		For each RAB established
>>>RAB information for setup	MP		RAB information for setup 10.3.4.10	
Uplink transport channels				
>>UL Transport channel information common for all transport channels	MP		UL Transport channel information common for all transport channels 10.3.5.24	
>>Added or Reconfigured TrCH information	MP	1 to <maxTrCH>		
>>>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2	
Downlink transport channels				
>>DL Transport channel information common for all transport channels	MP		DL Transport channel information common for all transport channels 10.3.5.6	
>>Added or Reconfigured TrCH information	MP	1 to <maxTrCH>		
>>>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1	
Uplink radio resources				
>>Uplink DPCH info	MP		Uplink DPCH info 10.3.6.88	
>>CHOICE *mode*	MP			
>>>FDD				

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>>>CPCH SET Info	OP		CPCH SET Info 10.3.6.13	
Downlink radio resources				
>>>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30	
>>>TDD				(no data)
>>Downlink information common for all radio links	MP		Downlink information common for all radio links 10.3.6.24	
>>Downlink information per radio link	MP	1 to <maxRL>		
>>>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27	
>Preconfiguration				
>>CHOICE Preconfiguration mode	MP			
>>>Predefined configuration	MP		Predefined configuration identity 10.3.4.5	
>>>Default configuration				
>>>>Default configuration mode	MP		Enumerated (FDD, TDD)	Indicates whether the FDD or TDD version of the default configuration shall be used
>>>>Default configuration identity	MP		Default configuration identity 10.3.4.0	
>>RAB info	OP		RAB info Post 10.3.4.9	One RAB is established
>>Uplink DPCH info	MP		Uplink DPCH info Post 10.3.6.89	
Downlink radio resources				
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Downlink information common for all radio links	MP		Downlink information common for all radio links Post 10.3.6.25	
>>>TDD				(no data)
>>Downlink information per radio link	MP	1 to <maxRL>		Send downlink information for each radio link to be set-up. In TDD MaxRL is 1.
>>>Downlink information for each radio link	MP		Downlink information for each radio link Post 10.3.6.28	
Frequency info	MP		Frequency info 10.3.6.36	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Maximum allowed UL TX power	MP		Maximum allowed UL TX power 10.3.6.39	
CHOICE mode	MP			
>FDD				(no data)
>TDD				
>>Primary CCPCH Tx Power	MP		Primary CCPCH Tx Power 10.3.6.59	

10.2.17 MEASUREMENT CONTROL

This message is sent by UTRAN to setup, modify or release a measurement in the UE.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN→UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Measurement Information elements				
Measurement Identity	MP		Measurement Identity 10.3.7.48 [Note to Hans: A space has been added]	
Measurement Command	MP		Measurement Command 10.3.7.46	
Measurement Reporting Mode	OP		Measurement Reporting Mode 10.3.7.49	
Additional measurements list	OP		Additional measurements list 10.3.7.1	
CHOICE Measurement type	CV *command*			
>Intra-frequency measurement			Intra-frequency measurement 10.3.7.36	
>Inter-frequency measurement			Inter-frequency measurement 10.3.7.16	
>Inter-RAT measurement			Inter-RAT measurement 10.3.7.27	
>UE positioning measurement			UE positioning measurement 10.3.7.100	
>Traffic Volume measurement			Traffic Volume measurement 10.3.7.68	
>Quality measurement			Quality measurement 10.3.7.56	
>UE internal measurement			UE internal measurement 10.3.7.77	
Physical channel information elements				
DPCH compressed mode status info	OP		DPCH compressed mode status info 10.3.6.34	

Condition	Explanation
Command	The IE is mandatory if the "Measurement command" IE is set to "Setup", optional if the "Measurement command" IE is set to "modify", otherwise the IE is not needed.

10.2.26 PUSCH CAPACITY REQUEST

NOTE: Only for TDD.

This message is used by the UE for request of PUSCH resources to the UTRAN.

RLC-SAP: TM

Logical channel: SHCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
C-RNTI	OP		C-RNTI 10.3.3.8	
RRC transaction identifier	CV-*ProtErr*		RRC transaction identifier 10.3.3.36	
Traffic Volume	OP		Traffic Volume, measured results list 10.3.7.67	
Timeslot list	OP	1 to maxTS		
>Timeslot number	MP		Timeslot number 10.3.6.84	
>Timeslot ISCP	MP		Timeslot ISCP info 10.3.7.65	
Primary CCPCH RSCP	OP		Primary CCPCH RSCP info 10.3.7.54	
CHOICE Allocation confirmation	OP			
>PDSCH Confirmation	~~MP~~		Integer(1..HiPDSCHIdentities)	
>PUSCH Confirmation	~~MP~~		Integer(1..HiPUSCHIdentities)	
Protocol error indicator	MD		Protocol error indicator 10.3.3.27	Default value is FALSE
Protocol error information	CV-*ProtErr*		Protocol error information 10.3.8.12	

Condition	Explanation
ProtErr	If the IE "Protocol error indicator" has the value "TRUE"

10.2.38 RRC CONNECTION RELEASE COMPLETE

This message is sent by UE to confirm that the RRC connection has been released.

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Error indication	OP		Failure cause and error information 10.3.3.14	

10.2.43 SECURITY MODE COMMAND

This message is sent by UTRAN to start or reconfigure ciphering and/or integrity protection parameters.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN to UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
Security capability	MP		Security capability 10.3.3.37	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	Only present if ciphering shall be controlled
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	Only present if integrity protection shall be controlled
CN Information elements				
CN domain identity	MP		CN domain identity 10.3.1.1	Indicates which cipher and integrity protection keys are applicable
Other information elements				
UE system specific security capability	CH	1 to <maxSystemCapability>		This IE is included if the IE "Inter-RAT UE radio access capability" was included in RRC CONNECTION SETUP COMPLETE message
>Inter-RAT UE security capability	MP		Inter-RAT UE security capability 10.3.8.8a	

10.2.48 SYSTEM INFORMATION

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message type	OP		Message type	The message type is mandatory on the FACH, and absent on the BCH
SFNprime	CV channel		Integer(0..4094 by step of 2)	SFN=SFNprime (for first 10ms frame of 20ms TTI), SFN=SFNprime+1 (for last 10ms frame of 20ms TTI)
CHOICE Segment combination	MP			
>Combination 1				(no data)
>Combination 2				
>>First Segment	MP		First Segment, 10.2.48.1	
>Combination 3				
>>Subsequent Segment	MP		Subsequent Segment, 10.2.48.3	
>Combination 4				
>>Last segment	MP		Last segment (short),10.2.48.5	
>Combination 5				
>>Last segment	MP		Last Segment (short)10.2.48.5	
>>First Segment	MP		First Segment (short), 10.2.48.2	
>Combination 6				
>>Last Segment	MP		Last Segment (short), 10.2.48.5	
>>Complete list	MP	1 to maxSIBperMsg		Note 1
>>>Complete	MP		Complete SIB (short),10.2.48.7	
>Combination 7				
>>Last Segment	MP		Last Segment (short), 10.2.48.5	
>>Complete list	MP	1..16		Note 1
>>>Complete	MP		Complete SIB (short),10.2.48.7	
>>First Segment	MP		First Segment (short), 10.2.48.2	
>Combination 8				
>>Complete list	MP	1 to maxSIBperMsg		Note 1
>>>Complete	MP		Complete	

			SIB (short),10.2.48.7	
>Combination 9				
>>Complete list	MP	1..MaxSIB perMsg		Note 1
>>>Complete	MP		Complete SIB (short),10.2.48.7	
>>First Segment	MP		First Segment (short), 10.2.48.2	
>Combination 10				
>>>Complete SIB of size 215 to 226	MP		Complete SIB,10.2.48.6	
>Combination 11				
>>Last segment of size 215 to 222	MP		Last segment,10.2.48.4	

If the encoded message does not fill a transport block, the RRC layer shall insert padding according to subclause 12.1. Padding is needed e.g. if the remaining space is insufficient to start a new First Segment (which requires several bits for SIB type, SEG_COUNT and SIB data).

NOTE 1: If Combination 6 - 9 contains a Master information block Master information shall be located as the first IE in the list.

10.3.2.3 Cell selection and re-selection info for SIB3/4

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Mapping Info	MD		Mapping info 10.3.2.5	Contains mapping function for quality measurements. Default is an implicit mapping: $Q_{map} = Q_{meas,LEV}$, [4].
Cell_selection_and_reselection_quality_measure	MP		Enumerated (CPICH Ec/N0, CPICH RSCP)	Choice of measurement (CPICH Ec/N0 or CPICH RSCP) to use as quality measure Q for FDD cells.
CHOICE *mode*	MP			
>FDD				
>>$S_{intrasearch}$	OP		Integer (-32..20 by step of 2)	[4] [dB]
>>$S_{intersearch}$	OP		Integer (-32..20 by step of 2)	[4] [dB]
>>$S_{searchHCS}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
>>RAT List	OP	1 to <maxOtherRAT>		
>>>RAT identifier	MP		Enumerated (GSM, cdma2000)	
>>>$S_{search,RAT}$	MP		Integer (-105..91 by step of 2)	[4] [dB]
>>>$S_{HCS,RAT}$	OP		Integer (-32..20 by step of 2)	[4] [dB]
>>$S_{limit,ShearchRAT}$	OP		Integer (-32..20 by step of 2)	[4] [dB]
>TDD				
>>$S_{intrasearch}$	OP		Integer (-105..91 by step of 2)	[4] [dB]

>>$S_{intersearch}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
>>$S_{searchHCS}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
>>RAT List	OP	1 to <maxOtherRAT>		
>>>RAT identifier	MP		Enumerated (GSM, cdma2000)	
>>>$S_{search,RAT}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
>>>$S_{HCS,RAT}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
>>>$S_{limit,ShearchRAT}$	OP		Integer (-105..91 by step of 2)	[4] [dB]
$Qhyst1_S$	MP		Integer (0..40 by step of 2)	[4]
$Qhyst2_S$	CV-*FDD-Quality-Measure*		Integer (0..40 by step of 2)	Default value is $Qhist1_S$ [4]
$Treselection_S$	MP		Integer (0..31)	[s]
HCS Serving cell Information	OP		HCS Serving cell information 10.3.7.12	
Maximum allowed UL TX power	MP		Maximum allowed UL TX power 10.3.6.39	[dBm] UE_TXPWR_MAX_RACH in [4].
CHOICE *mode*	MP			
>FDD				
>>Qqualmin	MP		Integer (-2420..0)	Ec/N0, [dB]
>>Qrxlevmin	MP		Integer (-115..-25 by step of 2)	RSCP, [dBm]
>TDD				
>>Qrxlevmin	MP		Integer (-115..-25 by step of 2)	RSCP, [dBm]

Condition	Explanation
CV-FDD-Quality-Measure	Presence is not allowed if the IE "Cell_selection_and_reselection_quality_measure" has the value CPICH RSCP, otherwise the IE is mandatory and has a default value.

10.3.2.4 Cell selection and re-selection info for SIB11/12

Information Element/Group name	Need	Multi	Type and reference	Semantics description
$Qoffset1_{s,n}$	MD		Real(-50.0..50.0 by step of 1)	Default value is 0.
$Qoffset2_{s,n}$	CV-*FDD-Quality-Measure*		Real(-50.0..50.0 by step of 1)	Default value is 0.
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	[dBm] UE_TXPWR_MAX_RACH in [4]. Default is the Maximum allowed UL TX power for the serving cell
HCS neighbouring cell information	OP		HCS Neighbouring cell information 10.3.7.11	
CHOICE *mode*	MP			
>FDD				
>>Qqualmin	MD		Integer (-2420..0)	Ec/N0, [dB] Default value is Qqualmin for the serving cell
>>Qrxlevmin	MD		Integer (-115..-25 by step of 2)	RSCP, [dBm] Default value is Qrxlevmin for the serving cell
>TDD				
>>Qrxlevmin	MD		Integer (-115..-25 by step of 2)	RSCP, [dBm] Default value is Qrxlevmin for the serving cell
>GSM				
>>Qrxlevmin	MD		Integer (-115..-25 by step of 2)	RSCP, [dBm] Default value is Qrxlevmin for the serving cell

Condition	Explanation
FDD-Quality-Measure	Presence is not allowed if the IE "Cell_selection_and_reselection_quality_measure" has the value CPICH RSCP, otherwise the IE is mandatory and has a default value.

10.3.3.1 Activation time

Activation Time defines the frame number/time at which the operation/changes caused by the related message shall take effect. Values between 0 and 255 indicate the absolute value of CFN (Connection Frame Number) of that frame number/time.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Activation time	MP		Integer(0..255~~, Now~~)	CFN [10]

10.3.3.21 Measurement capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Need for downlink compressed mode					
FDD measurements	MP		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on FDD	
3.84Mcps TDD measurements	CV *3.84Mcps_tdd_sup*		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on 3.84Mcps TDD	Name changed in REL-4
1.28Mcps TDD measurements	CV *1.28Mcps_tdd_sup*		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on 1.28Mcps TDD	REL-4
GSM 900	CV *Gsm900_sup*M		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on GSM 900	
DCS 1800	CV *Gsm1800_sup*		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on DCS 1800	
GSM 1900	CV *Gsm1900_sup*		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on GSM 1900	
Multi-carrier measurement	CV *mc_sup*		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on multi-carrier	
Need for uplink compressed mode					
FDD measurements	MP		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on FDD	
3.84Mcps TDD measurements	CV *3.84Mcps_tdd_sup*		Boolean	TRUE means that the UE requires UL compressed	Name changed in REL-4

				mode in order to perform measurements on 3.84Mcps TDD	
1.28Mcps TDD measurements	CV *1.28Mcps_tdd_sup*		Boolean	TRUE means that the UE requires DL compressed mode in order to perform measurements on 1.28Mcps TDD	REL-4
GSM 900	CV *Gsm900_sup*		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on GSM 900	
DCS 1800	CV *Gsm1800_sup*		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on DCS 1800	
GSM 1900	CV *Gsm1900_sup*		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on GSM 1900	
Multi-carrier measurement	CV *mc_sup*		Boolean	TRUE means that the UE requires UL compressed mode in order to perform measurements on multi-carrier	

Condition	Explanation
3.84Mcps_tdd_sup	Presence is mandatory if an IE "TDD RF capability" is present with the IE "Chip rate capability" set to "3.84Mcps". Otherwise this field is not needed in the message.
1.28Mcps_tdd_sup	Presence is mandatory if an IE "TDD RF capability" is present with the IE "Chip rate capability" set to "1.28Mcps". Otherwise this field is not needed in the message.
Gsm900_sup	Presence is needed if the IE "Inter-RAT UE radio access capability" indicates support for GSM900. Absence is needed if the IE "Inter-RAT UE radio access capability" indicates no support for GSM900.~~Presence is mandatory if IE Support of GSM900 has the value TRUE. Otherwise this field is not needed in the message.~~
Gsm1800_sup	Presence is needed if the IE "Inter-RAT UE radio access capability" indicates support for GSM1800. Absence is needed if the IE "Inter-RAT UE radio access capability" indicates no support for GSM1800.~~Presence is mandatory if IE Support of GSM1800 has the value TRUE. Otherwise this field is not needed in the message.~~
Gsm1900_sup	Presence is needed if the IE "Inter-RAT UE radio access capability" indicates support for GSM1900. Absence is needed if the IE "Inter-RAT UE radio access capability" indicates no support for GSM1900.~~Presence is mandatory if IE Support of GSM1900 has the value TRUE. Otherwise this field is not needed in the message.~~
mc_sup	Presence is mandatory if IE Support of multi-carrier has the value TRUE. Otherwise this field is not needed in the message.

10.3.3.25 Physical channel capability

Information Element/Group name	Need	Multi	Type and Reference	Semantics description	Version
Downlink physical channel capability information elements					
FDD downlink physical channel capability	CH-*fdd_req_sup*				
>Max no DPCH/PDSCH codes	MP		Integer (1..8)	Maximum number of DPCH/PDSCH codes to be simultaneously received	
>Max no physical channel bits received	MP		Integer (600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 48000, 57600, 67200, 76800)	Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH)	
>Support for SF 512	MP		Boolean	TRUE means supported	
>Support of PDSCH	MP		Boolean	TRUE means supported	
>Simultaneous reception of SCCPCH and DPCH	MP		Boolean	TRUE means supported	
>Simultaneous reception of SCCPCH, DPCH and PDSCH	CV-*if_sim_rec_pdsch_sup*		Boolean	TRUE means supported	
>Max no of S-CCPCH RL	CV-*if_sim_rec*		Integer(1)	Maximum number of simultaneous S-CCPCH radio links	
3.84Mcps TDD downlink physical channel capability	CH-*3.84Mcps_tdd_req_sup*				Name changed in REL-4
>Maximum number of timeslots per frame	MP		Integer (1..14)		
>Maximum number of physical channels per frame	MP		Integer (1..224)		
>Minimum SF	MP		Integer (1, 16)		
>Support of PDSCH	MP		Boolean	TRUE means supported	
>Maximum number of physical channels per timeslot	MP		Integer (1..16)		
1.28Mcps TDD downlink physical channel capability	CH-*1.28Mcps_tdd_req_sup*				REL-4
>Maximum number of timeslots per subframe	MP		Integer (1..6)		REL-4
>Maximum number of physical channels per subframe	MP		Integer (1..96)		REL-4
>Minimum SF	MP		Integer (1, 16)		REL-4
>Support of PDSCH	MP		Boolean	TRUE means supported	REL-4
>Maximum number of physical	MP		Integer		REL-4

channels per timeslot			(1..16)		
>Support of 8PSK	MP		Boolean	TRUE means supported	REL-4
Uplink physical channel capability information elements					
>FDD uplink physical channel capability	CH-*fdd_req_sup*				
>Maximum number of DPDCH bits transmitted per 10 ms	MP		Integer (600, 1200, 2400, 4800. 9600, 19200. 28800, 38400, 48000, 57600)		
>Support of PCPCH	MP		Boolean	TRUE means supported	
3.84Mcps TDD uplink physical channel capability	CH-*3.84Mcps_tdd_req_sup*				Name changed in REL-4
>Maximum Number of timeslots per frame	MP		Integer (1..14)		
>Maximum number of physical channels per timeslot	MP		Integer (1, 2)		
>Minimum SF	MP		Integer (1, 2, 4, 8, 16)		
>Support of PUSCH	MP		Boolean	TRUE means supported	
1.28Mcps TDD uplink physical channel capability	CH-*1.28Mcps_tdd_req_sup*				REL-4
>Maximum Number of timeslots per subframe	MP		Integer (1..6)		REL-4
>Maximum number of physical channels per timeslot	MP		Integer (1, 2)		REL-4
>Minimum SF	MP		Integer (1, 2, 4, 8, 16)		REL-4
>Support of PUSCH	MP		Boolean	TRUE means supported	REL-4
>Support of 8PSK	MP		Boolean	TRUE means supported	REL-4

Condition	Explanation
if_sim_rec_pdsch_sup	Presence is mandatory if IE Simultaneous reception of SCCPCH and DPCH = True and IE Support of PDSCH = True. Otherwise this field is not needed in the message.
if_sim_rec	Presence is mandatory if IE capability Simultaneous reception of SCCPCH and DPCH = True. Otherwise this field is not needed in the message.
3.84Mcps_tdd_req_sup	Presence is mandatory if an IE "TDD RF capability" is present with the IE "Chip rate capability" set to "3.84Mcps" and a 3.84Mcps TDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.
1.28Mcps_tdd_req_sup	Presence is mandatory if an IE "TDD RF capability" is present with the IE "Chip rate capability" set to "1.28Mcps" and a 1.28Mcps TDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.
fdd_req_sup	Presence is mandatory if IE Multi-mode capability has the value "FDD" or "FDD/TDD" and a FDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.

10.3.4.23 RLC info

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *Uplink RLC mode*	OP			Indicates if Acknowledged, Unacknowledged or Transparent mode RLC shall be used.
>AM RLC				
>>Transmission RLC discard	MP		Transmission RLC discard 10.3.4.25	
>>Transmission window size	MP		Integer(1,8,16,32,64,128,256,512,768,1024,1536,2047,2560,3072,3584,4095)	Maximum number of RLC PUs sent without getting them acknowledged. This parameter is needed if acknowledged mode is used. UE shall also assume that the UTRAN receiver window is equal to this value.
>>Timer_RST	MP		Integer(50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 700, 800, 900, 1000)	Elapsed time in milliseconds. It is used to trigger the retransmission of RESET PDU.~~It is used to detect the loss of RESET ACK PDU~~
>>Max_RST	MP		Integer(1, 4, 6, 8, 12 16, 24, 32)	The maximum number of retransmission of RESET PDU
>>Polling info	OP		Polling info 10.3.4.4	
>UM RLC				
>>Transmission RLC discard	OP		Transmission RLC discard 10.3.4.25	
>TM RLC				
>>Transmission RLC discard	OP		Transmission RLC discard 10.3.4.25	
>>Segmentation indication	MP		Boolean	TRUE indicates that segmentation is performed.
CHOICE *Downlink RLC mode*	OP			Indicates if Acknowledged, Unacknowledged or Transparent mode RLC shall be used
>AM RLC				
>>In-sequence delivery	MP		Boolean	TRUE indicates that RLC shall preserve the order of higher layer PDUs when these are delivered. FALSE indicates that receiving RLC entity could allow SDUs to be delivered to the higher layer in different order than submitted to RLC sublayer at the transmitting side.
>>Receiving window size	MP		Integer(1,8,16,32,64,128,256,512,768,1024,1536,2047,2560,3072,3584,4095)	Maximum number of RLC PUs allowed to be received. This parameter is needed if acknowledged mode is used. UE shall also assume that the UTRAN transmitter window is equal to this value
>>Downlink RLC status Info	MP		Downlink RLC status info 10.3.4.1	
>UM RLC				(No data)

>TM RLC				
>>Segmentation indication	MP		Boolean	TRUE indicates that segmentation is performed.

NOTE This information element is included within IE "Predefined RB configuration"

10.3.5.8 Power Offset Information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *Gain Factors*	MP			
>Signalled Gain Factors				
>>CHOICE mode				
>>>FDD				
>>>>Gain Factor β_c	MP		Integer (0.. 15)	For UL DPCCH or control part of PRACH or PCPCH
>>>TDD				(no data)
>>Gain Factor β_d	MP		Integer (0..15)	For UL DPDCH or data part of PRACH or PCPCH in FDD and all uplink channels in TDD
>>Reference TFC ID	OP		Integer (0..3)	If this TFC is a reference TFC, indicates the reference ID.
>Computed Gain Factors				
>>Reference TFC ID	MP		Integer (0.. 3)	Indicates the reference TFC Id of the TFC to be used to calculate the gain factors for this TFC. In case of using computed gain factors, at least one signalled gain factor is necessary for reference.
CHOICE mode	MP			
>FDD				
>>Power offset P p-m	OP		Integer(-5..10)	In dB. Power offset between the last transmitted preamble and the control part of the message (added to the preamble power to receive the power of the message control part) Needed only for PRACH
>TDD				(no data)

CHOICE *Gain Factors*	**Condition under which the way to signal the *Gain Factors* is chosen**
Signalled Gain Factors	The values for gain factors β_c (only in FDD mode) and β_d are signalled directly for a TFC.
Computed Gain Factors	The gain factors β_c (only in FDD mode) and β_d are computed for a TFC, based on the signalled settings for the associated reference TFC.

10.3.6.6 ASC setting

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE mode	MP				
>FDD					
>>Available signature Start Index	MP		Integer(0..15)		
>>Available signature End Index	MP		Integer(0..15)		
>>Assigned Sub-Channel Number	MP		Bitstring(4)		
>TDD					
>>CHOICE TDD option	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>>>Available Channelisation codes indices	MD		Bitstring(8)	Default is all defined in PRACH Info.	
>>>1.28 Mcps TDD					REL-4
>>>>Available SYNC_UL codes indices	MD		Bitstring(8)	Default is all defined in SYNC_UL Info.	REL-4
>>CHOICE subchannel size	MP				
>>>Size1					
>>>>Available Subchannels	MP		null	Indicates all Subchannels	
>>>Size2					
>>>>Available Subchannels	MD		Bitstring (2)	Each bit indicates if the subchannel is available for the given ASC. 01: subchannel 0 10: subchannel 1 11: all subchannels Default is all subchannels.	
>>>Size4					
>>>>Available Subchannels	MD		Bitstring (4)	Each bit indicates if the subchannel is available for the given ASC. 0001: subchannel 0 0011: subchannels 0 & 1 ... 1111: all subchannels. Default is all subchannels.	
>>>Size8					
>>>>Available Subchannels	MD		Bitstring (8)	Each bit indicates if the subchannel is available for the given ASC. 00000001: subchannel 0 00000011: subchannels 0 & 1 ... 11111111: all subchannels Default is all	

				subchannels.	

10.3.6.18 Downlink DPCH info common for all RL

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Timing Indication	MP		Enumerated(Initialise, Maintain)	
CFN-targetSFN frame offset	CV TimInd		Integer(0..255)	In frame
CHOICE mode	MP			
>FDD				
>>Downlink DPCH power control information	OP		Downlink DPCH power control information 10.3.6.23	
>>Power offset $P_{Pilot-DPDCH}$	MP		Integer(0..24)	Power offset equals P_{Pilot} - P_{DPDCH}, range 0..6 dB, in steps of 0.25 dB
>>Downlink rate matching restriction information	OP		Downlink rate matching restriction information 10.3.6.31	If this IE is set to "absent", no Transport CH is restricted in TFI.
>>Spreading factor	MP		Integer(4, 8, 16, 32, 64, 128, 256, 512)	
>>Fixed or Flexible Position	MP		Enumerated (Fixed, Flexible)	
>>TFCI existence	MP		Boolean	TRUE indicates that TFCI exists
>>CHOICE *SF*	MP			
>>>SF = 256				
>>>>Number of bits for Pilot bits	MP		Integer (2,4,8)	In bits
>>>SF = 128				
>>>>Number of bits for Pilot bits	MP		Integer(4,8)	In bits
>>>Otherwise				(no data)
>TDD				
>>Downlink DPCH power control information	OP		Downlink DPCH power control information 10.3.6.23	
>>Common timeslot info	MD		Common Timeslot Info 10.3.6.10	Default is the current Common timeslot info

CHOICE *SF*	Condition under which the given *SF* is chosen
SF=128	"Spreading factor" is set to 128
SF=256	"Spreading factor" is set to 256
Otherwise	"Spreading factor" is set to a value distinct from 128 and 256

Condition	Explanation
TimInd	This IE is OPTIONAL if the IE "Timing Indication" is set to "Initialise". Otherwise it is absent.

10.3.6.24 Downlink information common for all radio links

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Downlink DPCH info common for all RL	OP		Downlink DPCH info common for all RL 10.3.6.18		
CHOICE *mode*	MP				
>FDD					
>>DPCH compressed mode info	MD		DPCH compressed mode info 10.3.6.33	Default value is the existing value of DPCH compressed mode information	
>>TX Diversity Mode	MD		TX Diversity Mode 10.3.6.86	Default value is the existing value of TX Diversity mode	
>>SSDT information	OP		SSDT information 10.3.6.77		
>TDD				(no data)	
>>CHOICE TDD option	MP				REL-4
>>>3.84 Mcps TDD				(no data)	REL-4
>>>1.28 Mcps TDD					REL-4
>>>>TSTD indicator	MP		TSTD indicator 10.3.6.85a		REL-4
Default DPCH Offset Value	OP		Default DPCH Offset Value, 10.3.6.16		

10.3.6.28 Downlink information for each radio link Post

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Choice mode	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>Primary CCPCH info	MP		Primary CCPCH info post 10.3.6.58	
Downlink DPCH info for each RL	MP		Downlink DPCH info for each RL Post 10.3.6.22~~19~~	

10.3.6.33 DPCH compressed mode info

NOTE: Only for FDD.

This information element indicates the parameters of the compressed mode to be used by the UE in order to perform inter-frequency and inter-RAT measurements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Transmission gap pattern sequence	MP	1 to <maxTGPS>		
>TGPSI	MP		TGPSI 10.3.6.82	
>TGPS Status Flag	MP		Enumerated(active, inactive)	This flag indicates the current status of the Transmission Gap Pattern Sequence, whether it shall be activated or deactivated.
>TGCFN	CV Active		Integer (0..255)	Connection Frame Number of the first frame of the first pattern within the Transmission Gap Pattern Sequence.
>Transmission gap pattern sequence configuration parameters	OP			
>>TGMP	MP		Enumerated(TDD measurement, FDD measurement, GSM carrier RSSI measurement, GSM Initial BSIC identification, GSM BSIC re-confirmation)	Transmission Gap pattern sequence Measurement Purpose.
>>TGPRC	MP		Integer (1..511, Infinity)	The number of transmission gap patterns within the Transmission Gap Pattern Sequence.
>>TGSN	MP		Integer (0..14)	Transmission Gap Starting Slot Number The slot number of the first transmission gap slot within the TGCFN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>TGL1	MP		Integer(1..14)	The length of the first Transmission Gap within the transmission gap pattern expressed in number of slots
>>TGL2	MD		Integer (1..14)	The length of the second Transmission Gap within the transmission gap pattern. If omitted, then TGL2=TGL1.
>>TGD	MP		Integer(15..269, undefined)	Transmission gap distance indicates the number of slots between starting slots of two consecutive transmission gaps within a transmission gap pattern. If there is only one transmission gap in the transmission gap pattern, this parameter shall be set to zero.
>>TGPL1	MP		Integer (1..144)	The duration of transmission gap pattern 1.
>>TGPL2	MD		Integer (1..144)	The duration of transmission gap pattern 2. If omitted, then TGPL2=TGPL1.
>>RPP	MP		Enumerated (mode 0, mode 1).	Recovery Period Power control mode during the frame after the transmission gap within the compressed frame. Indicates whether normal PC mode or compressed PC mode is applied
>>ITP	MP		Enumerated (mode 0, mode 1).	Initial Transmit Power is the uplink power control method to be used to compute the initial transmit power after the compressed mode gap.
>>UL/DL mode	MP		Enumerated (UL only, DL only, UL/DL)	Defines whether only DL, only UL, or combined UL/DL compressed mode is used.
>>Downlink compressed mode method	CV DL		Enumerated (puncturing, SF/2, higher layer scheduling)	Method for generating downlink compressed mode gap
>>Uplink compressed mode method	CV UL		Enumerated (SF/2, higher layer scheduling)	Method for generating uplink compressed mode gap
>>Downlink frame type	MP		Enumerated (A, B)	
>>DeltaSIR1	MP		Real(0..3 by step of 0.1)	Delta in DL SIR target value to be set in the UE during the frame containing the start of the first transmission gap in the transmission gap pattern (without including the effect of the bit-rate increase)
>>DeltaSIRafter1	MP		Real(0..3 by step of 0.1)	Delta in DL SIR target value to be set in the UE one frame after the frame containing the start of the first transmission gap in the transmission gap pattern.
>>DeltaSIR2	OP		Real(0..3 by step of 0.1)	Delta in DL SIR target value to be set in the UE during the frame containing the start of the second transmission gap

Information Element/Group name	Need	Multi	Type and reference	Semantics description
				in the transmission gap pattern (without including the effect of the bit-rate increase) When omitted, DeltaSIR2 = DeltaSIR1.
>>DeltaSIRafter2	OP		Real(0..3 by step of 0.1)	Delta in DL SIR target value to be set in the UE one frame after the frame containing the start of the second transmission gap in the transmission gap pattern. When omitted, DeltaSIRafter2 = DeltaSIRafter1.
>>N Identify abort	CV Initial BSIC		Integer(1..128)	Indicates the maximum number of repeats of patterns that the UE shall use to attempt to decode the unknown BSIC of the GSM cell in the initial BSIC identification procedure
>>T Reconfirm abort	CV Re-confirm BSIC		Integer(1..20)	Indicates the maximum time allowed for the re-confirmation of the BSIC of one GSM cell in the BSIC re-confirmation procedure. The time is given in steps of 0.5 seconds.

Condition	Explanation
UL	This information element is only sent when the value of the "UL/DL mode" IE is "UL only" or "UL/DL".
DL	This information element is only sent when the value of the "UL/DL mode" IE is "DL only" or "UL/DL".
Active	This information element is only sent when the value of the "TGPS Status Flag" IE is "Active".
Initial BSIC	This information element is only sent when the value of the IE "TGMP" is set to "GSM Initial BSIC identification".
Re-confirm BSIC	This information element is only sent when the value of the IE "TGMP" is set to "GSM BSIC re-confirmation".

10.3.6.34 DPCH Compressed Mode Status Info

This information element indicates status information of the compressed mode used by the UE in order to perform inter-frequency and inter-RAT measurements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
TGPS reconfiguration CFN	MP		Integer (0..255)	Connection Frame Number of the frame where already active Transmission Gap Pattern Sequences shall be deactivated
Transmission gap pattern sequence	MP	1 to <maxTGPS>		
>TGPSI	MP		TGPSI 10.3.6.82	Transmission Gap Pattern Sequence Identifier
>TGPS Status Flag	MP		Enumerated(active, inactive)	This flag indicates the current status of the Transmission Gap Pattern Sequence, whether it shall be active or

Information Element/Group name	Need	Multi	Type and reference	Semantics description
				inactive.
>TGCFN	CV Active		Integer (0..255)	Connection Frame Number of the first frame of the first pattern within the Transmission Gap Pattern Sequence.

Condition	Explanation
Active	This information element is only sent when the value of the "TGPS Status Flag" IE is "Active".

10.3.6.48 Persistence scaling factors

This IE defines scaling factors associated with ASC 2 – ASC 7 to be applied to the dynamic persistence value.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Access Service Class	MP	1 to maxASCpersist		multiplicity corresponds to the number of PRACH partitions minus 2
>Persistence scaling factor	MP		Real(0.9..0.2, by step of 0.1)	Scaling factors in the range 0,…,1

10.3.6.56 Predefined PhyCH configuration

This information element concerns a pre- defined configuration of physical channel parameters.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Uplink radio resources				
Uplink DPCH info	MP		Uplink DPCH info Pre 10.3.6.90	
Downlink radio resources				
Downlink information common for all radio links	MP		Downlink information common for all radio links Pre 10.3.6.26	

10.3.7.3 Cell measured results

Includes non frequency related measured results for a cell.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Cell Identity	OP		Cell Identity 10.3.2.2	
SFN-SFN observed time difference	OP		SFN-SFN observed time difference 10.3.7.63	
Cell synchronisation information	OP		Cell synchronisation information 10.3.7.6	
CHOICE *mode*	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>>CPICH Ec/N0	OP		Integer(0..50)	According to CPICH_Ec/No in [19] and [20]
>>CPICH RSCP	OP		Integer(0..91)	According to CPICH_RSCP in [19] and [20]
>>Pathloss	OP		Integer(46..158)	In dB
>TDD				
>>Cell parameters Id	MP		Cell parameters Id 10.3.6.9	
>>Proposed TGSN	OP		Integer (0..14)	Proposal for the next TGSN
>>Primary CCPCH RSCP	OP		Primary CCPCH RSCP info 10.3.7.54	
>>Pathloss	OP		Integer(46..158)	In dB
>>Timeslot list	OP	1 to < maxTS>		
>>>Timeslot ISCP	MP		Timeslot ISCP Info 10.3.7.65	The UE shall report the Timeslot ISCP in the same order as indicated in the cell info

10.3.7.11 HCS neighbouring cell information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
HCS_PRIO	MD		Integer (0..7)	Default value = 0
Q_{HCS}	MD		Integer (-0..99)	Default value = 0
HCS Cell Re-selection Information	OP		HCS Cell Re-selection Information 10.3.7.10	

10.3.7.19 Inter-frequency measurement reporting criteria

The triggering of the event-triggered reporting for an inter-frequency measurements. All events concerning inter-frequency measurements are labelled 2x where x is a,b,c..

Event 2a: Change of best frequency.

Event 2b: The estimated quality of the currently used frequency is below a certain threshold **and** the estimated quality of a non-used frequency is above a certain threshold.

Event 2c: The estimated quality of a non-used frequency is above a certain threshold.

Event 2d: The estimated quality of the currently used frequency is below a certain threshold.

Event 2e: The estimated quality of a non-used frequency is below a certain threshold.

Event 2f: The estimated quality of the currently used frequency is above a certain threshold.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Parameters required for each event	OP	1 to <maxMeasEvent>		
>Inter-frequency event identity	MP		Inter-frequency event identity 10.3.7.14	
>Threshold used frequency	CV – clause 0		Integer(-115..0)	Ranges used depend on measurement quantity. CPICH Ec/No -24..0dB CPICH/Primary CCPCH RSCP -115..-25dBm
>W used frequency	CV – clause 0		Real(0, 0.1..2.0 by step of 0.1)	
>Hysteresis	MP		Real(0, 0.5..14.5 by step of 0.5)	In event 2a, 2b, 2c, 2d, 2e, 2f
>Time to trigger	MP		Time to trigger 10.3.7.64	Indicates the period of time between the timing of event detection and the timing of sending Measurement Report. Time in ms.
>Reporting cell status	OP		Reporting cell status 10.3.7.61	
>Parameters required for each non-used frequency	OP	1 to <maxFreq>		
>>Threshold non used frequency	CV – clause 1		Integer(-115..0)	Ranges used depend on measurement quantity. CPICH Ec/No -24..0dB CPICH/Primary CCPCH RSCP -115..-25dBm
>>W non-used frequency	CV-*clause 1*		Real(0, 0.1..2.0 by step of 0.1)	

Condition	Explanation
Clause 0	2a,2b, 2d, or 2f, otherwise the IE is not needed
Clause 1	The IE is mandatory in if "inter frequency event identity" is set to 2a, 2b, 2c or 2e, otherwise the IE is not needed

10.3.7.26 Inter-RAT measured results list

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Inter-RAT measurement results	OP	1 to <maxOtherRAT>		
>CHOICE system	MP			At least one spare value needed
>>GSM				
>>>Measured GSM cells	MP	1 to <maxReportedGSMCells>		
>>>>GSM carrier RSSI	OP		bit string(6)	RXLEV, [46]
>>>>Pathloss	OP		Integer(46..158)	In dB
>>>>CHOICE BSIC	MP			
>>>>>Verified BSIC				
>>>>>>inter-RAT cell id	MP		Integer(0..<maxCellMeas>)	
>>>>>Non verified BSIC				
>>>>>>BCCH ARFCN	MP		Integer (0..1023)	[45]
>>>>Observed time difference to GSM cell	OP		Observed time difference to GSM cell 10.3.7.52	

10.3.7.28 Inter-RAT measurement event results

This IE contains the measurement event results that are reported to UTRAN for inter-RAT measurements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Inter-RAT event identity	MP		Inter-RAT event identity 10.3.7.24	
Cells to report	MP	1 to <maxCellMeas>		
>CHOICE BSIC	MP			
>>Verified BSIC				
>>>inter-RAT cell id	MP		Integer(0..<maxCellMeas>)	
>>Non verified BSIC				
>>>BCCH ARFCN	MP		Integer (0..1023)	[45]

10.3.7.38 Intra-frequency measurement quantity

The quantity the UE shall measure in case of intra-frequency measurement. It also includes the filtering of the measurements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Filter coefficient	MP		Filter coefficient 10.3.7.9	
CHOICE *mode*	MP			
>FDD				
>>Measurement quantity	MP		Enumerated(CPICH Ec/N0, CPICH RSCP, Pathloss, UTRA Carrier RSSI)	Pathloss=Primary CPICH Tx power-CPICH RSCP If used in Inter system measurement quantity only Ec/N0 and RSCP is allowed. If used in inter-frequency measurement quantity RSSI is not allowed.
>TDD				
>>Measurement quantity list	MP	1 to 4		
>>>Measurement quantity	MP		Enumerated(Primary CCPCH RSCP, Pathloss, Timeslot ISCP, UTRA Carrier RSSI)	Pathloss=Primary CCPCH Tx power-Primary CCPCH RSCP If used in inter-frequency measurement quantity RSSI is not allowed.

10.3.7.55 Quality measured results list

Information Element/Group name	Need	Multi	Type and reference	Semantics description
BLER measurement results	OP	1 to <maxTrCH>		
>DL Transport channel identity	MP		Transport channel identity 10.3.5.18	transport channel type = DCH
>DL Transport Channel BLER	OP		Integer (0..63)	According to BLER_LOG in [19] and [20]
CHOICE mode	MP			
>FDD				No data
>TDD				
>>SIR measurement results	OP	1 to <MaxCCTrCH>		SIR measurements for DL CCTrCH
>>>TFCS ID	MP		Enumerated (1...8)	
>>>Timeslot list	MP	1 to <maxTS>		for all timeslot on which the CCTrCH is mapped on
>>>>SIR	MP		Integer(0..63)	According to UE_SIR in [20]

10.3.7.59 Quality reporting quantity

Information Element/Group name	Need	Multi	Type and reference	Semantics description
DL Transport Channel BLER	MP		Boolean	TRUE means report requested
Transport channels for BLER reporting	CV BLER reporting	1 to <maxTrCH>		The default, if no transport channel identities are present, is that the BLER is reported for all downlink transport channels
>DL Transport channel identity	MP		Transport channel identity 10.3.5.18	transport channel type = DCH
CHOICE mode	MP			
>FDD				No data
>TDD				
>>SIR measurement list	OP	1 to <maxCCTrCH>		SIR measurements shall be reported for all listed TFCS IDs
>>>TFCS ID	MP		Enumerated (1...8)	

Condition	Explanation
BLER reporting	This information element is absent if 'DL Transport Channel BLER' is 'False' and optional, if 'DL Transport Channel BLER' is 'True'

10.3.7.61 Reporting Cell Status

Indicates maximum allowed number of cells to report and whether active set cells and/or virtual active set cells and/or monitored set cells on and/or detected set cells used frequency and/or monitored set cells on non used frequency should/should not be included in the IE "Measured results".

Information Element/Group name	Need	Multi	Type and reference	Semantics description
~~Choice~~ CHOICE reported cell	MP			
>Report cells within active set				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells within monitored set cells on used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells within active set and/or monitored set cells on used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells within detected set on used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells within monitored set and/or detected set on used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report all active set cells + cells within monitored set on used frequency				
>>Maximum number of reported cells	MP		Enumerated (virtual/active set cells+1, virtual/active set cells+2, …., virtual/active set cells+6)	
>Report all active set cells + cells within detected set on used frequency				
>>Maximum number of reported cells	MP		Enumerated (virtual/active set cells+1, virtual/active set cells+2, …., virtual/active set cells+6)	
>Report all active set cells + cells within monitored set and/or detected set on used frequency				
>>Maximum number of reported cells	MP		Enumerated (virtual/active set cells+1, virtual/active set cells+2, …., virtual/active set cells+6)	

>Report cells within virtual active set				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells w within monitored set on non-used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report cells within monitored and/or active set on non-used frequency				
>>Maximum number of reported cells	MP		Integer(1..6)	
>Report all virtual active set cells + cells within monitored set on non-used frequency				
>>Maximum number of reported cells	MP		Enumerated (virtual/active set cells+1, virtual/active set cells+2, …., virtual/active set cells+6)	
>Report cells within active set or within virtual active set				
>>Maximum number of reported cells	MP		Integer (1..12)	
>Report cells within active and/or monitored set on used frequency or within active and/or monitored set on non-used frequency				
>>Maximum number of reported cells	MP		Integer(1..12)	

10.3.7.88 UE positioning GPS acquisition assistance

This IE contains parameters that enable fast acquisition of the GPS signals in UE-assisted GPS positioning.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE Reference Time	MP			
>UTRAN reference time				GPS Time of Week counted in microseconds, given as GPS TOW in milliseconds and GPS TOW remainder in microseconds, UTRAN reference time = 1000 * GPS TOW msec + GPS TOW rem usec
>>GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit)
>>GPS TOW rem usec	MP		Integer(0..999)	GPS Time of Week in microseconds MOD 1000.
>>SFN	MP		Integer(0..4095)	
>GPS reference time only				
>>GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).
Satellite information	MP	1 to <maxSat>		
>SatID	MP		Integer (0..63)	
>Doppler (0^{th} order term)	MP		Real(-5.120..5.1175 by step of 2.5)	Hz
>Extra Doppler	OP			
>>Doppler (1^{st} order term)	MP		Real (-1..0.5 by step of 0.023)	Scaling factor 1/42
>>Doppler Uncertainty	MP		Enumerated (12.5,25,50,100,200)	Hz
>Code Phase	MP		Integer(0..1022)	Chips, specifies the centre of the search window
>Integer Code Phase	MP		Integer(0..19)	1023 chip segments
>GPS Bit number	MP		Integer(0..3)	Specifies GPS bit number (20 1023 chip segments)
>Code Phase Search Window	MP		Integer(1023,1,2,3,4,6,8,12,16,24,32,48,64,96,128,192)	Specifies the width of the search window.
>Azimuth and Elevation	OP			
>>Azimuth	MP		Real(0..348.75 by step of 11.25)	Degrees
>>Elevation	MP		Real(0..78.75 by step of 11.25)	Degrees

CHOICE *Reference time*	Condition under which the given *reference time* is chosen
UTRAN reference time	The reference time is relating GPS time to UTRAN time (SFN)
GPS reference time only	The time gives the time for which the location estimate is valid

10.3.7.103 UE positioning OTDOA assistance data

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning OTDOA reference cell info	OP		UE positioning OTDOA cell info 10.3.7.108	
UE positioning OTDOA neighbour cell list	OP	1 to <maxCellMeas>		
>UE positioning OTDOA neighbour cell info	OP		UE positioning OTDOA neighbour cell info 10.3.7.106	

10.3.7.105 UE positioning OTDOA measurement

The purpose of the OTDOA Measurement Information element is to provide OTDOA measurements of signals sent from the reference and neighbour cells.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
SFN	MP		Integer(0..4095)	SFN during which the last measurement was performed
UE Rx-Tx time difference type 2	MP		UE Rx-Tx time difference type 2 10.3.7.84	
UE positioning OTDOA quality type	MP		UE positioning OTDOA quality type 10.3.7.107	
Neighbours	MP	0 to <maxCellMeas>		
>CHOICE mode	MP			
>>FDD				
>>>Neighbour Identity	MD		Primary CPICH info 10.3.6.60	Default value is the same as in the first set of multiple sets.
>>TDD				
>>>Cell and Channel ID	MD		Cell and Channel Identity info 10.3.6.8a	Default value is the same as in the first set of multiple sets.
>UE positioning OTDOA quality type	MP		UE positioning OTDOA quality type 10.3.7.107	Quality of the OTDOA from the neighbour cell.
>SFN-SFN observed time difference	MP		SFN-SFN observed time difference 10.3.7.63	Gives the timing relative to the reference cell. Only type 2 is allowed. Type 2 means that only the slot timing is accounted for
>UE Rx-Tx time difference type 2	OP		UE Rx-Tx time difference type 2 10.3.7.84	Included if the neighbour is in the active set

10.3.7.106 UE positioning OTDOA neighbour cell info

This IE gives approximate cell timing in order to decrease the search window.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE mode	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell and channel ID	MP		Cell and Channel Identity info 10.3.6.8a	Identifies the channel to be measured on.
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
IPDL parameters	CV-*IPDLs*		UE positioning IPDL parameters 10.3.7.98	
SFN-SFN relative time difference	MP		Integer(0..9830399)	Gives the relative timing compared to the reference cell. in chips.
SFN-SFN drift	OP		Real(0,+0.33,+0.66,+1,+1.33,+1.66,+2,+2.5,+3,+4,+5,+7,+9,+11,+13,+15,-0.33,-0.66,-1,-1.33,-1.66,-2,-2.5,-3,-4,-5,-7,-9,-11,-13,-15)	meters/sec
Search Window Size	MP		Integer(10, 20, 30, 40, 50, 60,70, infinity)	in chips. Infinity means more
CHOICE PositioningMode	MP			
>UE based				
>>Cell Position	MD			Default is the same as previous cell
>>>Relative North	MP		Integer(-20000..20000)	Seconds, scale factor 0.03. Relative position compared to reference cell.
>>>Relative East	MP		Integer(-20000..20000)	Seconds, scale factor 0.03. Relative position compared to reference cell.
>>>Relative Altitude	OP		Integer(-4000..4000)	Relative altitude in meters compared to ref. cell.
>>Fine SFN-SFN	MP		Real(0..0.9375 in steps of 0.0625)	Gives finer resolution
>>Round Trip Time	OP		Real(876.00 .. 2923.875) in steps of 0.0625	In chips. Included if cell is in active set.
>UE assisted				(no data)

Condition	Explanation
IPDLs	This IE is present only if IPDLs are applied.

10.3.7.108 UE positioning OTDOA reference cell info

This IE defines the cell used for time references in all OTDOA measurements.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
SFN	OP		Integer (0..4095)	Time stamp (SFN of Reference Cell) of the SFN-SFN observed time differences and SFN-SFN drift rates. Included if any SFN-SFN drift value is included.
CHOICE mode	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell and channel ID	MP		Cell and Channel Identity info 10.3.6.8a	Identifies the channel to be measured on.
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information.
CHOICE PositioningMode	MP			
>UE based				
>>CHOICE *Cell Position*	MP			The position of the antenna that defines the cell. Used for the UE based method.
>>>Ellipsoid point	~~OP~~		Ellipsoid point 10.3.8.4a	
>>>Ellipsoid point with altitude	~~OP~~		Ellipsoid point with altitude 10.3.8.4b	
>>Round Trip Time	OP		Real(876.00 .. 2923.875) in steps of 0.0625	In chips.
>UE assisted				(no data)
IPDL parameters	OP		UE positioning IPDL parameters 10.3.7.98	If this element is not included there are no idle periods present

10.3.7.110 UE positioning reporting criteria

The triggering of the event-triggered reporting for an UE positioning measurement.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Parameters required for each event	OP	1 to <maxMeasEvent>		
>Amount of reporting	MP		Integer(1, 2, 4, 8, 16, 32, 64,infinite)	
>Report first fix	MP		Boolean	If true the UE reports the position once the measurement control is received, and then each time an event is triggered.
>Measurement interval	MP		Integer(5,15, 60,300,900,1800,3600,7200)	Indicates how often the UE should make the measurement In seconds
>CHOICE Event ID	MP			
>>7a				
>>>Threshold Position Change	MP		Integer(10,20,30,40,50,100,200,300,500,1000,2000,5000,10000,20000,50000,100000)	Indicated how much the position should change compared to last reported position fix in order to trigger the event.
>>7b				
>>>Threshold SFN-SFN change	MP		Real(0.25,0.5,1,2,3,4,5,10,20,50,100,200,500,1000,2000,5000)	Chips. Indicates how much the SFN-SFN measurement of ANY measured cell is allowed to change before the event is triggered.
>>7c				
>>>Threshold SFN-GPS TOW	MP		Integer(1,2,3,5,10,20,50,100)	Time in ms. When the GPS TOW and SFN timer has drifted apart more than the specified value the event is triggered)

11.3 Information element definitions

[…]

```
-- **************************************************
--
--     PHYSICAL CHANNEL INFORMATION ELEMENTS (10.3.6)
--
-- **************************************************
```

[…]

```
DL-DPCH-InfoPerRL ::=               CHOICE {
    fdd                                 SEQUENCE {
        pCPICH-UsageForChannelEst           PCPICH-UsageForChannelEst,
        dpchdcph-FrameOffset                    DPCH-FrameOffset,
        secondaryCPICH-Info                 SecondaryCPICH-Info             OPTIONAL,
        dl-ChannelisationCodeList           DL-ChannelisationCodeList,
        tpc-CombinationIndex                TPC-CombinationIndex,
        ssdt-CellIdentity                   SSDT-CellIdentity               OPTIONAL,
        closedLoopTimingAdjMode             ClosedLoopTimingAdjMode         OPTIONAL
    },
    tdd                                 DL-CCTrChList
}

DL-DPCH-InfoPerRL-r4 ::=            CHOICE {
    fdd                                 SEQUENCE {
        pCPICH-UsageForChannelEst           PCPICH-UsageForChannelEst,
        dcphdpch-FrameOffset                    DPCH-FrameOffset,
        secondaryCPICH-Info                 SecondaryCPICH-Info             OPTIONAL,
        dl-ChannelisationCodeList           DL-ChannelisationCodeList,
        tpc-CombinationIndex                TPC-CombinationIndex,
        ssdt-CellIdentity                   SSDT-CellIdentity               OPTIONAL,
        closedLoopTimingAdjMode             ClosedLoopTimingAdjMode         OPTIONAL
    },
    tdd                                 DL-CCTrChList-r4
}
```

[…]

```
-- **************************************************
--
--     MEASUREMENT INFORMATION ELEMENTS (10.3.7)
--
-- **************************************************
```

[…]

```
CellSelectReselectInfoSIB-3-4 ::=   SEQUENCE {
    mappingInfo                         MappingInfo                         OPTIONAL,
    cellSelectQualityMeasure            CHOICE {
        cpich-Ec-NoN0                           SEQUENCE {
            q-HYST-2-S                          Q-Hyst-S                    OPTIONAL
            -- Default value for q-HYST-2-S is q-HYST-1-S
        },
        cpich-RSCP                          NULL
    },
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            s-Intrasearch                       S-SearchQual                OPTIONAL,
            s-Intersearch                       S-SearchQual                OPTIONAL,
            s-SearchHCS                         S-SearchRXLEV               OPTIONAL,
            rat-List                            RAT-FDD-InfoList            OPTIONAL,
            q-QualMin                           Q-QualMin,
            q-RxlevMin                          Q-RxlevMin
        },
        tdd                                 SEQUENCE {
            s-Intrasearch                       S-SearchRXLEV               OPTIONAL,
            s-Intersearch                       S-SearchRXLEV               OPTIONAL,
            s-SearchHCS                         S-SearchRXLEV               OPTIONAL,
            rat-List                            RAT-TDD-InfoList            OPTIONAL,
            q-RxlevMin                          Q-RxlevMin
        }
    },
    q-Hyst-l-S                          Q-Hyst-S,
    t-Reselection-S                     T-Reselection-S,
    hcs-ServingCellInformation          HCS-ServingCellInformation          OPTIONAL,
```

```
    maxAllowedUL-TX-Power               MaxAllowedUL-TX-Power
}

CellSelectReselectInfoSIB-11-12-HCS-RSCP ::=    SEQUENCE {
    q-OffsetS-N                     Q-OffsetS-N                     DEFAULT 0,
    maxAllowedUL-TX-Power               MaxAllowedUL-TX-Power               OPTIONAL,
    hcs-NeighbouringCellInformation-RSCP        HCS-NeighbouringCellInformation-RSCP
    OPTIONAL, [Note to Hans: Color changed from red to black]
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            q-QualMin                           Q-QualMin                   OPTIONAL,
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
        tdd                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
        gsm                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        }
    }
}


IntraFreqMeasQuantity-FDD ::=       ENUMERATED {
                                        cpich-Ec-NONC,
                                        cpich-RSCP,
                                        pathloss,
                                        utra-CarrierRSSI }

MeasurementControlSysInfo ::=       SEQUENCE {
    use-of-HCS                          CHOICE  {
        hcs-not-used                    SEQUENCE    {
            cellSelectQualityMeasure    CHOICE  {
                cpich-RSCP              SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-RSCP
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-RSCP    OPTIONAL
                },
                cpich-Ec-NONC               SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-ECN0
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-ECN0    OPTIONAL
                }
            },
            interRATMeasurementSysInfo      InterRATMeasurementSysInfo-HCS      OPTIONAL
        },
        hcs-used                        SEQUENCE    {
            cellSelectQualityMeasure    CHOICE  {
                cpich-RSCP              SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-HCS-RSCP
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-HCS-RSCP
    OPTIONAL
                },
                cpich-Ec-NONC               SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-HCS-ECN0
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-HCS-ECN0
    OPTIONAL                }
            },
            interRATMeasurementSysInfo      InterRATMeasurementSysInfo      OPTIONAL
        }
    },

    trafficVolumeMeasSysInfo            TrafficVolumeMeasSysInfo            OPTIONAL,
    ue-InternalMeasurementSysInfo       UE-InternalMeasurementSysInfo       OPTIONAL
}
```

12.1.3 Padding

Emitters compliant with this version of the specification of the protocol shall, unless indicated otherwise on a PDU type basis, pad the basic production with the smallest number of bits required to meet the size constraints of the lower layers. Padding bits shall be set to 0.

Receivers compliant with this version of the specification have no need to distinguish the extension and padding parts, and shall, unless indicated otherwise on a PDU type basis, accept RRC PDUs with any bit string in the extension and padding parts.

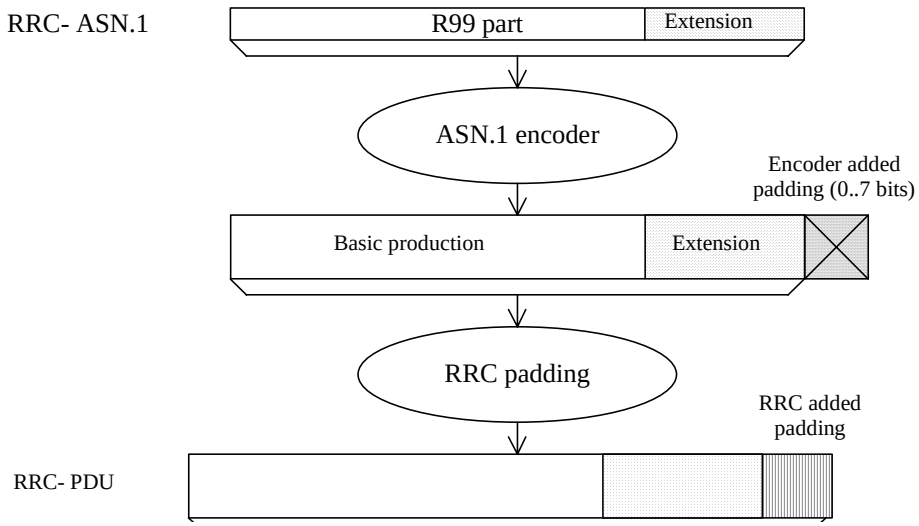

Figure 61: Padding

When using AM or UM mode, RLC requires that the RRC PDU length is a multiple of 8 bits.

When using Tr mode, RLC does neither impose size requirements nor perform padding. This implies that RRC has to take into account the transport format set defined for the transport channel across which the message is to be sent. RRC shall select the smallest transport format that fits the RRC PDU and shall add the lowest number of padding bits required to fit the size specified for the selected transport format.

For system information blocks, building the PDU involves two steps. The first step is the building of the SIBs, in which step padding is not applied (the rules for extension apply). The second step is the building of the RRC PDUs, involving segmentation and concatenation of SIBs, and then padding as described above for Tr mode. The procedure is shown by means of an example as described in Figure 62. The example includes two SIBs, SIBn and SIBn+1, of which only SIBn includes a protocol extension. The two SIBS used in the example don't require segmentation and are concatenated into one SYSTEM INFORMATION message.

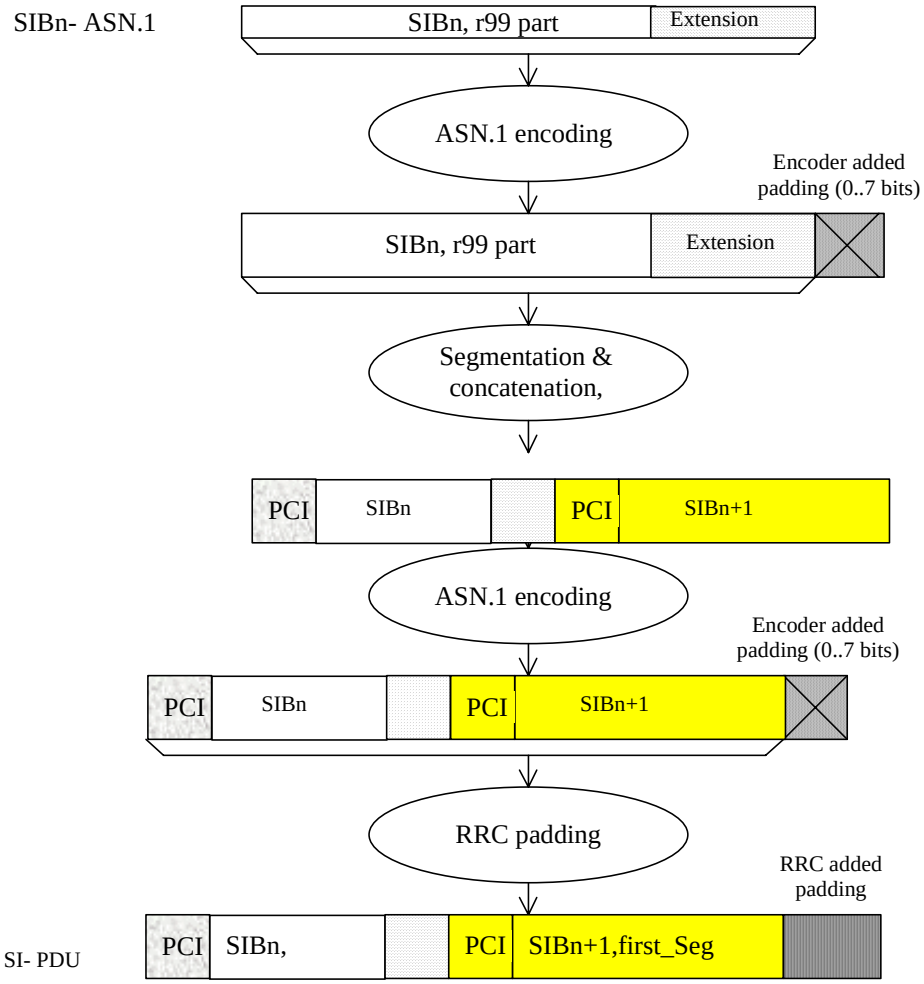

Figure 62: Padding for System Information

PCI: Protocol control information at SYSTEM INFORMATION message level

SI: SYSTEM INFORMATION message

For system information blocks, RRC may also add padding information at the end of IE "SIB data fixed", used both within IE "Last segment" and IE "Complete SIB". The IE "SIB data fixed" has a fixed length i.e. no length denominator used. In case the remaining amount of "SIB data" information is insufficient to fill the IE completely, RRC includes padding bits.

Since no length denominator is included, the receiving RRC can not remove the padding added by the sender. However, since the padding used is the same as the padding added by the PER encoder to achieve octet alignment, the receiver can handle it.

NOTE 1 The mechanism described above implies that the PDU provided to the ASN.1 decoder may have more than 7 padding bits included. For a complete SIB of length 215 bits, 11 padding bits are added by RRC. Since the decoder requires an octet aligned input, 6 additional bits need to be added. In this (worst) case, a total of 17 padding bits is included.

NOTE 2 For the above cases, use of padding bits is possible and more efficient than including a length denominator.

When using the RRC padding described above, the segment has a fixed length, which completely fills the transport block. Therefore, in this case no RRC padding is added within the SYSTEM INFORMATION message. This is illustrated by means of the following figure.

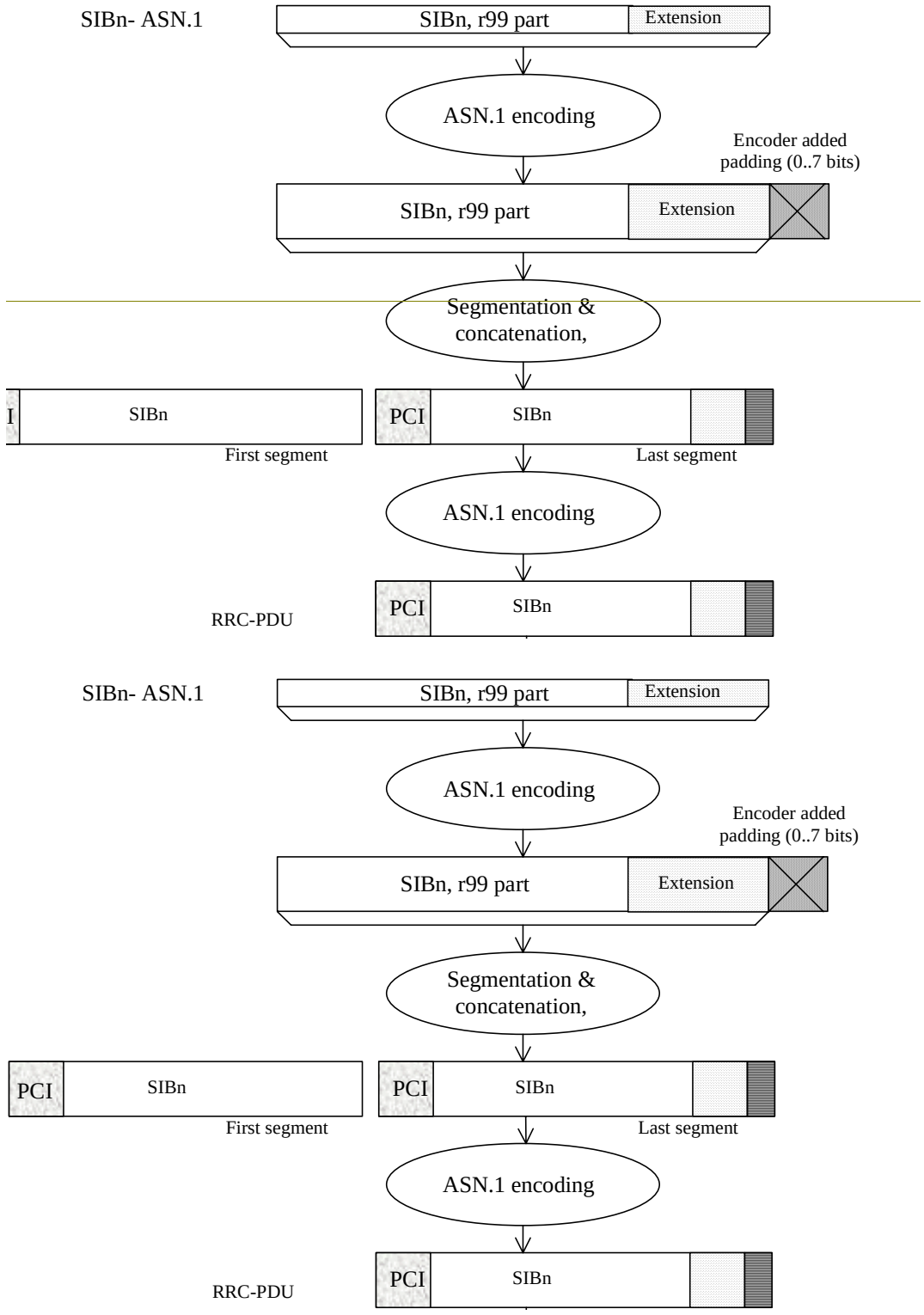

Figure 62a: No RRC padding for System Information

13.1 Timers for UE

Timer	Start	Stop	At expiry
T300	Transmission of RRC CONNECTION REQUEST	Reception of RRC CONNECTION SETUP	Retransmit RRC CONNECTION REQUEST if V300 =< N300, else go to Idle mode
T302	Transmission of CELL UPDATE/URA UPDATE	Reception of CELL UPDATE CONFIRM/URA UPDATE CONFIRM	Retransmit CELL UPDATE/URA UPDATE if V302 =< N302, else, go to Idle mode
T304	Transmission of UE CAPABILITY INFORMATION	Reception of UE CAPABILITY INFORMATION CONFIRM	Retransmit UE CAPABILITY INFORMATION if V304 =< N304, else initiate a cell update procedure
T305	Entering CELL_FACH or URA_PCH or CELL_PCH state. Reception of CELL UDPATE CONFIRM/URA UPDATE CONFIRM.	Entering another state.	Transmit CELL UPDATE if T307 is not activated, and the UE detects "in service area". Otherwise, if T307 is not active, start T307.
T307	When the timer T305 has expired and the UE detects "out of service area".	When the UE detects "in service area".	Transit to idle mode
T308	Transmission of RRC CONNECTION RELEASE COMPLETE	Not stopped	Transmit RRC CONNECTION RELEASE COMPLETE if V308 <=N308, else go to idle mode.
T309	Upon reselection of a cell belonging to another radio access system from connected mode	Successful establishment of a connection in the new cell	Resume the connection to UTRAN
T310	Transmission of PUSCH CAPACITY REQUEST	Reception of PHYSICAL SHARED CHANNEL ALLOCATION	Transmit PUSCH CAPACITY REQUEST if V310 =< N310, else procedure stops.
T311	Reception of PHYSICAL SHARED CHANNEL ALLOCATION message with the CHOICE "PUSCH allocation" set to "PUSCH allocation pending".	Reception of PHYSICAL SHARED CHANNEL ALLOCATION message with CHOICE "PUSCH allocation" set to "PUSCH allocation assignment".	UE may initiate a PUSCH capacity request procedure.
T312	When the UE starts to establish dedicated CH	When the UE detects consecutive N312 "in sync" indication from L1.	The criteria for physical channel establishment failure is fulfilled
T313	When the UE detects consecutive N313 "out of sync" indication from L1.	When the UE detects consecutive N315 "in sync" indication from L1.	The criteria for Radio Link failure is fulfilled
T314	When the criteria for radio link failure are fulfilled. The timer is started only if radio bearer(s) that are associated with T314 exist.	When the Cell Update procedure has been completed.	See subclause 8.3.1.13

Timer	Start	Stop	At expiry
T315	When the criteria for radio link failure are fulfilled. The timer is started only if radio bearer(s) that are associated with T315 exist.	When the Cell Update procedure has been completed.	See subclause 8.3.1.14
T316	When the UE detects "out of service area" in URA_PCH or CELL_PCH state	When the UE detects "in service area".	Initiate cell update procedure If in service area is detected, Otherwise start timer T317, transit to CELL_FACH state and initiate cell update procedure when the UE detects “in service area”.
T317	When the T316 expires or when in CELL_FACH state,and the UE detects "out of service area".	When the UE detects "in service area".	Transit to idle mode

13.3 UE constants and parameters

Constant	Usage
N300	Maximum number of retransmissions of the RRC CONNECTION REQUEST message
N302	Maximum number of retransmissions of the CELL UPDATE / URA UPDATE message
N304	Maximum number of retransmissions of the UE CAPABILITY INFORMATION message
N308	Maximum number of retransmissions of the RRC CONNECTION RELEASE COMPLETE message
N310	Maximum number of retransmission of the PUSCH CAPACITY REQUEST message
N312	Maximum number of successive "in sync" received from L1.
N313	Maximum number of successive "out of sync" received from L1.
N315	Maximum number of successive "in sync" received from L1 during T313 is activated.

13.4 UE variables

13.4.0 CELL INFO LIST

This variable contains cell information on intra-frequency, inter-frequency and inter-RAT cells, as received in messages System Information Block Type 11, System Information Block Type 12, and MEASUREMENT CONTROL.

The first position in Intra-frequency cell info list corresponds to Intra-frequency cell id 0~~)~~, the second to Intra-frequency cell id 1, etc.

The first position in Inter-frequency cell info list corresponds to Inter-frequency cell id 0~~)~~, the second to Inter-frequency cell id 1, etc.

The first position in Inter-RAT cell info list corresponds to Intra-frequency cell id 0~~)~~, the second to Inter-RAT cell id 1, etc.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Intra-frequency cell info	MP	1..<maxCellMeas>		
>CHOICE *position status*	MP			
>>Occupied				
>>>Cell info	MP		Cell info 10.3.7.2	
>>Vacant				No data
Inter-frequency cell info	MP	1..<maxCellMeas>		
>CHOICE *position status*	MP			
>>Occupied				
>>>Frequency info	MP		Frequency info 10.3.6.36	
>>>Cell info	MP		Cell info 10.3.7.2	
>>Vacant				No data
Inter-RAT cell info	MP	1..<maxCellMeas>		
>CHOICE *position status*	MP			
>>Occupied				
>>>CHOICE *Radio Access Technology*				
>>>>GSM				
>>>>>Cell selection and re-selection info	MP		Cell selection and re-selection info for SIB11/12 10.3.2.4	
>>>>>BSIC	MP		BSIC 10.3.8.2	
>>>>>BCCH ARFCN	MP		Integer (0..1023)	[43]
>>>>>Output power	OP			
>>>>IS-2000				
>>>>>System specific measurement info			enumerated (frequency, timeslot, colour code, output power, PN offset)	For IS-2000, use fields from TIA/EIA/IS-2000.5, Subclause 3. 7.3.3.2.27, *Candidate Frequency Neighbour List Message*
>>Vacant				No data

13.4.0a CELL_UPDATE_STARTED

This variable indicates whether a cell update or URA update procedure is in progress.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Cell update started	MP		Boolean	TRUE means a cell or URA update procedure is in progress.

13.4.1 CIPHERING_STATUS

This variable contains information about the current status of ciphering in the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Status	MP		Enumerated(Not started, Started)	
Reconfiguration	MP		Boolean	TRUE means a RRC procedure performing reconfiguration of ciphering is ongoing.

13.4.11a LATEST_CONFIGURED_CN_DOMAIN

This variable stores the CN-domain that is latest configured to be used for ciphering and integrity protection for each RB.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Latest configured CN domain	~~MP~~OP		CN domain identity 10.3.1.1	

13.4.12 MEASUREMENT_IDENTITY

This variable stores the measurements configured in the UE. For each configured measurement, the information below shall be stored.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
MEASUREMENT CONTROL	OP		MEASUREMENT CONTROL 10.2.17, System Information Block type 11 10.2.48.8.12, System Information Block type 12 10.2.48.8.13 [Note to Hans: A space has been added before each reference]	Information as contained in these messages.

13.4.26 TGSN_REPORTED

This variable specifies whether an IE "Proposed TGSN" was reported to the UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Proposed TGSN reported	MP		Boolean	

13.4.26a TIMERS_AND_CONSTANTS

This variable contains the values for all timers and constants used in connected mode.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE Timers and constants in connected mode	MD		UE Timers and constants in connected mode 10.3.3.43	Default value means that for all timers and constants - For parameters with need MD, the defaults specified in 10.3.3.43 apply and - For parameters with need OP, the parameters are absent

13.4.27 TRANSACTIONS

This variable stores the identifications of the ongoing RRC procedure transactions.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Accepted transactions	OP	1 to <maxtransactions>		
>Message type	MP		Message Type	
>RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Rejected transactions	OP	1 to <maxtransactions>		
>Message type	MP		Message Type	
>RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	

13.6 RB information parameters for ~~SRB~~ signalling radio bearer RB 0

The following Radio Bearer parameter values apply for signalling radio bearer RB 0~~SRB0~~:

Information element/ Group name	Value	Comment
RLC info		
>Uplink RLC mode	TM	
>>Transmission RLC discard	No discard	Neither discard is used, nor will there be a reset
>>Segmentation indication	FALSE	
>Downlink RLC mode	UM	
RB mapping info		Single multiplexing option
>Uplink mapping info		
>>UL transport channel	RACH	RACH corresponding with selected PRACH
>>RLC size list	N/A	The first TB defined in the Transport Format Set for the transport channel that is used
>Downlink mapping info		
>>DL transport channel	FACH	

13.7 Parameter values for default radio configurations

The UE shall support the use of the default radio configurations that are specified in the following.

NOTE 1: These configurations are based on [41] and cover a number of RAB and signalling connection configurations.

In the table that is used to specify the parameter values for these default configurations, the following principles are used:

- Optional IEs that are not used are omitted;
- In case no parameter value is specified in a column, this means the value given the previous (left side) column applies.

NOTE 2: If needed, signalling radio bearer ~~S~~RB4 is established after the completion of handover.

NOTE 3: For each default configuration, the value of both FDD and TDD parameters are specified. All parameters apply to both FDD and TDD modes, unless explicitly stated otherwise. It should be noted that in this respect default configurations differ from pre-defined configurations, which only include parameter values for one mode.

NOTE 4: The transport format sizes, indicated in the following table, concern the RLC PDU size, since all configurations concern dedicated channels. The transport block sizes indicated in TS 34.108 are different since these include the size of the MAC header.

<…>

14.11 UE autonomous update of active set on non-used frequency (FDD only)

Within the measurement reporting criteria field in the MEASUREMENT CONTROL message the UTRAN notifies the UE which events should trigger a measurement report. For inter frequency measurements it is possible to specify intra-frequency measurements reporting events for support of maintenance of a active set associated with a non-used frequency, a "virtual active set". A "non-used frequency" is a frequency that the UE has been ordered to measure upon but are not used by the active set. A "used frequency" is a frequency that the UE has been ordered to measure upon and is also currently used for the connection.

The autonomous update is controlled by the IE "UE autonomous update mode" that can be set to the following values.

- On: Do the autonomous updates of the "virtual active set" according to the described rules below and also report the events that trigger the update of the "virtual active set".
- On with no reporting: Do the autonomous updates of the "virtual active set" according to the described rules below.
- Off: Only report the events and do no updates of the "virtual active set" unless ordered to do so by the IE " Inter-frequency set update".

If the IE "UE autonomous update mode" is set to "on" or "on with no reporting" the UE shall evaluate the following intra-frequency events and update the "virtual active set" associated with the frequency measured upon, according to the following rules:

- Event 1a shall make the UE add the primary CPICH that enters the reporting range to the "virtual active set".
- Event 1b shall make the UE remove a primary CPICH that leaves the reporting range from the "virtual active set".
- Event 1c shall make the UE replace an active primary CPICH in the "virtual active set" with a non-active primary CPICH that have become better than the active primary CPICH.

14.12.3 RRC information, target RNC to source system

The RRC information, target RNC to source system is used to transfer information to another RAT, e.g., in case of handover to UTRAN. In this case, the RRC information concerns the "Handover To UTRAN Command" that is compiled by the target RNC but transferred via another RAT towards the UE, as specified in 8.3.6.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *case*	MP			
>handover to UTRAN			HANDOVER TO UTRAN COMMAND 10.2.1210	
>spare				(no data) Criticality: reject

B.3.3 CELL_PCH state

The CELL_PCH state is characterised by:

- No dedicated physical channel is allocated to the UE.
- The UE selects a PCH with the algorithm specified in subclause ~~8.6.6.5~~8.5.19, and uses DRX for monitoring the selected PCH via an associated PICH.
- No uplink activity is possible.
- The position of the UE is known by UTRAN on cell level according to the cell where the UE last made a cell update in CELL_FACH state.

The DCCH logical channel cannot be used in this state. If the network wants to initiate any activity, it needs to make a paging request on the PCCH logical channel in the known cell to initiate any downlink activity.

B.3.4 URA_PCH State

The URA_PCH state is characterised by:

- No dedicated channel is allocated to the UE.
- The UE selects a PCH with the algorithm specified in subclause ~~8.6.6.5~~8.5.19, and uses DRX for monitoring the selected PCH via an associated PICH.
- No uplink activity is possible.
- The location of the UE is known on UTRAN Registration area level according to the URA assigned to the UE during the last URA update in CELL_FACH state.

The DCCH logical channel cannot be used in this state. If the network wants to initiate any activity, it needs to make a paging request on the PCCH logical channel within the URA where the location of the UE is known. If the UE needs to transmit anything to the network, it goes to the CELL_FACH state. The transition to URA_PCH State can be controlled with an inactivity timer, and optionally, with a counter that counts the number of cell updates. When the number of cell updates has exceeded certain limits (a network parameter), then the UE changes to the URA_PCH State.

URA updating is initiated by the UE, which, upon the detection of the Registration area, sends the network the Registration area update information on the RACH of the new cell.

B.3.5 States and Transitions for Cell Reselection in URA_PCH, CELL_PCH, and CELL_FACH

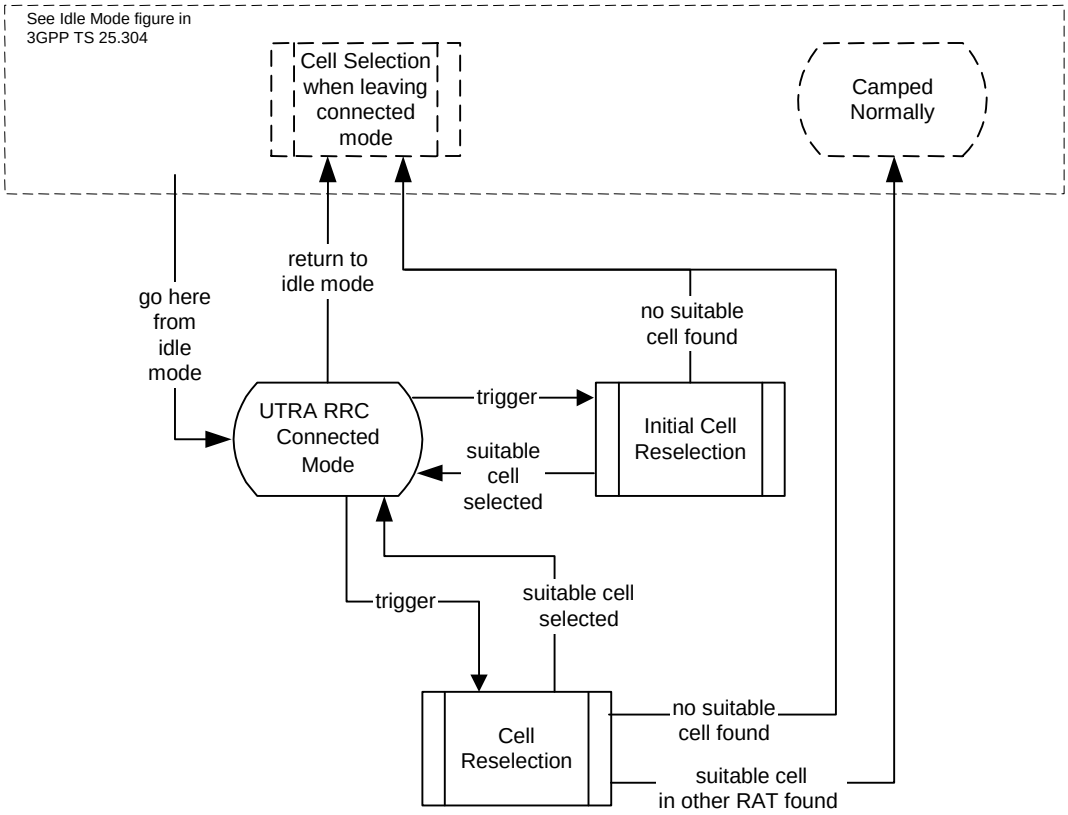

Figure 61: UTRA RRC Connected mode cell reselection for URA_PCH, CELL_PCH, and CELL_FACH

In some states the UE performs cell reselection procedures. The UE selects a suitable cell (defined in [4]) and radio access technology based on connected mode radio measurements and cell reselection criteria.

Figure 61 shows the states and procedures in the cell reselection process in connected mode.

When a cell reselection is triggered, the UE evaluates the cell reselection criteria based on radio measurements, and if a better cell is found that cell is selected, procedure Cell reselection (see [4]). If the change of cell implies a change of radio access technology, the RRC connection is released, and the UE enters idle mode of the other RAT. If no suitable cell is found in the cell reselection procedure, ~~the RRC connection is released, and~~ the UE eventually enters idle mode.

When an Initial cell reselection is triggered, the UE shall use the Initial cell reselection procedure (see [4]) to find a suitable cell. One example where this procedure is triggered is at radio link failure, where the UE may trigger an initial cell reselection in order to request re-establishment of the RRC connection. If the UE is unable to find a suitable cell, the UE ~~shall release the RRC connection and~~ eventually enters idle mode.

B.4 Inter-RAT handover with ~~PSTN/ISDN~~CS domain services

When using ~~PSTN / ISDN~~CS domain services, UTRAN is using an Inter-Radio access system Handover Procedure and GSM is using a Handover procedure for the transition from UTRA RRC Connected Mode to GSM Connected Mode.

B.5 Inter-RAT handover with ~~IP~~ PS domain services

When using ~~IP~~ PS domain services, the UE initiates cell reselection from a GSM/GPRS cell to a UTRAN cell and then uses the RRC Connection Establishment procedure for the transition to UTRA RRC Connected mode.

When the RRC Connection is established from Idle Mode (GPRS Packet Idle Mode) the RRC CONNECTION REQUEST message contains an indication, that UTRAN needs to continue an already established GPRS UE context from the CN. This indication allows UTRAN to e.g. prioritise the RRC CONNECTION REQUEST from the UE.

In UTRA RRC connected mode UTRAN is using UE or network initiated cell reselection to change from a UTRAN cell to a GSM/GPRS cell. If the cell reselection was successful the UE enters Idle Mode (GPRS Packet Idle Mode). The UE sends a packet channel request from Idle Mode (GPRS Packet Idle mode) to establish a Temporary Block flow and enter GPRS Packet Transfer Mode. In the GPRS Packet Transfer Mode the UE sends a RA Update request message. The RA Update Request message sent from the UE contains an indication that GSM/GPRS need to continue an already established UTRAN UE context from the CN. This means that the RA Update request is always sent for the transition from UTRA RRC Connected Mode to GSM/GPRS regardless if the RA is changed or not.

NOTE: The reason for using RA update instead of a new message is to reduce the impact on the existing GSM/GPRS specification.

B.6 Inter-RAT handover with simultaneous ~~IP~~ PS and ~~PSTN/ISDN~~CS domain services

NOTE: This is an initial assumption that needs to be seen by SMG2 and requiring checking by SMG2, when the work on this item has progressed.

B.6.1 Inter-RAT handover UTRAN to GSM / BSS

For a UE in CELL_DCH state using both ~~PSTN / ISDN~~CS and ~~IP~~ PS Domain services the Inter-RAT handover procedure is based on measurement reports from the UE but initiated from UTRAN.

The UE performs the Inter-RAT handover from UTRA RRC Connected Mode to GSM Connected Mode first. When the UE has sent handover complete message to GSM / BSS the UE initiates a temporary block flow towards GPRS and sends a RA update request.

If the Inter-RAT handover from UTRA RRC Connected Mode to GSM Connected Mode was successful the handover is considered as successful regardless if the UE was able to establish a temporary block flow or not towards GPRS.

In case of Inter-RAT handover failure the UE has the possibility to go back to UTRA RRC Connected Mode and re-establish the connection in the state it originated from without attempting to establish a temporary block flow. If the UE has the option to try to establish a temporary block flow towards GSM / GPRS after Inter-RAT handover failure is FFS.

B.6.2 Inter-RAT handover GSM / BSS to UTRAN

For a UE in GSM Connected Mode using both ~~PSTN / ISDN~~CS and ~~IP~~ PS domain services the Inter-RAT handover procedure is based on measurement reports from the UE but initiated from GSM / BSS.

The UE performs the Inter-RAT handover from GSM Connected Mode to UTRA RRC Connected Mode.

In UTRA RRC Connected Mode both services are established in parallel.

If the Inter-RAT handover from GSM Connected mode to UTRA RRC Connected Mode was successful the handover is considered as successful.

In case of Inter-RAT handover failure the UE has the possibility to go back to GSM Connected Mode and re-establish the connection in the state it originated from.

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21st-25th 2001

Tdoc R2-011235

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **749** ⌘ rev **r1** ⌘ Current version: **3.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	General error handling for system information
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-23
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘

The general error handling procedures for system information received on the BCCH are somewhat unclear.
Currently it is in some situations stated that the UE discards the whole "message". To interpret "message" as the SYSTEM INFORMATION message is not necessary if the error was detected in a system information block (SIB) after reassembly of the SIB segments. The UE should be able to continue to decode the rest of the SYSTEM INFORMATION message since the SIB segments are defined as bitstrings in the message and used in a second pass by the decoder.

And since the extensions are made on the SIB level the general error handling should be applied also for that level. This needs to be clarified.

Backwards compatibility analysis:
The CR contains a correction to a function where the specification was :

- ambiguous or not sufficiently explicit.

Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Summary of change: ⌘

In clause 9, "Handling of unknown, unforeseen and erroneous protocol data", new cases are added, which deals with undefined or unexpected information in SIBs received on the BCCH.
In each of the following subclauses, the error cases are made applicable for a SIB received on the BCCH. In case the error was detected on a SIB, and the error handling suggested to ignore the "message", it is clarified that the SIB shall be discarded.

- ASN.1 violation or encoding error (9.2)
- Unknown or unforeseen information element value, mandatory information element (9.4)
- Conditional information element error (9.5)
- Unknown or unforeseen information element value, conditional information element (9.6)

		• Unknown or unforeseen information element value, optional information element (9.7) • Unexpected non-critical extension (9.8) In chapter 9.1 (General) a clarification is also added that for the BCCH, there are procedures applied for the messages (clarified to be the SYSTEM INFORMATION message), the re-assembled segments as well as the SIBs. The term “invalid abstract syntax value” is clarified with a reference to X.691 (PER specification) and using the wording “encoding error”.
Consequences if not approved:	⌘	If extensions are made in system information blocks, UEs of earlier revisions may discard the whole SYSTEM INFORMATION message where the error was detected (and possibly all other messages containing segments of that SIB). This leads a risk that UEs looses SIBs just because they are scheduled in the same SYSTEM INFORMATION message as the SIB containing the extension.

Clauses affected:	⌘	9.1, 9.2, 9.4, 9.5, 9.6, 9.7, 9.8		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9 Handling of unknown, unforeseen and erroneous protocol data

9.1 General

This subclause specifies procedures for the handling of unknown, unforeseen, and erroneous protocol data by the receiving entity. These procedures are called "error handling procedures", but in addition to provide recovery mechanisms for error situations they define a compatibility mechanism for future extensions of the protocol.

The error handling procedures specified in this subclause shall apply to all RRC messages. When there is a specific handling for messages received on different logical channels this is specified.

For system information received on the BCCH, the error handling procedures are applied on the BCCH message SYSTEM INFORMATION, the re-assembled system information segments as well as the system information blocks (including the master information block and the scheduling blocks), with specific error handling as specified below.

When the UE receives an RRC message, it shall set the variable PROTOCOL_ERROR_REJECT to FALSE and then perform the checks in the order as defined below.

The procedures specified in clause 8 are applied only for the messages passing the checks as defined below, except when procedure specific handling is used to recover from the error.

In certain error cases, as specified in the following, default values apply. In this case, the default values specified within the ASN.1, the tabular and the procedure specifications apply.

9.2 ASN.1 violation or encoding error

If the UE receives a message on the DCCH for which the encoded message does not result in any valid abstract syntax value [49] (or “encoding error”), it shall perform the following. The UE shall:

- set the variable PROTOCOL_ERROR_REJECT to TRUE;
- transmit an RRC STATUS message on the uplink DCCH. The IE "Protocol error information" shall contain an IE "Protocol error cause" set to "ASN.1 violation or encoding error";
- when RRC STATUS message has been submitted to lower layers for transmission:
  - continue with any ongoing processes and procedures as if the invalid message had not been received.

If a reassembled set of system information segments received in messages on the BCCH does not result in any valid abstract syntax value, the UE shall:

- ignore the reassembled set of system information segments;
- treat the rest of each message containing the ignored system information segments as if those segments were not present.

If the UE receives a message on the BCCH, PCCH, CCCH or SHCCH for which the encoded message does not result in any valid abstract syntax value, it shall ignore the message.

9.4 Unknown or unforeseen information element value, mandatory information element

If the UE receives an RRC message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, with a mandatory IE having a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value [49] for this IE, the UE shall:

- if a default value of the IE is defined:
  - treat the rest of the message using the default value of the IE;
- if no default value of the IE is defined:
  - set the variable PROTOCOL_ERROR_REJECT to TRUE;
  - set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "Information element value not comprehended";
  - perform procedure specific error handling according to clause 8.

If the UE receives a system information block on the BCCH with a mandatory IE having a value reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, it shall

- if a default value of the IE is defined:
  - treat the rest of the system information block using the default value of the IE.
- if no default value of the IE is defined:
  - ignore the system information block.

If the UE receives an RRC message on the BCCH or PCCH with a mandatory IE having a value reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, it shall

- if a default value of the IE is defined:
  - treat the rest of the message using the default value of the IE.
- if no default value of the IE is defined:
  - ignore the message.

9.5 Conditional information element error

If the UE receives an RRC message on the DCCH, BCCH, PCCH, or addressed to the UE on the CCCH, for which the specified conditions for absence of a conditional IE are met and that IE is present, the UE shall:

- ignore the IE;
- treat the rest of the message as if the IE was not present.

If the UE receives an RRC message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- set the variable PROTOCOL_ERROR_REJECT to TRUE;
- set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "Conditional information element error";
- perform procedure specific error handling according to clause 8.

If the UE receives a system information block on the BCCH for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- ignore the system information block.

If the UE receives an RRC message on the BCCH or PCCH for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- ignore the message.

9.6 Unknown or unforeseen information element value, conditional information element

If the UE receives an RRC message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, for which the specified conditions for presence of a conditional IE are met, that IE is present, and that IE has a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value [49] for this IE, the UE shall:

- if a default value of the IE is defined:
  - treat the rest of the message using the default value of the IE;
- if no default value of the IE is defined:
  - set the variable PROTOCOL_ERROR_REJECT to TRUE;
  - set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "Information element value not comprehended";
  - perform procedure specific error handling according to clause 8.

If the UE receives a system information block on the BCCH for which the specified conditions for presence of a conditional IE are met, that IE is present, and that IE has a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, the UE shall:

- if a default value of the IE is defined:
  - treat the rest of the system information block using the default value of the IE;
- if no default value of the IE is defined:
  - ignore the system information block.

If the UE receives an RRC message on the BCCH or PCCH for which the specified conditions for presence of a conditional IE are met, that IE is present, and that IE has a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, the UE shall:

- if a default value of the IE is defined:
  - treat the rest of the message using the default value of the IE;
- if no default value of the IE is defined:
  - ignore the message.

9.7 Unknown or unforeseen information element value, optional information element

If the UE receives an RRC message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, with an optional IE having a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value [49] for this IE, it shall:

- ignore the value of the IE;
- treat the rest of the message as if the IE was not present.

If the UE receives a system information block on the BCCH with an optional IE having a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, it shall:

- ignore the value of the IE;
- treat the rest of the system information block as if the IE was not present.

If the UE receives an RRC message on the BCCH or PCCH with an optional IE having a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, it shall:

- ignore the value of the IE;
- treat the rest of the message as if the IE was not present.

9.8 Unexpected non-critical message extension

If the UE receives a message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, containing an undefined non-critical message extension, the UE shall:

- ignore the content of the extension and the message contents after the extension, but treat the parts of the message up to the extension normally.

If the UE receives a system information block on the BCCH containing an undefined non-critical message extension, the UE shall:

- ignore the content of the extension and the system information block contents after the extension, but treat the parts of the system information block up to the extension normally.

If the UE receives a message on the BCCH or PCCH, containing an undefined non-critical message extension, the UE shall:

- ignore the content of the extension and the message contents after the extension, but treat the parts of the message up to the extension normally.

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21st-25th 2001

Tdoc R2-011236

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **750** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	General error handling for system information
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-25
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘

The general error handling procedures for system information received on the BCCH are somewhat unclear.
Currently it is in some situations stated that the UE discards the whole "message". To interpret "message" as the SYSTEM INFORMATION message is not necessary if the error was detected in a system information block (SIB) after reassembly of the SIB segments. The UE should be able to continue to decode the rest of the SYSTEM INFORMATION message since the SIB segments are defined as bitstrings in the message and used in a second pass by the decoder.

And since the extensions are made on the SIB level the general error handling should be applied also for that level. This needs to be clarified.

Backwards compatibility analysis:
The CR contains a correction to a function where the specification was :

- ambiguous or not sufficiently explicit.

Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Summary of change: ⌘

In clause 9, "Handling of unknown, unforeseen and erroneous protocol data", new cases are added, which deals with undefined or unexpected information in SIBs received on the BCCH.
In each of the following subclauses, the error cases are made applicable for a SIB received on the BCCH. In case the error was detected on a SIB, and the error handling suggested to ignore the "message", it is clarified that the SIB shall be discarded.

- ASN.1 violation or encoding error (9.2)
- Unknown or unforeseen information element value, mandatory information element (9.4)
- Conditional information element error (9.5)
- Unknown or unforeseen information element value, conditional information element (9.6)

		• Unknown or unforeseen information element value, optional information element (9.7) • Unexpected non-critical extension (9.8) In chapter 9.1 (General) a clarification is also added that for the BCCH, there are procedures applied for the messages (clarified to be the SYSTEM INFORMATION message), the re-assembled segments as well as the SIBs. The term “invalid abstract syntax value” is clarified with a reference to X.691 (PER specification) and using the wording “encoding error”.
Consequences if not approved:	⌘	If extensions are made in system information blocks, UEs of earlier revisions may discard the whole SYSTEM INFORMATION message where the error was detected (and possibly all other messages containing segments of that SIB). This leads a risk that UEs looses SIBs just because they are scheduled in the same SYSTEM INFORMATION message as the SIB containing the extension.

Clauses affected:	⌘	9.1, 9.2, 9.4, 9.5, 9.6, 9.7, 9.8		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9 Handling of unknown, unforeseen and erroneous protocol data

9.1 General

This subclause specifies procedures for the handling of unknown, unforeseen, and erroneous protocol data by the receiving entity. These procedures are called "error handling procedures", but in addition to provide recovery mechanisms for error situations they define a compatibility mechanism for future extensions of the protocol.

The error handling procedures specified in this subclause shall apply to all RRC messages. When there is a specific handling for messages received on different logical channels this is specified.

For system information received on the BCCH, the error handling procedures are applied on the BCCH message SYSTEM INFORMATION, the re-assembled system information segments as well as the system information blocks (including the master information block and the scheduling blocks), with specific error handling as specified below.

When the UE receives an RRC message, it shall set the variable PROTOCOL_ERROR_REJECT to FALSE and then perform the checks in the order as defined below.

The procedures specified in clause 8 are applied only for the messages passing the checks as defined below, except when procedure specific handling is used to recover from the error.

In certain error cases, as specified in the following, default values apply. In this case, the default values specified within the ASN.1, the tabular and the procedure specifications apply.

9.2 ASN.1 violation or encoding error

If the UE receives a message on the DCCH for which the encoded message does not result in any valid abstract syntax value [49] (or "encoding error"), it shall perform the following. The UE shall:

- set the variable PROTOCOL_ERROR_REJECT to TRUE;
- transmit an RRC STATUS message on the uplink DCCH. The IE "Protocol error information" shall contain an IE "Protocol error cause" set to "ASN.1 violation or encoding error";
- when RRC STATUS message has been submitted to lower layers for transmission:
  - continue with any ongoing processes and procedures as if the invalid message had not been received.

If a reassembled set of system information segments received in messages on the BCCH does not result in any valid abstract syntax value, the UE shall:

- ignore the reassembled set of system information segments;
- treat the rest of each message containing the ignored system information segments as if those segments were not present.

If the UE receives a message on the BCCH, PCCH, CCCH or SHCCH for which the encoded message does not result in any valid abstract syntax value, it shall ignore the message.

9.4 Unknown or unforeseen information element value, mandatory information element

If the UE receives an RRC message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, with a mandatory IE having a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value [49] for this IE, the UE shall:

- if a default value of the IE is defined:
  - treat the rest of the message using the default value of the IE;
- if no default value of the IE is defined:
  - set the variable PROTOCOL_ERROR_REJECT to TRUE;
  - set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "Information element value not comprehended";
  - perform procedure specific error handling according to clause 8.

If the UE receives a system information block on the BCCH with a mandatory IE having a value reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, it shall

- if a default value of the IE is defined:
  - treat the rest of the system information block using the default value of the IE.
- if no default value of the IE is defined:
  - ignore the system information block.

If the UE receives an RRC message on the BCCH or PCCH with a mandatory IE having a value reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, it shall

- if a default value of the IE is defined:
  - treat the rest of the message using the default value of the IE.
- if no default value of the IE is defined:
  - ignore the message.

9.5 Conditional information element error

If the UE receives an RRC message on the DCCH, BCCH, PCCH, or addressed to the UE on the CCCH, for which the specified conditions for absence of a conditional IE are met and that IE is present, the UE shall:

- ignore the IE;
- treat the rest of the message as if the IE was not present.

If the UE receives an RRC message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- set the variable PROTOCOL_ERROR_REJECT to TRUE;
- set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "Conditional information element error";
- perform procedure specific error handling according to clause 8.

If the UE receives a system information block on the BCCH for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- ignore the system information block.

If the UE receives an RRC message on the BCCH or PCCH for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- ignore the message.

9.6 Unknown or unforeseen information element value, conditional information element

If the UE receives an RRC message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, for which the specified conditions for presence of a conditional IE are met, that IE is present, and that IE has a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value [49] for this IE, the UE shall:

- if a default value of the IE is defined:
  - treat the rest of the message using the default value of the IE;
- if no default value of the IE is defined:
  - set the variable PROTOCOL_ERROR_REJECT to TRUE;
  - set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "Information element value not comprehended";
  - perform procedure specific error handling according to clause 8.

If the UE receives a system information block on the BCCH for which the specified conditions for presence of a conditional IE are met, that IE is present, and that IE has a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, the UE shall:

- if a default value of the IE is defined:
  - treat the rest of the system information block using the default value of the IE;
- if no default value of the IE is defined:
  - ignore the system information block.

If the UE receives an RRC message on the BCCH or PCCH for which the specified conditions for presence of a conditional IE are met, that IE is present, and that IE has a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, the UE shall:

- if a default value of the IE is defined:
  - treat the rest of the message using the default value of the IE;
- if no default value of the IE is defined:
  - ignore the message.

9.7 Unknown or unforeseen information element value, optional information element

If the UE receives an RRC message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, with an optional IE having a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value [49] for this IE, it shall:

- ignore the value of the IE;
- treat the rest of the message as if the IE was not present.

If the UE receives a system information block on the BCCH with an optional IE having a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, it shall:

- ignore the value of the IE;
- treat the rest of the system information block as if the IE was not present.

If the UE receives an RRC message on the BCCH or PCCH with an optional IE having a value, including choice, reserved for future extension (spare) or when the encoded IE does not result in any valid abstract syntax value for this IE, it shall:

- ignore the value of the IE;
- treat the rest of the message as if the IE was not present.

9.8 Unexpected non-critical message extension

If the UE receives a message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, containing an undefined non-critical message extension, the UE shall:

- ignore the content of the extension and the message contents after the extension, but treat the parts of the message up to the extension normally.

If the UE receives a system information block on the BCCH containing an undefined non-critical message extension, the UE shall:

- ignore the content of the extension and the system information block contents after the extension, but treat the parts of the system information block up to the extension normally.

If the UE receives a message on the BCCH or PCCH, containing an undefined non-critical message extension, the UE shall:

- ignore the content of the extension and the message contents after the extension, but treat the parts of the message up to the extension normally.

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21st-25th 2001

Tdoc R2-011332

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **751** ⌘ rev **r1** ⌘ Current version: **3.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Order of elements in strings
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-23
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘

1. The order of bits in bit strings containing information non-transparent to RRC needs to be clarified
   A few information elements are specified as bit strings but still intepreted and used by RRC, such as PRACH info, ciphering capability etc.
   In some of these cases each bit is given a separate meaning. Currently for those cases the meaning is explained by values of the total bit string, e.g. '0010'. However, the order of the bits is not explicitely defined in these explainations, even if rightmost bit should be interpreted as the least significant bit. In ASN.1 it is defined as a bit string, without any connection to the tabular definitions of the meaning of the bits. Therefore it needs to be clarified both in tabular, and in ASN.1, the meaning of each individual bit.
2. The order of octets in octet strings containing NAS messages needs to be clarified
   For the octet strings that are used to carry RRC transparent information (such as NAS messages) the mapping of the octets in the NAS message on the RRC octet string has not been explicitely defined. TS 24.007 defines a numbering of octets in the NAS messages, where octets are numbered from 1 and up. A hidden assumption is that octet 1 of the NAS message is mapped on the first octet in the RRC octet string, but that has not explicitly been defined. To keep the integrity of the NAS message, this mapping needs to be defined.
3. The order of bits in upper layer or inter-RAT information specified as bit strings needs to be clarified
   For the transparent upper layer or inter-RAT information defined as bit strings in RRC, such as TMSI or inter-RAT message, RRC does not interpret the content. Nevertheless it is still important to define how the information is stored in the bit string to keep the integrity of the bit ordering and to be able to compare the bit string with an external value (e.g. at paging).
   The numbering of bits on ASN.1 bitstrings is defined as that the first (or leftmost) bit is the most significant. However, that bit is in ASN.1 numbered as "bit 0". This convention may cause problems since in if e.g. the semantics

of the bitstring is a “TMSI” the least significant bit is numbered bit 0. Because of this numbering of bits in ASN.1 bitstrings it is even more important to define which bit in the semantics that corresponds to which bit in the ASN.1 bitstring.

4. The order of digits in upper layer identifiers specified as sequences of digits needs to be clarified
   Some upper layer identifiers, such as IMSI, PLMN id and IMEI are specified as sequences of decimal or hexadecimal digits. RRC uses the content (without interpretation) for different kinds of comparisions. It is important that how the digits of the identifiers are mapped into the digits in the information element is defined, in order to keep the integrity of the digit ordering.
5. The order of how the bits in RRC PDUs are mapped to/from RLC SDUs is not explicitely defined.

Backwards compatibility analysis:
The CR contains corrections to functions where the specification was:

- ambiguous or not sufficiently explicit.

Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Summary of change: ⌘

1. Bit strings containing information non-transparent to RRC
   Where each individual bit has a unique meaning and is used in that way by RRC, the tabular should be changed to use list of enumerated (or Boolean). However, in some cases the procedure text performs operations on the bit string as a whole and then the bit string is kept in tabular.
   In ASN.1, the bit string is kept for backward compatibility reasons, but each bit in the bitstring tagged, using the “named bits” notation, and those tags reflect the tabular.
   The following IEs are affected:
   Security capability (10.3.3.37)
   ASC setting (10.3.6.6) – note that a clarification is also made in the text in 8.6.6.29 on references to bits.
   Downlink channelisation codes (10.3.5.17)
   PRACH info (for RACH) (10.3.6.52)
   Inter-RAT UE security capability (10.3.8.8a)
2. Octet strings containing NAS messages
   It is clarified in the tabular that the first octet of the NAS information is put into the first octet of the octet string and so on.
   The following IEs are affected:
   NAS message (10.3.1.8)
   NAS system information (10.3.1.9)
3. Upper layer or inter-RAT information specified as bit strings
   For most of these, in the tabular semantics a naming of the bits is defined for each IE (e.g. “b0-b31”), and if necessary explaining which bit that is least significant (“b0”). If not the notion of bit significance can be used, an explaination in the tabular that the first bit of the upper layer or NAS information is contained in the first bit of the bit string (in the same way as for sequences of digits or octet strings).
   It is also added a general statement in a new subclause of 11 on the mapping between tabular and ASN.1 bitstrings in the cases where the tabular semantics defines significance of bits. It is said that the bit defined as most significant in tabular is carried as the first (leftmost) bit of the ASN.1 bitstring.
   The following IEs are affected:
   Intra Domain NAS Node Selector (10.3.1.6)
   Location Area Identification (10.3.1.7)
   P-TMSI (GSM-MAP) (10.3.1.13)
   RAB identity (10.3.1.14)
   Routing Area Code (10.3.1.15)
   NAS Synchronization Indicator (10.3.4.12)

		Inter-RAT measured results list (10.3.7.26) Inter-RAT message (10.3.8.8) Rplmn information (10.3.8.15) SIB data fixed (10.3.8.19) SIB data variable (10.3.8.20) ANSI-41 NAS parameter (10.3.9.3) MIN_P_REV (10.3.9.8) NID (10.3.9.9) P_REV (10.3.9.10) SID (10.3.9.11) 4. Upper layer identifiers specified as sequences of digits It is clarified in the tabular that the first digit of the identifier is stored as the first digit of the sequence. The following IEs are affected: IMEI (10.3.1.4) IMSI (GSM-MAP) (10.3.1.5) PLMN identity (10.3.1.11) 5. The order of how the bits in RRC PDUs are mapped to/from RLC SDUs It is stated in 12.1 that the first bit in the RRC PDU becomes the first bit of the RLC SDU and vice versa.
Consequences if not approved:	⌘	A risk of incompatibility in case of different interpretation of the order of elements.

Clauses affected:	⌘	8.6.6.29, 10.3.1.4, 10.3.1.5, 10.3.1.6, 10.3.1.7, 10.3.1.8, 10.3.1.9, 10.3.1.11, 10.3.1.13, 10.3.1.14, 10.3.1.15, 10.3.1.17, 10.3.3.16, 10.3.3.37, 10.3.3.38, 10.3.4.12, 10.3.6.6, 10.3.6.17, 10.3.6.52, 10.3.7.26, 10.3.8.8, 10.3.8.8a, 10.3.8.15, 10.3.8.19, 10.3.8.20, 10.3.9.3, 10.3.9.8, 10.3.9.9, 10.3.9.10, 10.3.9.11, 11.a (new), 11.3, 12.1		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6.6.29 ASC setting

If the IE "ASC setting" is included, the UE shall:

- establish the available signatures for this ASC as specified in the following:
  - renumber the list of available signatures specified in the IE "Available signature" included in the IE "PRACH info" from signature index 0 to signature index N-1, where N is the number of available signatures, starting with the lowest available signature number and continuing in sequence, in the order of increasing signature numbers;
  - consider as available signatures for this ASC the signatures included in this renumbered list from the index specified by the IE "Available signature Start Index" to the index specified by the IE "Available signature End Index";
- establish the available access slot sub-channels for this ASC as specified in the following:
  - if the IE "AICH transmission timing" included in the IE "AICH Info" is set to '0';
    - ignore the leftmost (most significant) bit (bit b3) of the bitstring specified by the IE "Assigned Sub-Channel Number";
    - repeat 4 times the 3 rightmost (least significant) bits (bits b2-b0) of the bitstring specified by the IE "Assigned Sub-Channel Number" to form a resulting bitstring 'b2 b1 b0 b2 b1 b0 b2 b1 b0 b2 b1 b0' of length 12 bits, where the leftmost bit is the most significant;
  - if the IE "AICH transmission timing" included in the IE "AICH Info" is set to '1':
    - repeat 3 times the bitstring (bits b3-b0) specified by the IE "Assigned Sub-Channel Number" to form a bitstring 'b3 b2 b1 b0 b3 b2 b1 b0 b3 b2 b1 b0' of length 12 bits, where the leftmost bit is the most significant;
  - perform in both cases, for the resulting bitstring (that includes the repetitions) bit-wise logical AND operation with the IE "Available Sub Channel number" included in IE "PRACH info (for RACH)";
  - consider as available sub-channels for this ASC the available sub-channels indicated in the resulting bitstring, after logical AND operation i.e. each bit set to 1 or 0 indicates availability or non-availability, respectively, of sub-channel number *x*, with *x* from 0 to 11, for the respective ASC.

NOTE 1: In FDD, the list of available signatures is renumbered from signature index 0 to signature index N-1, where N is the number of available signatures, starting with the lowest available signature number and continuing in sequence, in the order of increasing signature numbers.

- List of available signatures: 16 or less signatures are available.
- Example: only signatures 0, 5, 10 and 15 are available, then :
- Signature 0 is: available signature index 0
- Signature 5 is: available signature index 1
- Signature 10 is: available signature index 2
- Signature 15 is: available signature index 3

NOTE 2: In TDD, the list of available channelisation codes (defined in PRACH info) is renumbered from channelisation code index 0 to channelisation code index N-1, where N is the number of available channelisation codes, starting with the lowest available channelisation code number and continuing in sequence, in the order of increasing channelisation code numbers

List of available channelisation codes : 8 or less channelisation codes are available.

The i-th bit of the bitmap defined in the IE "Available Channelisation Code indices" defines whether the channelisation code with the available channelisation code index i is to be used for this ASC (bit set means used, bit unset means not used). Only the low N bits shall be used in the bitmap, where N is the number of available channelisation codes defined in PRACH info.

Ex : spreading factor 16, channelisation codes 16/1, 16/2, 16/5, 16/10 are available :

Channelisation code 16/1 is: available channelisation code index 0
Channelisation code 16/2 is: available channelisation code index 1
Channelisation code 16/5 is: available channelisation code index 2
Channelisation code 16/10 is: available channelisation code index 3

Available Channelisation Code indices has the value '1100' means: Channelisation Codes 16/5 and 16/10 are available for this ASC.

NOTE 3: In TDD, the subchannel description is found in [33].

10.3.1.4 IMEI

This IE contains an International Mobile Equipment Identity. Setting specified in [11].

Information Element/Group name	Need	Multi	Type and reference	Semantics description
IMEI	MP	15		The first element contains the first IMEI digit, the second element the second IMEI digit and so on.
>IMEI digit	MP		INTEGER(0. .15)	

10.3.1.5 IMSI (GSM-MAP)

This IE contains an International Mobile Subscriber Identity, used towards a GSM-MAP type of PLMN. Setting specified in [11].

Information Element/Group name	Need	Multi	Type and reference	Semantics description
IMSI	MP	6 to 15		The first element contains the first IMSI digit, the second element the second IMSI digit and so on.
>IMSI digit	MP		INTEGER(0. .9)	

10.3.1.6 Intra Domain NAS Node Selector

This IE carries information to be used to route the establishment of a signalling connection to a CN node within a CN domain.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE version	MP			
>R99				
>>CHOICE CN type	MP			
>>>GSM-MAP				
>>>>CHOICE Routing basis	MP			
>>>>>local (P)TMSI				TMSI allocated in the current LA or PTMSI allocated in the current RA
>>>>>>Routing parameter	MP		Bitstring (10)	The TMSI/ PTMSI consists of 4 octets (32bits). The bits are numbered from b0 to b31, with bit b0 being the least significant The "Routing parameter" bitstring consists of bits b14 through b23 of the TMSI/ PTMSI among bit b14 is the least significant.
>>>>>(P)TMSI of same PLMN, different (RA)LA				TMSI allocated in another LA of this PLMN or PTMSI allocated in another RA this PLMN
>>>>>>Routing parameter	MP		Bitstring (10)	The TMSI/ PTMSI consists of 4 octets (32bits). The bits are numbered from b0 to b31, with bit b0 being the least significant The "Routing parameter" bitstring consists of bits b14 through b23 of the TMSI/ PTMSI among bit b14 is the least significant.
>>>>>(P)TMSI of different PLMN				TMSI or a PTMSI allocated in another PLMN
>>>>>>Routing parameter	MP		Bitstring (10)	The TMSI/ PTMSI consists of 4 octets (32bits). The bits are numbered from b0 to b31, with bit b0 being the least significant The "Routing parameter" bitstring consists of bits b14 through b23 of the TMSI/ PTMSI among bit b14 is the least significant.
>>>>>IMSI(response to IMSI paging)				NAS identity is IMSI
>>>>>>Routing parameter	MP		Bitstring (10)	The "Routing parameter" bitstring consists of DecimalToBinary [(IMSI div 10) mod 1000]. The bits of the result are numbered from b0 to b9, with bit b0 being the least significant.
>>>>>IMSI(cause UE initiated event)				NAS identity is IMSI
>>>>>>Routing parameter	MP		Bitstring (10)	The "Routing parameter" bitstring consists of DecimalToBinary [(IMSI div 10) mod 1000]. The bits of the result are numbered from b0 to b9, with bit b0 being the least significant.
>>>>>IMEI				NAS parameter is IMEI

>>>>>>Routing parameter	MP		Bitstring (10)	The "Routing parameter" bitstring consists of DecimalToBinary [(IMEI div 10) mod 1000]. The bits of the result are numbered from b0 to b9, with bit b0 being the least significant.
>>>>>Spare 1			Bitstring (10)	This choice shall not be used in this version
>>>>>Spare 2			Bitstring (10)	This choice shall not be used in this version
>>>>Entered parameter	MP		Boolean	Entered parameter shall be set to TRUE if the most significant byte of the current LAI/RAI is different compared to the most significant byte of the LAI/RAI stored on the SIM; Entered parameter shall be set to FALSE otherwise
>>>ANSI-41			Bitstring (14)	All bits shall be set to 0
>Later			Bitstring(15)	This bitstring shall not be sent by mobiles that are compliant to this version of the protocol.

10.3.1.7 Location Area Identification

Identifies uniquely a location area for a GSM-MAP type of PLMN. Setting specified in [5].

Information Element/Group name	Need	Multi	Type and reference	Semantics description
PLMN identity	MP		PLMN identity 10.3.1.11	
LAC	MP		Bit string(16)	The LAC bits are numbered b0-b15, where b0 is the least significant bit.

10.3.1.8 NAS message

A non-access stratum message to be transferred transparently through UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
NAS message	MP		Octet string (1..4095)	The first octet contains octet 1 [17] of the NAS message, the second octet contains octet 2 of the NAS message and so on.

10.3.1.9 NAS system information (GSM-MAP)

This information element contains system information that belongs to the non-access stratum for a GSM-MAP type of PLMN. This information is transparent to RRC. It may contain either information specific to one CN domain (CS or PS) or information common for both CN domains.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
GSM-MAP NAS system information	MP		Octet string(1..8)	The first octet contains octet 1 [17] of the NAS system information element, the second octet contains octet 2 of the NAS system information element and so on.

10.3.1.11 PLMN identity

This information element identifies a Public Land Mobile Network for a GSM-MAP type of PLMN. Setting of digits is defined in [11].

Information Element/Group name	Need	Multi	Type and reference	Semantics description
MCC	MP	3		The first element contains the first MCC digit, the second element the second MCC digit and so on.
>MCC digit	MP		INTEGER(0..9)	
MNC	MP	2 to 3		The first element contains the first MNC digit, the second element the second MNC digit and so on.
>MNC digit	MP		INTEGER(0..9)	

10.3.1.13 P-TMSI (GSM-MAP)

This IE contains a Packet Temporary Mobile Subscriber Identity, used towards a GSM-MAP type of PLMN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
P-TMSI	MP		Bit string (32)	Setting specified in [11]. The P-TMSI bits are numbered b0-b31, where b0 is the least significant bit.

10.3.1.14 RAB identity

This information element uniquely identifies a radio access bearer within a CN domain.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *RAB identity type*	MP			
>RAB identity (GSM-MAP)			Bit string (8)	Formatted according to [5]. The bits are numbered b1-b8, where b1 is the least significant bit.
>RAB identity (ANSI-41)			Bit string (8)	The bits are numbered b1-b8, where b1 is the least significant bit.

CHOICE *NAS binding info type*	**Condition under which the given *RAB identity type* is chosen**
RAB identity (GSM-MAP)	PLMN is of type GSM-MAP
RAB identity (ANSI-41)	PLMN is of type ANSI-41

10.3.1.15 Routing Area Code

Identifies a routing area within a location area for a GSM-MAP type of PLMN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Routing Area Code	MP		Bit string(8)	Setting specified in [11]. The Routing Area Code bits are numbered b0 to b7, where b0 is the least significant bit.

10.3.1.17 TMSI (GSM-MAP)

This IE contains a Temporary Mobile Subscriber Identity, used towards a GSM-MAP type of PLMN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
TMSI (GSM-MAP)	MP		Bit string (32)	Setting specified in [11]. The TMSI bits are numbered b0-b31, where b0 is the least significant bit.

10.3.3.16 Integrity check info

The Integrity check info contains the RRC message sequence number needed in the calculation of XMAC-I [40] and the calculated MAC-I.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message authentication code	MP		bit string(32)	MAC-I [40]. The Message Authentication Code bits are numbered b0-b31, where b0 is the least significant bit. The 27 MSB of the IE shall be set to zero and the 5 LSB of the IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm.
RRC Message sequence number	MP		Integer (0..15)	The local RRC hyper frame number (RRC HFN) is concatenated with the RRC message sequence number to form the input parameter COUNT-I for the integrity protection algorithm. The IE value shall be set to zero when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm.

10.3.3.37 Security capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Ciphering algorithm capability	MP		~~Bit string(16)~~	~~"0000000000000001$_2$": UEA0, no encryption supported; "0000000000000010$_2$": UEA1, Kasumi supported~~
>UEA0	MP		Boolean	The value TRUE means that an unciphered connection after the Security mode control procedure is accepted by the UE.
>UEA1	MP		Boolean	The value TRUE means that UEA1, Kasumi, is supported
>Spare	MP	14	Boolean	Shall be set to FALSE by UEs complying with this version of the protocol.
Integrity protection algorithm capability	MP		~~Bit string(16)~~	~~"0000000000000010$_2$": UIA1, Kasumi supported~~
>UIA1	MP		Boolean	The value TRUE means that UIA1, Kasumi, is supported
>Spare	MP	15	Boolean	Shall be set to FALSE by UEs complying with this version of the protocol.

NOTE: ~~Each bit is 0 or 1 to indicate support for the corresponding UEAx or UIAx, x=0 to 15.~~ The UE shall support at least one UEAx other than UEA0 and one UIAx. ~~The ciphering algorithm capability bit for UEA0 indicates to UTRAN if the UE accepts unciphered connection(s) after the security mode control procedure.~~

10.3.3.38 START

There is a START value per CN domain. The START is used to initialise the 20 MSBs of all hyper frame numbers (MAC-d HFN, RLC UM HFN, RLC AM HFN, RRC HFN) for a CN domain.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
START	MP		Bit string (20)	The START [40] bits are numbered b0-b19, where b0 is the least significant bit.

10.3.4.12 NAS Synchronization indicator

A container for non-access stratum information to be transferred transparently through UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
NAS Synchronization indicator	MP		Bitstring(4)	The bits are numbered b1-b4, where b1 is the least significant bit.

10.3.6.6 ASC setting

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE mode	MP			
>FDD				
>>Available signature Start Index	MP		Integer(0..15)	
>>Available signature End Index	MP		Integer(0..15)	
>>Assigned Sub-Channel Number	MP		Bitstring(4)	This IE defines the subchannel assignment as specified in 8.6.6.29. The bits are numbered b0 to b3, where b0 is the least significant bit.
>TDD				
>>Available Channelisation codes indices	MD		Bitstring(8)	Each bit indicates availability of a channelisation code index, where the channelisation code indices are numbered "channelisation code index 0" to "channelisation code index 7". The value 1 of a bit indicates that the channelisation code index is available for the ASC this IE is associated to. The value 0 of a bit indicates that the channelisation code index is not available for the ASC this IE is associated to. Default is that all channelisation codes defined in PRACH Info are available.
>>CHOICE subchannel size	MP			
>>>Size1				
>>>>Available Subchannels	MP		null	Indicates that all Subchannels are available.
>>>Size2				
>>>>Available Subchannels	MD		Bitstring (2)	NOTE 1~~Each bit indicates if the subchannel is available for the given ASC.~~ ~~01: subchannel 0~~ ~~10: subchannel 1~~ ~~11: all subchannels~~ ~~Default is all subchannels.~~
>>>Size4				
>>>>Available Subchannels	MD		Bitstring (4)	NOTE 1~~Each bit indicates if the subchannel is available for the given ASC.~~ ~~0001: subchannel 0~~ ~~0011: subchannels 0 & 1~~ ~~...~~ ~~1111: all subchannels.~~ ~~Default is all subchannels.~~
>>>Size8				

>>>>Available Subchannels	MD		Bitstring (8)	NOTE 1~~Each bit indicates if the subchannel is available for the given ASC.~~ ~~00000001: subchannel 0~~ ~~00000011: subchannels 0 & 1~~ ~~...~~ ~~11111111: all subchannels~~ ~~Default is all subchannels.~~

NOTE 1: Each bit indicates availability of a subchannel, where the subchannels are numbered subchannel 0, subchannel 1 etc. The value 1 of a bit indicates that the subchannel is available for the ASC this IE is associated with. The value 0 of a bit indicates that the subchannel is not available for the ASC this IE is associated with. Default value of the IE is that all subchannels within the size are available for the ASC this IE is associated with.

10.3.6.17 Downlink channelisation codes

NOTE: Only for TDD

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *codes representation*	MP			
>Consecutive codes				
>>First channelisation code	MP		Enumerated ((16/1)...(16/16))	The codes from First channelisation code to Last channelisation code shall be used in that order by the physical layer in this timeslot. If a TFCI exists in this timeslot, it is mapped in the First channelisation code.
>>Last channelisation code	MP		Enumerated ((16/1)...(16/16))	If this is the same as First channelisation code, only one code is used by the physical layer.
>Bitmap				
>>Channelisation codes bitmap	MP		Bit string~~map~~(16)	~~0000000000000000: Usage of SF1~~ ~~0000000000000001: Channelisation Code 1, SF16~~ ~~0000000000000010: Channelisation Code 2, SF16~~ ~~0000000000000011: Channelisation Code 1 & 2, SF16~~ ~~.....~~ ~~1111111111111111: Channelisation Code 1 to 16, SF16~~ Each bit indicates the availability of a channelisation code for SF16, where the channelisation codes are numbered as channelisation code 1 (SF16) to channelisation code 16 (SF16). (For SF 16, a 1 in the bitmap means that the corresponding code is used, a 0 means that the corresponding code is not used.) If all bits are set to zero, SF 1 shall be used.

10.3.6.52 PRACH info (for RACH)

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>Available Signature	MP		Bitstring(16)	~~(Note1)~~ ~~0000000000000001:Signature 0~~ ~~0000000000000010:Signature 1~~ ~~0000000000000011:Signature 0&1~~ ~~.....:~~ ~~1111111111111111:Signature 0to15~~ Each bit indicates availability for a signature, where the signatures are numbered "signature 0" up to "signature 15". The value 1 of a bit indicates that the corresponding signature is available and the value 0 that it is not available.
>>Available SF	MP		Integer (32,64,128,256)	In chips per symbol Defines the smallest permitted SF (i.e. the maximum rate)
>>Preamble scrambling code number	MP		Integer (0 .. 15)	Identification of scrambling code see [28]
>>Puncturing Limit	MP		Real(0.40..1.00 by step of 0.04)	
>>Available Sub Channel Number	MP		Bitstring(12)	~~(Note2)~~ ~~000000000001:SubChNumber 0~~ ~~000000000010:SubChNumber 1~~ ~~000000000011:SubChNumber 0&1~~ ~~...:~~ ~~111111111111:SubChNumber 0to11~~ Each bit indicates availability for a subchannel, where the subchannels are numbered "subchannel 0" to "subchannel 11". The value 1 of a bit indicates that the corresponding subchannel is available and the value 0 indicates that it is not available.
>TDD				
>>Timeslot number	MP		Timeslot number 10.3.6.84	
>>PRACH Channelisation Code List	MP		PRACH Channelisation Code List 10.3.6.51	
>>PRACH Midamble	MP		Enumerated (Direct, Direct/Inverted)	Direct or direct and inverted midamble are used for PRACH

~~NOTE 1: Each bit is 0 or 1 to indicate available signature_x, x= 0 to 15.~~

~~NOTE 2: Each bit is 0 or 1 to indicate available sub channel number _x, x= 0 to 11.~~

10.3.7.26 Inter-RAT measured results list

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Inter-RAT measurement results	OP	1 to <maxOtherRAT>		
>CHOICE system				At least one spare value needed
>>GSM				
>>>Measured GSM cells	MP	1 to <maxReportedGSMCells>		
>>>>GSM carrier RSSI	OP		bit string(6)	RXLEV, [46]. The RSSI bits are numbered b0 to b5, where b0 is the least significant bit.
>>>>Pathloss	OP		Integer(46..158)	In dB
>>>>CHOICE BSIC	MP			
>>>>>Verified BSIC				
>>>>>>inter-RAT cell id			Integer(0..<maxCellMeas>)	
>>>>>Non verified BSIC				
>>>>>>BCCH ARFCN			Integer (0..1023)	[45]
>>>>Observed time difference to GSM cell	OP		Observed time difference to GSM cell 10.3.7.52	

10.3.8.8 Inter-RAT message

This Information Element contains one or several messages that are structured and coded according to the specification used for the system type indicated by the first parameter.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
System type	MP		Enumerated (GSM (DCS 1800 band used), GSM (PCS 1900 band used), cdma2000)	This IE indicates in particular which specification to apply to decode the transported messages
CHOICE *system*	MP			
>GSM				
>>Message(s)	MP	1.to.<maxInterSysMessages>	Bitstring (1..512)	Formatted and coded according to GSM specifications. The first bit of the bitstring contains the first bit of the GSM message.
>cdma2000				
>>cdma2000Message	MP	1.to.<maxInterSysMessages>		
>>>MSG_TYPE(s)	MP		Bitstring (8)	Formatted and coded according to cdma2000 specifications. The MSG_TYPE bits are numbered b0 to b7, where b0 is the least significant bit..
>>>cdma2000Messagepayload(s)	MP		Bitstring (1..512)	Formatted and coded according to cdma2000 specifications. The first bit of the bitstring contains the first bit of the cdma2000 message.

Condition	Explanation
System	The 'GSM' choice shall be applied when the IE 'System type' is 'GSM except PCS 1900' or 'PCS 1900', and the 'cdma2000' choice shall be applied when the IE 'system type' is 'cdma2000'.

10.3.8.8a Inter-RAT UE security capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *system*	MP			
>GSM				
>>GSM security capability	MP		~~Bit string(7)~~	~~"0000001$_2$": A5/1 supported, "0000010$_2$": A5/2 supported, "0000100$_2$": A5/3 supported, "0001000$_2$": A5/4 supported, "0010000$_2$": A5/5 supported, "0100000$_2$": A5/6 supported, "1000000$_2$": A5/7 supported~~The value TRUE means that the indicated ciphering algorithm is supported.
>>>A5/7 supported	MP		Boolean	
>>>A5/6 supported	MP		Boolean	
>>>A5/5 supported	MP		Boolean	
>>>A5/4 supported	MP		Boolean	
>>>A5/3 supported	MP		Boolean	
>>>A5/2 supported	MP		Boolean	
>>>A5/1 supported	MP		Boolean	

10.3.8.15 Rplmn information

Contains information to provide faster RPLMN selection in the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
GSM BA Range	OP	1 to maxNumGSMFreqRanges		GSM BA Range
>GSM Lower Range (UARFCN)	MP		Integer(0..16383)	Lower bound for range of GSM BA freqs
>GSM Upper Range (UARFCN)	MP		Integer(0..16383)	Upper bound for range of GSM BA freqs
FDD UMTS Frequency list	OP	1 to maxNumFDDFreqs		
>UARFCN (Nlow)	MP		Integer(0..16383)	[21]
>UARFCN (Nupper)	OP		Integer(0..16383)	[21] This IE is only needed when the FDD frequency list is specifying a range.
TDD UMTS Frequency list	OP	1 to maxNumTDDFreqs		
>UARFCN	MP		Integer(0..16383)	[22]
CDMA2000 UMTS Frequency list	OP	1 to maxNumCDMA200Freqs		
>BAND_CLASS	MP		Bitstring(5 bits)	TIA/EIA/IS-2000. The BAND_CLASS bits are numbered b0 to b4, where b0 is the least significant bit.
>CDMA_FREQ	MP		Bitstring (11 bits)	TIA/EIA/IS-2000. The CDMA_FREQ bits are numbered b0 to b10, where b0 is the least significant bit.

10.3.8.19 SIB data fixed

Contains the result of a master information block or a system information block after encoding and segmentation. The IE is used for segments with fixed length (segments filling an entire transport block).

Information Element/Group name	Need	Multi	Type and reference	Semantics description
SIB data fixed	MP		Bit string (222)	The first bit contains the first bit of the segment.

10.3.8.20 SIB data variable

Contains either a complete system information block or a segment of a system information block. Contains the result of a master information block or a system information block after encoding and segmentation. The IE is used for segments with variable length. The system information blocks are defined in clauses10.2.48.8.1 to10.2.48.8.18.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
SIB data variable	MP		Bit string (1..214)	The first bit contains the first bit of the segment.

10.3.9.3 ANSI-41 NAS parameter

This Information Element contains ANSI-41 User Zone Identification information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
ANSI-41 NAS parameter	MP		Bit string (size (1..2048))	The first bit contains the first bit of the ANSI-41 information.

10.3.9.8 MIN_P_REV

This Information Element contains minimum protocol revision level.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
MIN_P_REV	MP		Bitstring (8)	Minimum protocol revision level. The MIN_P_REV bits are numbered b0 to b7, where b0 is the least significant bit.

10.3.9.9 NID

This Information Element contains Network identification.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
NID	MP		Bitstring (16)	Network identification. The NID bits are numbered b0 to b15, where b0 is the least significant bit.

10.3.9.10 P_REV

This Information Element contains protocol revision level.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
P_REV	MP		Bitstring (8)	Protocol revision level. The P_REV bits are numbered b0 to b7, where b0 is the least significant bit..

10.3.9.11 SID

This Information Element contains System identification.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
SID	MP		Bitstring (15)	System identification. The SID bits are numbered b0 to b14, where b0 is the least significant bit.

11 Message and Information element abstract syntax (with ASN.1)

This clause contains definitions for RRC PDUs and IEs using a subset of ASN.1 as specified in [14]. PDU and IE definitions are grouped into separate ASN.1 modules.

11.a General

If the abstract syntax of an IE is defined using the ASN.1 type "BIT STRING", and this IE corresponds to a functional IE definition in tabular format, in which the significance of bits is semantically defined, the following general rule shall be applied:

The bits in the ASN.1 bit string shall represent the semantics of the functional IE definition in decreasing order of bit significance;

- with the first (or leftmost) bit in the bit string representing the most significant bit, and;
- with the last (or rightmost) bit in the bit string representing the least significant bit.

11.1 General message structure

11.3 Information element definitions

```
-- **************************************************
--
--     USER EQUIPMENT INFORMATION ELEMENTS (10.3.3)
--
-- **************************************************


SecurityCapability ::=              SEQUENCE {
    cipheringAlgorithmCap                ----BIT STRING {
                                             spare15(0),
                                             spare14(1),
                                             spare13(2),
                                             spare12(3),
                                             spare11(4),
                                             spare10(5),
                                             spare9(6),
                                             spare8(7),
                                             spare7(8),
                                             spare6(9),
                                             spare5(10),
                                             spare4(11),
                                             spare3(12),
                                             spare2(13),
                                             uea1(14),
                                             uea0(15)
                                             }   (SIZE (16)),
    integrityProtectionAlgorithmCap     BIT STRING {
                                             spare15(0),
                                             spare14(1),
                                             spare13(2),
                                             spare12(3),
                                             spare11(4),
                                             spare10(5),
                                             spare9(6),
                                             spare8(7),
                                             spare7(8),
                                             spare6(9),
                                             spare5(10),
                                             spare4(11),
                                             spare3(12),
                                             spare2(13),
                                             uia1(14),
                                             spare0(15)
                                             }   (SIZE (16))
}


-- **************************************************
--
--     PHYSICAL CHANNEL INFORMATION ELEMENTS (10.3.6)
--
-- **************************************************


AccessServiceClass-FDD ::=          SEQUENCE {
    availableSignatureStartIndex        INTEGER (0..15),
    availableSignatureEndIndex          INTEGER (0..15),

    assignedSubChannelNumber            BIT STRING {
                                             b3(0),
                                             b2(1),
                                             b1(2),
                                             b0(3)
                                             }   (SIZE(4))
}

AccessServiceClass-TDD ::=          SEQUENCE {
    channelisationCodeIndices           BIT STRING {
                                             chCodeIndex0(0),
                                             chCodeIndex1(1),
                                             chCodeIndex2(2),
                                             chCodeIndex3(3),
                                             chCodeIndex4(4),
```

```
                                        chCodeIndex5(5),
                                        chCodeIndex6(6),
                                        chCodeIndex7(7)
                                        }   (SIZE(8))               OPTIONAL,
    subchannelSize                  CHOICE {
        size1                           NULL,
-- in size2, subch0 means bitstring '01' in the tabular, subch1 means bitsring '10'.
        size2                           SEQUENCE {
            subchannels                     ENUMERATED  { subch0, subch1 }  OPTIONAL
        },
        size4                           SEQUENCE {
            subchannels                     BIT STRING {
                                                subCh3(0),
                                                subCh2(1),
                                                subCh1(2),
                                                subCh0(3)
                                                }   (SIZE(4))       OPTIONAL
        },
        size8                           SEQUENCE {
            subchannels                     BIT STRING {
                                                subCh7(0),
                                                subCh6(1),
                                                subCh5(2),
                                                subCh4(3),
                                                subCh3(4),
                                                subCh2(5),
                                                subCh1(6),
                                                subCh0(7)
                                                }   (SIZE(8))       OPTIONAL
        }
    }
}


AvailableSignatures ::=         BIT STRING {
                                    Signature15(0),
                                    signature14(1),
                                    signature13(2),
                                    signature12(3),
                                    signature11(4),
                                    signature10(5),
                                    signature9(6),
                                    signature8(7),
                                    signature7(8),
                                    signature6(9),
                                    signature5(10),
                                    signature4(11),
                                    signature3(12),
                                    signature2(13),
                                    signature1(14),
                                    signature0(15)
                                    }   (SIZE(16))

AvailableSubChannelNumbers ::=      BIT STRING {
                                    SubCh11(0),
                                    subCh10(1),
                                    subCh9(2),
                                    subCh8(3),
                                    subCh7(4),
                                    subCh6(5),
                                    subCh5(6),
                                    subCh4(7),
                                    subCh3(8),
                                    subCh2(9),
                                    subCh1(10),
                                    subCh0(11)
                                    }   (SIZE(12))


DL-TS-ChannelisationCodesShort ::=  SEQUENCE {
    codesRepresentation                 CHOICE {
        consecutive                         SEQUENCE {
            firstChannelisationCode             DL-TS-ChannelisationCode,
            lastChannelisationCode              DL-TS-ChannelisationCode
        },
        bitmap                              BIT STRING {
                                                chCode16-SF16(0),
                                                chCode15-SF16(1),
```

```
                                                chCode14-SF16(2),
                                                chCode13-SF16(3),
                                                chCode12-SF16(4),
                                                chCode11-SF16(5),
                                                chCode10-SF16(6),
                                                chCode9-SF16(7),
                                                chCode8-SF16(8),
                                                chCode7-SF16(9),
                                                chCode6-SF16(10),
                                                chCode5-SF16(11),
                                                chCode4-SF16(12),
                                                chCode3-SF16(13),
                                                chCode2-SF16(14),
                                                chCode1-SF16(15)
                                                } (SIZE (16))
    }
}

-- ************************************************
--
--     OTHER INFORMATION ELEMENTS (10.3.8)
--
-- ************************************************

GsmSecurityCapability ::=           BIT STRING {
                                        a5-7(0),
                                        a5-6(1),
                                        a5-5(2),
                                        a5-4(3),
                                        a5-3(4),
                                        a5-2(5),
                                        a5-1(6)
                                        }   (SIZE (7))
```

12 Message transfer syntax

Transfer syntax for RRC PDUs is derived from their ASN.1 definitions by use of Packed Encoding Rules, unaligned as specified in X.691 [49], and with adapted final padding. If special encoding is used, it is indicated in the ECN module defined for each ASN.1 module. The use of special encoding is defined in [14].

12.1 Structure of encoded RRC messages

An RRC PDU, which is the bit string that is exchanged between peer entities/ across the radio interface, is the concatenation of a basic production, an extension and padding, in that order.

RRC PDUs shall be mapped to and from RLC SDUs upon transmission and reception as follows:

- When delivering an RRC PDU as an RLC SDU to the RLC layer for transmission, the first bit of the RRC PDU shall be represented as the first bit in the RLC SDU and onwards, and;
- upon reception of an RLC SDU from the RLC layer, the first bit of the RLC SDU shall represent the first bit of the RRC PDU and onwards.

12.1.1 Basic production

The 'basic production' is obtained by applying UNALIGNED PER to the abstract syntax value (the ASN.1 description) as specified in X.691, except for the 0 to 7 bits added at the end to produce a multiple of 8 bits. The basic production can have any positive number of bits, not necessarily a multiple of 8 bits.

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21st-25th 2001

Tdoc R2-011429

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **752** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Order of elements in strings
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-25
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘

1. The order of bits in bit strings containing information non-transparent to RRC needs to be clarified
   A few information elements are specified as bit strings but still intepreted and used by RRC, such as PRACH info, ciphering capability etc.
   In some of these cases each bit is given a separate meaning. Currently for those cases the meaning is explained by values of the total bit string, e.g. '0010'. However, the order of the bits is not explicitely defined in these explainations, even if rightmost bit should be interpreted as the least significant bit. In ASN.1 it is defined as a bit string, without any connection to the tabular definitions of the meaning of the bits. Therefore it needs to be clarified both in tabular, and in ASN.1, the meaning of each individual bit.
2. The order of octets in octet strings containing NAS messages needs to be clarified
   For the octet strings that are used to carry RRC transparent information (such as NAS messages) the mapping of the octets in the NAS message on the RRC octet string has not been explicitely defined. TS 24.007 defines a numbering of octets in the NAS messages, where octets are numbered from 1 and up. A hidden assumption is that octet 1 of the NAS message is mapped on the first octet in the RRC octet string, but that has not explicitly been defined. To keep the integrity of the NAS message, this mapping needs to be defined.
3. The order of bits in upper layer or inter-RAT information specified as bit strings needs to be clarified
   For the transparent upper layer or inter-RAT information defined as bit strings in RRC, such as TMSI or inter-RAT message, RRC does not interpret the content. Nevertheless it is still important to define how the information is stored in the bit string to keep the integrity of the bit ordering and to be able to compare the bit string with an external value (e.g. at paging).
   The numbering of bits on ASN.1 bitstrings is defined as that the first (or leftmost) bit is the most significant. However, that bit is in ASN.1 numbered as "bit 0". This convention may cause problems since in if e.g. the semantics

of the bitstring is a “TMSI” the least significant bit is numbered bit 0. Because of this numbering of bits in ASN.1 bitstrings it is even more important to define which bit in the semantics that corresponds to which bit in the ASN.1 bitstring.

4. The order of digits in upper layer identifiers specified as sequences of digits needs to be clarified
   Some upper layer identifiers, such as IMSI, PLMN id and IMEI are specified as sequences of decimal or hexadecimal digits. RRC uses the content (without interpretation) for different kinds of comparisions. It is important that how the digits of the identifiers are mapped into the digits in the information element is defined, in order to keep the integrity of the digit ordering.
5. The order of how the bits in RRC PDUs are mapped to/from RLC SDUs is not explicitely defined.

Backwards compatibility analysis:
The CR contains corrections to functions where the specification was:

- ambiguous or not sufficiently explicit.

Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Summary of change: ⌘

1. Bit strings containing information non-transparent to RRC
   Where each individual bit has a unique meaning and is used in that way by RRC, the tabular should be changed to use list of enumerated (or Boolean). However, in some cases the procedure text performs operations on the bit string as a whole and then the bit string is kept in tabular.
   In ASN.1, the bit string is kept for backward compatibility reasons, but each bit in the bitstring tagged, using the “named bits” notation, and those tags reflect the tabular.
   The following IEs are affected:
   Security capability (10.3.3.37)
   ASC setting (10.3.6.6) – note that a clarification is also made in the text in 8.6.6.29 on references to bits.
   Downlink channelisation codes (10.3.5.17)
   PRACH info (for RACH) (10.3.6.52)
   Inter-RAT UE security capability (10.3.8.8a)
2. Octet strings containing NAS messages
   It is clarified in the tabular that the first octet of the NAS information is put into the first octet of the octet string and so on.
   The following IEs are affected:
   NAS message (10.3.1.8)
   NAS system information (10.3.1.9)
3. Upper layer or inter-RAT information specified as bit strings
   For most of these, in the tabular semantics a naming of the bits is defined for each IE (e.g. “b0-b31”), and if necessary explaining which bit that is least significant (“b0”). If not the notion of bit significance can be used, an explaination in the tabular that the first bit of the upper layer or NAS information is contained in the first bit of the bit string (in the same way as for sequences of digits or octet strings).
   It is also added a general statement in a new subclause of 11 on the mapping between tabular and ASN.1 bitstrings in the cases where the tabular semantics defines significance of bits. It is said that the bit defined as most significant in tabular is carried as the first (leftmost) bit of the ASN.1 bitstring.
   The following IEs are affected:
   Intra Domain NAS Node Selector (10.3.1.6)
   Location Area Identification (10.3.1.7)
   P-TMSI (GSM-MAP) (10.3.1.13)
   RAB identity (10.3.1.14)
   Routing Area Code (10.3.1.15)
   NAS Synchronization Indicator (10.3.4.12)

		Inter-RAT measured results list (10.3.7.26) Inter-RAT message (10.3.8.8) Rplmn information (10.3.8.15) SIB data fixed (10.3.8.19) SIB data variable (10.3.8.20) ANSI-41 NAS parameter (10.3.9.3) MIN_P_REV (10.3.9.8) NID (10.3.9.9) P_REV (10.3.9.10) SID (10.3.9.11) 4. Upper layer identifiers specified as sequences of digits It is clarified in the tabular that the first digit of the identifier is stored as the first digit of the sequence. The following IEs are affected: IMEI (10.3.1.4) IMSI (GSM-MAP) (10.3.1.5) PLMN identity (10.3.1.11) 5. The order of how the bits in RRC PDUs are mapped to/from RLC SDUs It is stated in 12.1 that the first bit in the RRC PDU becomes the first bit of the RLC SDU and vice versa.
Consequences if not approved:	⌘	A risk of incompatibility in case of different interpretation of the order of elements.

Clauses affected:	⌘	8.6.6.29, 10.3.1.4, 10.3.1.5, 10.3.1.6, 10.3.1.7, 10.3.1.8, 10.3.1.9, 10.3.1.11, 10.3.1.13, 10.3.1.14, 10.3.1.15, 10.3.1.17, 10.3.3.16, 10.3.3.37, 10.3.3.38, 10.3.4.12, 10.3.6.6, 10.3.6.17, 10.3.6.52, 10.3.7.26, 10.3.8.8, 10.3.8.8a, 10.3.8.15, 10.3.8.19, 10.3.8.20, 10.3.9.3, 10.3.9.8, 10.3.9.9, 10.3.9.10, 10.3.9.11, 11.a (new), 11.3, 12.1		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6.6.29 ASC setting

If the IE "ASC setting" is included, the UE shall:

- establish the available signatures for this ASC as specified in the following:
  - renumber the list of available signatures specified in the IE "Available signature" included in the IE "PRACH info" from signature index 0 to signature index N-1, where N is the number of available signatures, starting with the lowest available signature number and continuing in sequence, in the order of increasing signature numbers;
  - consider as available signatures for this ASC the signatures included in this renumbered list from the index specified by the IE "Available signature Start Index" to the index specified by the IE "Available signature End Index";
- establish the available access slot sub-channels for this ASC as specified in the following:
  - if the IE "AICH transmission timing" included in the IE "AICH Info" is set to '0';
    - ignore the leftmost (most significant) bit (bit b3) of the bitstring specified by the IE "Assigned Sub-Channel Number";
    - repeat 4 times the 3 rightmost (least significant) bits (bits b2-b0) of the bitstring specified by the IE "Assigned Sub-Channel Number" to form a resulting bitstring 'b2 b1 b0 b2 b1 b0 b2 b1 b0 b2 b1 b0' of length 12 bits, where the leftmost bit is the most significant;
  - if the IE "AICH transmission timing" included in the IE "AICH Info" is set to '1':
    - repeat 3 times the bitstring (bits b3-b0) specified by the IE "Assigned Sub-Channel Number" to form a bitstring 'b3 b2 b1 b0 b3 b2 b1 b0 b3 b2 b1 b0' of length 12 bits, where the leftmost bit is the most significant;
  - perform in both cases, for the resulting bitstring (that includes the repetitions) bit-wise logical AND operation with the IE "Available Sub Channel number" included in IE "PRACH info (for RACH)";
  - consider as available sub-channels for this ASC the available sub-channels indicated in the resulting bitstring, after logical AND operation i.e. each bit set to 1 or 0 indicates availability or non-availability, respectively, of sub-channel number *x*, with *x* from 0 to 11, for the respective ASC.

NOTE 1: In FDD, the list of available signatures is renumbered from signature index 0 to signature index N-1, where N is the number of available signatures, starting with the lowest available signature number and continuing in sequence, in the order of increasing signature numbers.

- List of available signatures: 16 or less signatures are available.
- Example: only signatures 0, 5, 10 and 15 are available, then :
- Signature 0 is: available signature index 0
- Signature 5 is: available signature index 1
- Signature 10 is: available signature index 2
- Signature 15 is: available signature index 3

NOTE 2: In TDD, the list of available channelisation codes (defined in PRACH info) is renumbered from channelisation code index 0 to channelisation code index N-1, where N is the number of available channelisation codes, starting with the lowest available channelisation code number and continuing in sequence, in the order of increasing channelisation code numbers

List of available channelisation codes : 8 or less channelisation codes are available.

The i-th bit of the bitmap defined in the IE "Available Channelisation Code indices" defines whether the channelisation code with the available channelisation code index i is to be used for this ASC (bit set means used, bit unset means not used). Only the low N bits shall be used in the bitmap, where N is the number of available channelisation codes defined in PRACH info.

Ex : spreading factor 16, channelisation codes 16/1, 16/2, 16/5, 16/10 are available :

Channelisation code 16/1 is: available channelisation code index 0
Channelisation code 16/2 is: available channelisation code index 1
Channelisation code 16/5 is: available channelisation code index 2
Channelisation code 16/10 is: available channelisation code index 3

Available Channelisation Code indices has the value '1100' means: Channelisation Codes 16/5 and 16/10 are available for this ASC.

NOTE 3: In TDD, the subchannel description is found in [33].

10.3.1.4 IMEI

This IE contains an International Mobile Equipment Identity. Setting specified in [11].

Information Element/Group name	Need	Multi	Type and reference	Semantics description
IMEI	MP	15		The first element contains the first IMEI digit, the second element the second IMEI digit and so on.
>IMEI digit	MP		INTEGER(0. .15)	

10.3.1.5 IMSI (GSM-MAP)

This IE contains an International Mobile Subscriber Identity, used towards a GSM-MAP type of PLMN. Setting specified in [11].

Information Element/Group name	Need	Multi	Type and reference	Semantics description
IMSI	MP	6 to 15		The first element contains the first IMSI digit, the second element the second IMSI digit and so on.
>IMSI digit	MP		INTEGER(0. .9)	

10.3.1.6 Intra Domain NAS Node Selector

This IE carries information to be used to route the establishment of a signalling connection to a CN node within a CN domain.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE version	MP			
>R99				
>>CHOICE CN type	MP			
>>>GSM-MAP				
>>>>CHOICE Routing basis	MP			
>>>>>local (P)TMSI				TMSI allocated in the current LA or PTMSI allocated in the current RA
>>>>>>Routing parameter	MP		Bitstring (10)	The TMSI/ PTMSI consists of 4 octets (32bits). The bits are numbered from b0 to b31, with bit b0 being the least significant The "Routing parameter" bitstring consists of bits b14 through b23 of the TMSI/ PTMSI among bit b14 is the least significant.
>>>>>(P)TMSI of same PLMN, different (RA)LA				TMSI allocated in another LA of this PLMN or PTMSI allocated in another RA this PLMN
>>>>>>Routing parameter	MP		Bitstring (10)	The TMSI/ PTMSI consists of 4 octets (32bits). The bits are numbered from b0 to b31, with bit b0 being the least significant The "Routing parameter" bitstring consists of bits b14 through b23 of the TMSI/ PTMSI among bit b14 is the least significant.
>>>>>(P)TMSI of different PLMN				TMSI or a PTMSI allocated in another PLMN
>>>>>>Routing parameter	MP		Bitstring (10)	The TMSI/ PTMSI consists of 4 octets (32bits). The bits are numbered from b0 to b31, with bit b0 being the least significant The "Routing parameter" bitstring consists of bits b14 through b23 of the TMSI/ PTMSI among bit b14 is the least significant.
>>>>>IMSI(response to IMSI paging)				NAS identity is IMSI
>>>>>>Routing parameter	MP		Bitstring (10)	The "Routing parameter" bitstring consists of DecimalToBinary [(IMSI div 10) mod 1000]. The bits of the result are numbered from b0 to b9, with bit b0 being the least significant.
>>>>>IMSI(cause UE initiated event)				NAS identity is IMSI
>>>>>>Routing parameter	MP		Bitstring (10)	The "Routing parameter" bitstring consists of DecimalToBinary [(IMSI div 10) mod 1000]. The bits of the result are numbered from b0 to b9, with bit b0 being the least significant.
>>>>>IMEI				NAS parameter is IMEI

>>>>>>Routing parameter	MP		Bitstring (10)	The "Routing parameter" bitstring consists of DecimalToBinary [(IMEI div 10) mod 1000]. The bits of the result are numbered from b0 to b9, with bit b0 being the least significant.
>>>>>Spare 1			Bitstring (10)	This choice shall not be used in this version
>>>>>Spare 2			Bitstring (10)	This choice shall not be used in this version
>>>>Entered parameter	MP		Boolean	Entered parameter shall be set to TRUE if the most significant byte of the current LAI/RAI is different compared to the most significant byte of the LAI/RAI stored on the SIM; Entered parameter shall be set to FALSE otherwise
>>>ANSI-41			Bitstring (14)	All bits shall be set to 0
>Later			Bitstring(15)	This bitstring shall not be sent by mobiles that are compliant to this version of the protocol.

10.3.1.7 Location Area Identification

Identifies uniquely a location area for a GSM-MAP type of PLMN. Setting specified in [5].

Information Element/Group name	Need	Multi	Type and reference	Semantics description
PLMN identity	MP		PLMN identity 10.3.1.11	
LAC	MP		Bit string(16)	The LAC bits are numbered b0-b15, where b0 is the least significant bit.

10.3.1.8 NAS message

A non-access stratum message to be transferred transparently through UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
NAS message	MP		Octet string (1..4095)	The first octet contains octet 1 [17] of the NAS message, the second octet contains octet 2 of the NAS message and so on.

10.3.1.9 NAS system information (GSM-MAP)

This information element contains system information that belongs to the non-access stratum for a GSM-MAP type of PLMN. This information is transparent to RRC. It may contain either information specific to one CN domain (CS or PS) or information common for both CN domains.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
GSM-MAP NAS system information	MP		Octet string(1..8)	The first octet contains octet 1 [17] of the NAS system information element, the second octet contains octet 2 of the NAS system information element and so on.

10.3.1.11 PLMN identity

This information element identifies a Public Land Mobile Network for a GSM-MAP type of PLMN. Setting of digits is defined in [11].

Information Element/Group name	Need	Multi	Type and reference	Semantics description
MCC	MP	3		The first element contains the first MCC digit, the second element the second MCC digit and so on.
>MCC digit	MP		INTEGER(0..9)	
MNC	MP	2 to 3		The first element contains the first MNC digit, the second element the second MNC digit and so on.
>MNC digit	MP		INTEGER(0..9)	

10.3.1.13 P-TMSI (GSM-MAP)

This IE contains a Packet Temporary Mobile Subscriber Identity, used towards a GSM-MAP type of PLMN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
P-TMSI	MP		Bit string (32)	Setting specified in [11]. The P-TMSI bits are numbered b0-b31, where b0 is the least significant bit.

10.3.1.14 RAB identity

This information element uniquely identifies a radio access bearer within a CN domain.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *RAB identity type*	MP			
>RAB identity (GSM-MAP)			Bit string (8)	Formatted according to [5]. The bits are numbered b1-b8, where b1 is the least significant bit.
>RAB identity (ANSI-41)			Bit string (8)	The bits are numbered b1-b8, where b1 is the least significant bit.

CHOICE *NAS binding info type*	**Condition under which the given *RAB identity type* is chosen**
RAB identity (GSM-MAP)	PLMN is of type GSM-MAP
RAB identity (ANSI-41)	PLMN is of type ANSI-41

10.3.1.15 Routing Area Code

Identifies a routing area within a location area for a GSM-MAP type of PLMN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Routing Area Code	MP		Bit string(8)	Setting specified in [11]. The Routing Area Code bits are numbered b0 to b7, where b0 is the least significant bit.

10.3.1.17 TMSI (GSM-MAP)

This IE contains a Temporary Mobile Subscriber Identity, used towards a GSM-MAP type of PLMN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
TMSI (GSM-MAP)	MP		Bit string (32)	Setting specified in [11]. The TMSI bits are numbered b0-b31, where b0 is the least significant bit.

10.3.3.16 Integrity check info

The Integrity check info contains the RRC message sequence number needed in the calculation of XMAC-I [40] and the calculated MAC-I.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message authentication code	MP		bit string(32)	MAC-I [40]. The Message Authentication Code bits are numbered b0-b31, where b0 is the least significant bit. The 27 MSB of the IE shall be set to zero and the 5 LSB of the IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm.
RRC Message sequence number	MP		Integer (0..15)	The local RRC hyper frame number (RRC HFN) is concatenated with the RRC message sequence number to form the input parameter COUNT-I for the integrity protection algorithm. The IE value shall be set to zero when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm.

10.3.3.37 Security capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Ciphering algorithm capability	MP		~~Bit string(16)~~	~~"0000000000000001$_2$": UEA0, no encryption supported; "0000000000000010$_2$": UEA1, Kasumi supported~~
>UEA0	MP		Boolean	The value TRUE means that an unciphered connection after the Security mode control procedure is accepted by the UE.
>UEA1	MP		Boolean	The value TRUE means that UEA1, Kasumi, is supported
>Spare	MP	14	Boolean	Shall be set to FALSE by UEs complying with this version of the protocol.
Integrity protection algorithm capability	MP		~~Bit string(16)~~	~~"0000000000000010$_2$": UIA1, Kasumi supported~~
>UIA1	MP		Boolean	The value TRUE means that UIA1, Kasumi, is supported
>Spare	MP	15	Boolean	Shall be set to FALSE by UEs complying with this version of the protocol.

NOTE: ~~Each bit is 0 or 1 to indicate support for the corresponding UEAx or UIAx, x=0 to 15.~~ The UE shall support at least one UEAx other than UEA0 and one UIAx. ~~The ciphering algorithm capability bit for UEA0 indicates to UTRAN if the UE accepts unciphered connection(s) after the security mode control procedure.~~

10.3.3.38 START

There is a START value per CN domain. The START is used to initialise the 20 MSBs of all hyper frame numbers (MAC-d HFN, RLC UM HFN, RLC AM HFN, RRC HFN) for a CN domain.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
START	MP		Bit string (20)	The START [40] bits are numbered b0-b19, where b0 is the least significant bit.

10.3.4.12 NAS Synchronization indicator

A container for non-access stratum information to be transferred transparently through UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
NAS Synchronization indicator	MP		Bitstring(4)	The bits are numbered b1-b4, where b1 is the least significant bit.

10.3.6.6 ASC setting

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE mode	MP				
>FDD					
>>Available signature Start Index	MP		Integer(0..15)		
>>Available signature End Index	MP		Integer(0..15)		
>>Assigned Sub-Channel Number	MP		Bitstring(4)	This IE defines the subchannel assignment as specified in 8.6.6.29. The bits are numbered b0 to b3, where b0 is the least significant bit.	
>TDD					
>>CHOICE TDD option	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>>>Available Channelisation codes indices	MD		Bitstring(8)	Each bit indicates availability of a channelisation code index, where the channelisation code indices are numbered "channelisation code index 0" to "channelisation code index 7". The value 1 of a bit indicates that the channelisation code index is available for the ASC this IE is associated to. The value 0 of a bit indicates that the channelisation code index is not available for the ASC this IE is associated to. Default is that all channelisation codes defined in PRACH Info are available.	
>>>1.28 Mcps TDD					REL-4
>>>>Available SYNC_UL codes indices	MD		Bitstring(8)	Each bit indicates availability of a SYNC_UL code index, where the SYNC_UL code indices are numbered "SYNC_UL code index 0" to "SYNC_UL code index 7". The value 1 of a bit indicates that the SYNC_UL code index is available for the ASC this IE is	REL-4

				associated to. The value 0 of a bit indicates that the SYNC_UL code index is not available for the ASC this IE is associated to. Default is that all SYNC_UL codes defined in SYNC_UL Info are available.	
>>CHOICE subchannel size	MP				
>>>Size1					
>>>>Available Subchannels	MP		null	Indicates that all Subchannels are available.	
>>>Size2					
>>>>Available Subchannels	MD		Bitstring (2)	NOTE 1~~Each bit indicates if the subchannel is available for the given ASC.~~ ~~01: subchannel 0~~ ~~10: subchannel 1~~ ~~11: all subchannels~~ ~~Default is all subchannels.~~	
>>>Size4					
>>>>Available Subchannels	MD		Bitstring (4)	NOTE 1~~Each bit indicates if the subchannel is available for the given ASC.~~ ~~0001: subchannel 0~~ ~~0011: subchannels 0 & 1~~ ~~...~~ ~~1111: all subchannels.~~ ~~Default is all subchannels.~~	
>>>Size8					
>>>>Available Subchannels	MD		Bitstring (8)	NOTE 1~~Each bit indicates if the subchannel is available for the given ASC.~~ ~~00000001: subchannel 0~~ ~~00000011: subchannels 0 & 1~~ ~~...~~ ~~11111111: all subchannels~~ ~~Default is all subchannels.~~	

NOTE 1: Each bit indicates availability of a subchannel, where the subchannels are numbered subchannel 0, subchannel 1 etc. The value 1 of a bit indicates that the subchannel is available for the ASC this IE is associated with. The value 0 of a bit indicates that the subchannel is not available for the ASC this IE is associated with. Default value of the IE is that all subchannels within the size are available for the ASC this IE is associated with.

10.3.6.17 Downlink channelisation codes

NOTE: Only for TDD

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *codes representation*	MP			
>Consecutive codes				
>>First channelisation code	MP		Enumerated ((16/1)...(16/16))	The codes from First channelisation code to Last channelisation code shall be used in that order by the physical layer in this timeslot. If a TFCI exists in this timeslot, it is mapped in the First channelisation code.
>>Last channelisation code	MP		Enumerated ((16/1)...(16/16))	If this is the same as First channelisation code, only one code is used by the physical layer.
>Bitmap				
>>Channelisation codes bitmap	MP		Bit string~~map~~(16)	~~0000000000000000: Usage of SF1~~ ~~0000000000000001: Channelisation Code 1, SF16~~ ~~0000000000000010: Channelisation Code 2, SF16~~ ~~0000000000000011: Channelisation Code 1 & 2, SF16~~ ~~.....~~ ~~1111111111111111: Channelisation Code 1 to 16, SF16~~ Each bit indicates the availability of a channelisation code for SF16, where the channelisation codes are numbered as channelisation code 1 (SF16) to channelisation code 16 (SF16). (For SF 16, a 1 in the bitmap means that the corresponding code is used, a 0 means that the corresponding code is not used.) If all bits are set to zero, SF 1 shall be used.

10.3.6.52 PRACH info (for RACH)

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE *mode*	MP				
>FDD					
>>Available Signature	MP		Bitstring(16)	Each bit indicates availability for a signature, where the signatures are numbered "signature 0" up to "signature 15". The value 1 of a bit indicates that the corresponding signature is available and the value 0 that it is not available. ~~(Note1) 0000000000000001:Signature 0 0000000000000010:Signature 1 0000000000000011:Signature 0&1 .....: 1111111111111111:Signature 0to15~~	
>>Available SF	MP		Integer (32,64,128,256)	In chips per symbol Defines the smallest permitted SF (i.e. the maximum rate)	
>>Preamble scrambling code number	MP		Integer (0 .. 15)	Identification of scrambling code see [28]	
>>Puncturing Limit	MP		Real(0.40..1.00 by step of 0.04)		
>>Available Sub Channel Number	MP		Bitstring(12)	Each bit indicates availability for a subchannel, where the subchannels are numbered "subchannel 0" to "subchannel 11". The value 1 of a bit indicates that the corresponding subchannel is available and the value 0 indicates that it is not available. ~~(Note2) 000000000001:SubChNumber 0 000000000010:SubChNumber 1 000000000011:SubChNumber 0&1 ...: 111111111111:Su~~	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
				~~bChNumber 0to11~~	
>TDD					
>>CHOICE TDD option	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>>>Timeslot number	MP		Timeslot number 10.3.6.84		
>>>>PRACH Channelisation Code List	MP		PRACH Channelisation Code List 10.3.6.51		
>>>>PRACH Midamble	MP		Enumerated (Direct, Direct/Inverted)	Direct or direct and inverted midamble are used for PRACH	
>>>1.28 Mcps TDD					REL-4
>>>>SYNC_UL info	MP		SYNC_UL info 10.3.6.~~78a~~?		REL-4
>>>>PRACH Definition	MP	1..<maxPRACH_FPACH			REL-4
>>>>>Timeslot number	MP		Timeslot number 10.3.6.84		REL-4
>>>>>PRACH Channelization Code	MP		PRACH Channelization Code 1.28Mcps TDD 10.3.6.51a		REL-4
>>>>>Midamble Shift and burst type	MP		Midamble shift and burst type 10.3.6.41		REL-4
>>>>>FPACH info	MP		FPACH info 10.3.6.?		REL-4
>>PNBSCH allocation	OP		PNBSCH allocation 10.3.8.10a	Identifies frames used for cell synchronisation purposes	REL-4

~~NOTE 1: Each bit is 0 or 1 to indicate available signature_x, x= 0 to 15.~~

~~NOTE 2: Each bit is 0 or 1 to indicate available sub channel number _x, x= 0 to 11.~~

10.3.7.26 Inter-RAT measured results list

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Inter-RAT measurement results	OP	1 to <maxOtherRAT>		
>CHOICE system				At least one spare value needed
>>GSM				
>>>Measured GSM cells	MP	1 to <maxReportedGSMCells>		
>>>>GSM carrier RSSI	OP		bit string(6)	RXLEV, [46]. The RSSI bits are numbered b0 to b5, where b0 is the least significant bit.
>>>>Pathloss	OP		Integer(46..158)	In dB
>>>>CHOICE BSIC	MP			
>>>>>Verified BSIC				
>>>>>>inter-RAT cell id			Integer(0..<maxCellMeas>)	
>>>>>Non verified BSIC				
>>>>>>BCCH ARFCN			Integer (0..1023)	[45]
>>>>Observed time difference to GSM cell	OP		Observed time difference to GSM cell 10.3.7.52	

10.3.8.8 Inter-RAT message

This Information Element contains one or several messages that are structured and coded according to the specification used for the system type indicated by the first parameter.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
System type	MP		Enumerated (GSM (DCS 1800 band used), GSM (PCS 1900 band used), cdma2000)	This IE indicates in particular which specification to apply to decode the transported messages
CHOICE *system*	MP			
>GSM				
>>Message(s)	MP	1.to.<maxInterSysMessages>	Bitstring (1..512)	Formatted and coded according to GSM specifications. The first bit of the bitstring contains the first bit of the GSM message.
>cdma2000				
>>cdma2000Message	MP	1.to.<maxInterSysMessages>		
>>>MSG_TYPE(s)	MP		Bitstring (8)	Formatted and coded according to cdma2000 specifications. The MSG_TYPE bits are numbered b0 to b7, where b0 is the least significant bit..
>>>cdma2000Messagepayload(s)	MP		Bitstring (1..512)	Formatted and coded according to cdma2000 specifications. The first bit of the bitstring contains the first bit of the cdma2000 message.

Condition	Explanation
System	The 'GSM' choice shall be applied when the IE 'System type' is 'GSM except PCS 1900' or 'PCS 1900', and the 'cdma2000' choice shall be applied when the IE 'system type' is 'cdma2000'.

10.3.8.8a Inter-RAT UE security capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *system*	MP			
>GSM				
>>GSM security capability	MP		~~Bit string(7)~~	~~"0000001$_2$": A5/1 supported, "0000010$_2$": A5/2 supported, "0000100$_2$": A5/3 supported, "0001000$_2$": A5/4 supported, "0010000$_2$": A5/5 supported, "0100000$_2$": A5/6 supported, "1000000$_2$": A5/7 supported~~The value TRUE means that the indicated ciphering algorithm is supported.
>>>A5/7 supported	MP		Boolean	
>>>A5/6 supported	MP		Boolean	
>>>A5/5 supported	MP		Boolean	
>>>A5/4 supported	MP		Boolean	
>>>A5/3 supported	MP		Boolean	
>>>A5/2 supported	MP		Boolean	
>>>A5/1 supported	MP		Boolean	

10.3.8.15 Rplmn information

Contains information to provide faster RPLMN selection in the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
GSM BA Range	OP	1 to maxNumGSMFreqRanges		GSM BA Range	
>GSM Lower Range (UARFCN)	MP		Integer(0..16383)	Lower bound for range of GSM BA freqs	
>GSM Upper Range (UARFCN)	MP		Integer(0..16383)	Upper bound for range of GSM BA freqs	
FDD UMTS Frequency list	OP	1 to maxNumFDDFreqs			
>UARFCN (Nlow)	MP		Integer(0..16383)	[21]	
>UARFCN (Nupper)	OP		Integer(0..16383)	[21] This IE is only needed when the FDD frequency list is specifying a range.	
3.84 Mcps TDD UMTS Frequency list	OP	1 to maxNumTDDFreqs			
>UARFCN	MP		Integer(0..16383)	[22]	
1.28 Mcps TDD UMTS Frequency list	OP	1 to maxNumTDDFreqs			REL-4
>UARFCN	MP		Integer(0..16383)	[22]	REL-4
CDMA2000 UMTS Frequency list	OP	1 to maxNumCDMA200Freqs			
>BAND_CLASS	MP		Bitstring(5 bits)	TIA/EIA/IS-2000. The BAND_CLASS bits are numbered b0 to b4, where b0 is the least significant bit.	
>CDMA_FREQ	MP		Bitstring (11 bits)	TIA/EIA/IS-2000. The CDMA_FREQ bits are numbered b0 to b10, where b0 is the least significant bit.	

10.3.8.19 SIB data fixed

Contains the result of a master information block or a system information block after encoding and segmentation. The IE is used for segments with fixed length (segments filling an entire transport block).

Information Element/Group name	Need	Multi	Type and reference	Semantics description
SIB data fixed	MP		Bit string (222)	The first bit contains the first bit of the segment.

10.3.8.20 SIB data variable

Contains either a complete system information block or a segment of a system information block. Contains the result of a master information block or a system information block after encoding and segmentation. The IE is used for segments with variable length. The system information blocks are defined in clauses10.2.48.8.1 to10.2.48.8.18.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
SIB data variable	MP		Bit string (1..214)	The first bit contains the first bit of the segment.

10.3.9.3 ANSI-41 NAS parameter

This Information Element contains ANSI-41 User Zone Identification information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
ANSI-41 NAS parameter	MP		Bit string (size (1..2048))	The first bit contains the first bit of the ANSI-41 information.

10.3.9.8 MIN_P_REV

This Information Element contains minimum protocol revision level.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
MIN_P_REV	MP		Bitstring (8)	Minimum protocol revision level. The MIN_P_REV bits are numbered b0 to b7, where b0 is the least significant bit.

10.3.9.9 NID

This Information Element contains Network identification.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
NID	MP		Bitstring (16)	Network identification. The NID bits are numbered b0 to b15, where b0 is the least significant bit.

10.3.9.10 P_REV

This Information Element contains protocol revision level.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
P_REV	MP		Bitstring (8)	Protocol revision level. The P_REV bits are numbered b0 to b7, where b0 is the least significant bit..

10.3.9.11 SID

This Information Element contains System identification.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
SID	MP		Bitstring (15)	System identification. The SID bits are numbered b0 to b14, where b0 is the least significant bit.

11 Message and Information element abstract syntax (with ASN.1)

This clause contains definitions for RRC PDUs and IEs using a subset of ASN.1 as specified in [14]. PDU and IE definitions are grouped into separate ASN.1 modules.

11.a General

If the abstract syntax of an IE is defined using the ASN.1 type "BIT STRING", and this IE corresponds to a functional IE definition in tabular format, in which the significance of bits is semantically defined, the following general rule shall be applied:

The bits in the ASN.1 bit string shall represent the semantics of the functional IE definition in decreasing order of bit significance;

- with the first (or leftmost) bit in the bit string representing the most significant bit, and;
- with the last (or rightmost) bit in the bit string representing the least significant bit.

11.1 General message structure

11.3 Information element definitions

```
-- **************************************************
--
--     USER EQUIPMENT INFORMATION ELEMENTS (10.3.3)
--
-- **************************************************


SecurityCapability ::=              SEQUENCE {
    cipheringAlgorithmCap                ----BIT STRING {
                                             spare15(0),
                                             spare14(1),
                                             spare13(2),
                                             spare12(3),
                                             spare11(4),
                                             spare10(5),
                                             spare9(6),
                                             spare8(7),
                                             spare7(8),
                                             spare6(9),
                                             spare5(10),
                                             spare4(11),
                                             spare3(12),
                                             spare2(13),
                                             uea1(14),
                                             uea0(15)
                                             }   (SIZE (16)),
    integrityProtectionAlgorithmCap     BIT STRING {
                                             spare15(0),
                                             spare14(1),
                                             spare13(2),
                                             spare12(3),
                                             spare11(4),
                                             spare10(5),
                                             spare9(6),
                                             spare8(7),
                                             spare7(8),
                                             spare6(9),
                                             spare5(10),
                                             spare4(11),
                                             spare3(12),
                                             spare2(13),
                                             uia1(14),
                                             spare0(15)
                                             }   (SIZE (16))
}


-- **************************************************
--
--     PHYSICAL CHANNEL INFORMATION ELEMENTS (10.3.6)
--
-- **************************************************


AccessServiceClass-FDD ::=          SEQUENCE {
    availableSignatureStartIndex        INTEGER (0..15),
    availableSignatureEndIndex          INTEGER (0..15),

    assignedSubChannelNumber            BIT STRING {
                                             b3(0),
                                             b2(1),
                                             b1(2),
                                             b0(3)
                                             }   (SIZE(4))
}

AccessServiceClass-TDD ::=          SEQUENCE {
    channelisationCodeIndices           BIT STRING {
                                             chCodeIndex0(0),
                                             chCodeIndex1(1),
                                             chCodeIndex2(2),
                                             chCodeIndex3(3),
                                             chCodeIndex4(4),
```

```
                                        chCodeIndex5(5),
                                        chCodeIndex6(6),
                                        chCodeIndex7(7)
                                        }   (SIZE(8))               OPTIONAL,
    subchannelSize                  CHOICE {
        size1                           NULL,
-- in size2, subch0 means bitstring '01' in the tabular, subch1 means bitsring '10'.
        size2                           SEQUENCE {
            subchannels                     ENUMERATED  { subch0, subch1 }  OPTIONAL
        },
        size4                           SEQUENCE {
            subchannels                     BIT STRING {
                                                subCh3(0),
                                                subCh2(1),
                                                subCh1(2),
                                                subCh0(3)
                                                }   (SIZE(4))       OPTIONAL
        },
        size8                           SEQUENCE {
            subchannels                     BIT STRING {
                                                subCh7(0),
                                                subCh6(1),
                                                subCh5(2),
                                                subCh4(3),
                                                subCh3(4),
                                                subCh2(5),
                                                subCh1(6),
                                                subCh0(7)
                                                }   (SIZE(8))       OPTIONAL
        }
    }
}

AccessServiceClass-TDD-LCR ::=          SEQUENCE {
    availableSYNC-UlCodesIndics     BIT STRING {
                                        sulCodeIndex0(0),
                                        sulCodeIndex1(1),
                                        sulCodeIndex2(2),
                                        sulCodeIndex3(3),
                                        sulCodeIndex4(4),
                                        sulCodeIndex5(5),
                                        sulCodeIndex6(6),
                                        sulCodeIndex7(7)
                                        } (SIZE(8))                 OPTIONAL,
    subchannelSize                  CHOICE {
        size1                           NULL,
-- in size2, subch0 means bitstring '01' in the tabular, subch1 means bitsring '10'.
        size2                           SEQUENCE {
            subchannels                     ENUMERATED  { subch0, subch1 }  OPTIONAL
        },
        size4                           SEQUENCE {
            subchannels                     BIT STRING  {
                                                subCh3(0),
                                                subCh2(1),
                                                subCh1(2),
                                                subCh0(3)
                                                } (SIZE(4))         OPTIONAL
        },
        size8                           SEQUENCE {
            subchannels                     BIT STRING  {
                                                subCh7(0),
                                                subCh6(1),
                                                subCh5(2),
                                                subCh4(3),
                                                subCh3(4),
                                                subCh2(5),
                                                subCh1(6),
                                                subCh0(7)
                                                } (SIZE(8))         OPTIONAL
        }
    }

}


AvailableSignatures ::=         BIT STRING {
                                    Signature15(0),
```

```
                                        signature14(1),
                                        signature13(2),
                                        signature12(3),
                                        signature11(4),
                                        signature10(5),
                                        signature9(6),
                                        signature8(7),
                                        signature7(8),
                                        signature6(9),
                                        signature5(10),
                                        signature4(11),
                                        signature3(12),
                                        signature2(13),
                                        signature1(14),
                                        signature0(15)
                                        }   (SIZE(16))

AvailableSubChannelNumbers ::=      BIT STRING {
                                        SubCh11(0),
                                        subCh10(1),
                                        subCh9(2),
                                        subCh8(3),
                                        subCh7(4),
                                        subCh6(5),
                                        subCh5(6),
                                        subCh4(7),
                                        subCh3(8),
                                        subCh2(9),
                                        subCh1(10),
                                        subCh0(11)
                                        }   (SIZE(12))


DL-TS-ChannelisationCodesShort ::=  SEQUENCE {
    codesRepresentation                 CHOICE {
        consecutive                         SEQUENCE {
            firstChannelisationCode             DL-TS-ChannelisationCode,
            lastChannelisationCode              DL-TS-ChannelisationCode
        },
        bitmap                              BIT STRING {
                                                chCode16-SF16(0),
                                                chCode15-SF16(1),
                                                chCode14-SF16(2),
                                                chCode13-SF16(3),
                                                chCode12-SF16(4),
                                                chCode11-SF16(5),
                                                chCode10-SF16(6),
                                                chCode9-SF16(7),
                                                chCode8-SF16(8),
                                                chCode7-SF16(9),
                                                chCode6-SF16(10),
                                                chCode5-SF16(11),
                                                chCode4-SF16(12),
                                                chCode3-SF16(13),
                                                chCode2-SF16(14),
                                                chCode1-SF16(15)
                                                } (SIZE (16))
    }
}


-- **************************************************
--
--     OTHER INFORMATION ELEMENTS (10.3.8)
--
-- **************************************************


GsmSecurityCapability ::=           BIT STRING {
                                        a5-7(0),
                                        a5-6(1),
                                        a5-5(2),
                                        a5-4(3),
                                        a5-3(4),
                                        a5-2(5),
                                        a5-1(6)
                                        }   (SIZE (7))
```

12 Message transfer syntax

Transfer syntax for RRC PDUs is derived from their ASN.1 definitions by use of Packed Encoding Rules, unaligned as specified in X.691 [49], and with adapted final padding. If special encoding is used, it is indicated in the ECN module defined for each ASN.1 module. The use of special encoding is defined in [14].

12.1 Structure of encoded RRC messages

An RRC PDU, which is the bit string that is exchanged between peer entities/ across the radio interface, is the concatenation of a basic production, an extension and padding, in that order.

RRC PDUs shall be mapped to and from RLC SDUs upon transmission and reception as follows:

- When delivering an RRC PDU as an RLC SDU to the RLC layer for transmission, the first bit of the RRC PDU shall be represented as the first bit in the RLC SDU and onwards, and;
- upon reception of an RLC SDU from the RLC layer, the first bit of the RLC SDU shall represent the first bit of the RRC PDU and onwards.

12.1.1 Basic production

The 'basic production' is obtained by applying UNALIGNED PER to the abstract syntax value (the ASN.1 description) as specified in X.691, except for the 0 to 7 bits added at the end to produce a multiple of 8 bits. The basic production can have any positive number of bits, not necessarily a multiple of 8 bits.

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21st-25th, 2001

Tdoc R2-011241

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **753** ⌘ rev **r1** ⌘ Current version: **3.6.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Configuration consistency checks
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-15
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘ This CR covers some consistency checks that shall be performed when setting up the multiplexing options for a RB, the transport channels or the physical resources.

1. When configuring the multiplexing options for an RB:
   - If a multiplexing option defined in the “RB mapping info” refers to a non-existing transport channel, that could not be used by the UE.
   - A multiplexing option in the “RB mapping info” that allows for a RB realised through TM-RLC to be mapped on RACH, FACH, DSCH or CPCH can be defined according to the current text in 25.331. This is not consistent with chapter 3.5 of 25.301, which describes the different data flows through layer 2.
   - If a radio bearer is realised using two logical channels, the two logical channels could, according to the current text, be mapped onto transport channels of different types. If the DTCH used for data and the one used for the status PDU are not mapped onto transport channels of the same type (for example having one mapped onto a DCH and the other onto RACH), the mapping option could not be used.
   - ~~Neither the RACH selection procedure not the current signalling procedures fully support the use of more than one RACH with different transport format sets. The proposal is to clarify this within the part concerning the signalling limitation.~~
2. When configuring the uplink transport channels:
   - The PRACH TFCS can be received in dedicated messages. The way the UE shall act on it is not clear. The same issue was brought up in document R2-010910.

3. When configuring the physical resources:

- There is no mention in 25.331 about the fact that the consistency rules defined in the physical layer specification shall apply when sending physical layer information in an RRC message.

Some inconsistencies between the procedure and the message definitions was also detected.

4 - The current mechanism to signal the uplink RLC size to the UE can lead to cases where contradicting information is signalled to the UE in the same message. For example, if 'RB mapping info' uses the 'explicit list' to indicate the RLC size and the 'TFS' also uses 'explicit list' to indicate the allowed logical channels. The semantic column in the tabular description 'suggests' that this is a disallowed combination but does not clearly state it.

5 - When 'RB mapping info' maps a logical channel onto a RACH transport channel the RLC size can only be indicated by the 'explicit list' of TFs. However, there is no identification of the RACH transport channel to which this TF corresponds. If SIB5/6 includes several PRACHs/RACH with different TFSs then the allowed RLC size(s) will be ambiguous.

6. The procedures handling the reception of "RB mapping info" and "Transport format set" do not mention configuring the TFs used by MAC for each logical channel, even though both these messages affect them.
7. There is no mention in RRC that RLC needs to be re-established when the RLC size is modified. Also, the HFN value needs to be reset to guaranty synchronization between the peer entities.
8. There is no mention that it is necessary to configure RLC depending on the PDCP configuration. This is necessary since RLC behaviour changes depending on whether lossless SRNS relocation is configured for PDCP.
9. The use of a "UTRAN should" statement to avoid the erroneous configuration where multiple RLC sizes are allowed for an AM entity is not strong enough.

R2-ADHOC13:
It was agreed that it was not necessary to re-establish UM entities.
In the case of non-segmented TM, the need to transmit multiple PDU in the same TTI requires that a single RLC size is used.
It was agreed that selecting the HFN when re-establishing the RLC entity should be adapted to the message flow used for the particular message.

Backwards compatibility: Correction to a function where rules were missing from the specification. Would not affect implementations that behave as indicated in the CR, otherwise implementations supporting the affected functionality are affected.~~the change is backward compatible for an implementation assuming the same behaviour as clarified by this CR~~.

Summary of change: ⌘ 1/2 - It is proposed that all cases in 1 and 2 be treated as erroneous, by setting the variable INVALID_CONFIGURATION to TRUE.

3 - Point 3 is covered by a reference to L1 specifications, which is included at the beginning of chapter 8.6.6 to ensure that the compatibility rules defined in those documents be followed in the RRC messages.

The statement that transport channel identity is not needed for RACH and FACH has been removed from the general description for Transport format set (that IE is included in for these cases in IE "PRACH system information list" and IE "Secondary CCPCH system information" respectively)
The statement about restrictions regarding the use of RLC size list configuration for RACH has been moved from the part describing dedicated channels to the part describing common channels.

4 - Extra rules are added so that the UE treats these potentially conflicting cases as invalid configuration

5 - An extra rule is added to clearly indicate that in the case of RACH transport channels the RLC size must be indicated by the 'explicit' list. In order to solve the potential ambiguity that occurs when there is more than one PRACH/RACH, the best approach would be to include the RACH transport channel identity in the IE. However, this would require a non backward compatible change to the ASN.1 and so it is proposed here that the explicit list always refers to the *first* RACH TFS that was received in system information. In this way the allowed RLC size(s) is determined from a single RACH TFS, but other RACH TFSs are allowed in the cell.

6. A new step was added to the procedure describing the handling of "Transport format set" to configure the TFS for the corresponding transport channel in MAC.
7. A new step was added to the procedures describing the handling of "Transport format set" to indicate that whenever the set of allowed RLC sizes for an AM or UM RB is modified, the corresponding RLC entity has to be re-established. If both are present then the re-establishment is performed when "RB mapping info" is read.
8. A new step was added to the procedures describing the handling of "Transport format set" and "RB mapping info" to configure the set of allowed RLC sizes for each logical channel in MAC.
9. A new step was added to the procedures describing the handling of "Transport format set" and "RB mapping info" to reject the configuration when multiple RLC sizes are introduced for an AM entity.
10. Eliminated the original check of the set of RLC sizes configured for AM entities.
11. A new step was added to the procedure describing the handling of "PDCP Info" to indicate that RLC also needs to be reconfigured based on this information

Modifications for R2-ADHOC13:
Incorporated the changes in R2-011161.
The reference to UM entities was removed.
"RLC value" was replace with "RLC values" since uplink and downlink values are specified.
Made the restriction of having a single RLC size valid also for non-segmented TM channels.
Specified explicitly how to handle the cases where the RLC size is changed by system information, reconfiguration message, cell update confirm, active set update, RRC connection setup and handover to UTRAN command.

Modification for R2-011319:
Eliminated the case where the IEs were included in messages RRC Connection Setup and Handover to UTRAN command.
Eliminated the case of Active Set Update in the handling of RB mapping info.
Clarified the wording of the initialisation of the HFN values.
Separated the checks for the RLC size in the case of AM and non-segmented TM to make the text more readable

Consequences if not approved:	⌘	Unspecified UE behaviour and inconsistency between procedures and message definition.

Clauses affected:	⌘	8.6.4.8, 8.6.4.10, 8.6.5.1, 8.6.5.9, 8.6.6, 10.3.5.23		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	

Other comments:	⌘	This contents of tdoc 1161 (CR 858), 1319 (CR 856) and 1129 (CR822) have been merged into this CR.

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6.4.8 RB mapping info

If the IE "RB mapping info" is included, the UE shall, for each ~~transport channel in each~~ multiplexing option of that RB:

- if the value of the IE "RLC size list" is set to "Explicit list":
  - if a "Transport format set" for that transport channel is included in the same message, and the value (index) of any IE "RLC size index" in the IE "RLC size index list" does not correspond to an "RLC size" in the IE transport format set of that transport channel given in the message; or [Hans - indent increased one level]
  - ~~-~~ if a "Transport format set" for that transport channel is not included in the same message, and the value (index) of any IE "RLC size index" in the IE "RLC size index list" does not correspond to an "RLC size" in the stored transport format set of that transport channel or~~:~~ [Hans - indent increased one level]
  - if a "Transport format set" for that transport channel is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
  - if a "Transport format set" for that transport channel is included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured";
    - set the variable INVALID_CONFIGURATION to TRUE;
- if the value of the IE "RLC size list" is set to "All":
  - if a "Transport format set" for that transport channel is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
  - if a "Transport format set" for that transport channel is included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured";
    - set the variable INVALID_CONFIGURATION to TRUE;
- if the value of the IE "RLC size list" is set to "Configured":
  - if a "Transport format set" for that transport channel is included in the same message, and the IE "Logical channel list" in the transport format set indicates that no "RLC size" is applicable for that RB
  - if a "Transport format set" for that transport channel is included in the same message, and the IE "Logical channel list" in the stored transport format set of that transport channel indicates that no "RLC size" is applicable for that RB;

~~if a mapping option is included with IE "Uplink transport channel type" set to RACH, and the Choice *RLC size list* is set to "Explicit", and more than one PRACH is defined in IE "PRACH system information list", and the transport format set is not the same for all RACHs:~~

- ~~keep the previously stored multiplexing options for that RB;~~
- set the variable INVALID_CONFIGURATION to TRUE;

- if that RB is using TM and the IE "Segmentation indication" is set to TRUE and, based on the multiplexing configuration resulting from this message, it is mapped onto the same transport channel as another RB:
  - set the variable INVALID_CONFIGURATION to true;

- else:
  - delete all previously stored multiplexing options for that radio bearer;
  - store each new multiplexing option for that radio bearer;
  - select and configure the multiplexing options applicable for the transport channels to be used;
  - if the IE "Uplink transport channel type" is set to the value "RACH" the UE shall refer the IE "RLC size index" to the RACH Transport Format Set of the first PRACH received in the IE "PRACH system information list" received in SIB5 or SIB6.
  - -determine the sets of RLC sizes that apply to the logical channels used by that RB, based on the "RLC size list" and/or the "Logical Channel List" included in the applicable "Transport format set" (either the one received in the same message or the one stored if none were received);
  - if that RB is using AM and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:
    - set the variable INVALID_CONFIGURATION to true.
  - ~~if that RB is using TM and the IE "Segmentation indication" is set to FALSE, and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:~~
    - ~~set the variable INVALID_CONFIGURATION to true.~~
  - if that RB is using AM and the RLC size applicable to the logical channel transporting data PDUs is different from the one derived from the previously stored configuration:
    - re-establish the corresponding RLC entity;
    - configure the corresponding RLC entity with the new RLC size;
    - if the variable CIPHERING_STATUS is set to "Started":
      - if this IE was included in system information then set the HFN values for the corresponding RLC entity equal to the value of the IE "START" for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN that will be included in the CELL UPDATE message that will be sent before the next transmission;
      - if this IE was included in CELL UPDATE CONFIRM, then set the HFN values for the corresponding RLC entity equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
      - if this IE was included in a reconfiguration message, then set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the reconfiguration complete message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
  - if that RB is using UM, indicate the largest applicable RLC size to the corresponding RLC entity
  - configure MAC multiplexing according to the selected multiplexing option;
  - configure the MAC with the logical channel priorities according to selected multiplexing option;
  - configure the MAC with the set of applicable RLC Sizes for each of the logical channels used for that RB;

- if a transport channel that would not exist as a result of the message is referred to:

  - set the variable INVALID_CONFIGURATION to TRUE;

- if a multiplexing option that maps a logical channel corresponding to a TM-RLC entity onto RACH, CPCH, FACH or DSCH is included:

  - set the variable INVALID_CONFIGURATION to TRUE;

- if a multiplexing option is included that realises the radio bearer on the uplink (resp. on the downlink) using two logical channels with different values of the IE "Uplink transport channel type" (resp. of the IE "Downlink transport channel type"):

  - set the variable INVALID_CONFIGURATION to TRUE;

- if there is no multiplexing option applicable for the transport channels to be used:

  - set the variable INVALID_CONFIGURATION to TRUE;

- if there is more than one multiplexing option applicable for the transport channels to be used:

  - set the variable INVALID_CONFIGURATION to TRUE.

In case IE "RB mapping info" includes IE "Downlink RLC logical channel info" but IE "Number of downlink RLC logical channels" is absent, the parameter values are exactly the same as for the corresponding UL logical channels. In case two multiplexing options are specified for the UL, the first options shall be used as default for the DL. As regards the IE "Channel type", the following rule should be applied to derive the DL channel type from the UL channel included in the IE:

Channel used in UL	**DL channel type implied by "same as"**
DCH	DCH
RACH	FACH
CPCH	FACH
USCH	DSCH

8.6.4.10 PDCP Info

If IE "PDCP info" is included, the UE shall:

- configure the PDCP entity for that radio bearer accordingly.
- configure the RLC entity for that radio bearer according to the value of the IE “Support for lossless SRNS relocation”. ~~SRNS relocation configuration.~~

8.6.5.1 Transport Format Set

If the IE "transport channel type", the IE "transport channel identity" ~~(not needed for RACH and FACH)~~ and the IE "Transport format set" are included, the UE shall, for the indicated transport channel:

- if the value ~~(index)~~ of any IE "RB identity" (and "Logical Channel" for RBs using two UL logical channels) in the IE "Logical channel list" does not correspond to a logical channel indicated to be mapped onto this transport channel in any RB multiplexing option (either included in the same message or previously stored and not changed by this message):
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- else:
  - remove a previously stored transport format set if this exists for that transport channel;
  - store the transport format set for that transport channel;
  - if the IE "Transport format Set" has the choice "Transport channel type" set to "Dedicated transport channel":
    - calculate the transport block size for all transport formats in the TFS using the following

      TB size = RLC PDU size + MAC header size,

      where:

      - MAC header size is calculated according to [15] if MAC multiplexing is used. Otherwise it is 0 bits.

  - configure the MAC with the new transport format set (with computed transport block sizes) for that transport channel;
  - if the RB multiplexing option for a RB mapped onto that transport channel (based on the stored RB multiplexing option) is not modified by this message:
    - determine the sets of RLC sizes that apply to the logical channels used by that RB, based on the IE "Logical Channel List" and/or the IE "RLC Size List" from the previously stored RB multiplexing option;
    - if that RB is using AM and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:
      - set the variable INVALID_CONFIGURATION to true;
    - ~~if that RB is using TM and the IE "Segmentation indication" is set to FALSE, and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:~~
      - ~~set the variable INVALID_CONFIGURATION to true;~~
    - if that RB is using AM and the RLC size applicable to the logical channel transporting data PDUs is different from the one derived from the previously stored configuration:
      - re-establish the corresponding RLC entity;
      - configure the corresponding RLC entity with the new RLC size;
      - if this IE was included in system information and if the variable CIPHERING_STATUS is set to "Started", then set the HFN values for the

corresponding RLC entity equal to the value of the IE “START” for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN that will be included in the CELL UPDATE message that will be sent before the next transmission;

- if this IE was included in CELL UPDATE CONFIRM and if the variable CIPHERING_STATUS is set to "Started", then set the HFN values for the corresponding RLC entity equal to the value of the IE “START” included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;

- if this IE was included in a reconfiguration message and if the variable CIPHERING_STATUS is set to "Started", then set the HFN values for the corresponding RLC entity equal to the value of the IE “START” that will be included in the reconfiguration complete message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;

- if this IE was included in ACTIVE SET UPDATE and if the variable CIPHERING_STATUS is set to "Started", then set the HFN values for the corresponding RLC entity equal to the value of the IE “START” that will be included in the ACTIVE SET UPDATE COMPLETE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;

- if that RB is using UM, indicate the largest applicable RLC size to the corresponding RLC entity

- configure MAC with the set of applicable RLC Sizes for each of the logical channels used for that RB.

If neither the IE "transport channel type" nor the IE "Transport format set" is included, the UE shall:

- consider the stored transport format set as valid information.

~~The UTRAN should not assign transport formats with different "RLC Size" to any logical channel transferring data using AM RLC. If an AM RLC entity is mapped to two logical channels, UTRAN may configure more than one "RLC Size" for the logical channel transferring control PDUs only.~~

8.6.5.9 UL Transport channel information common for all transport channels

If the IE "UL Transport channel information common for all transport channels" is included the UE shall:

- perform actions for the IE "TFC subset" as specified in subclause 8.6.5.3;
- if the IE "PRACH TFCS" is included:
  - set the variable INVALID_CONFIGURATION to TRUE~~perform actions for the IE "TFCS" for the selected PRACH as specified in subclause 8.6.5.2~~;
- if the IE has the choice "mode" set to FDD:
  - perform actions for the IE "UL DCH TFCS" as specified in subclause 8.6.5.2;
- if the IE has the choice "mode" set to TDD:
  - if the IE "Individual UL CCTRCH information" is included:
    - for each TFCS identified by IE "UL TFCS id":
      - perform actions for the IE "UL TFCS" as specified in subclause 8.6.5.2.

8.6.6 Physical channel information elements

This section specifies the actions upon reception and/or non-reception of the physical channel information elements. The combination of the values of those information elements included in a given message shall follow the compatibility rules that are specified in the physical layer specifications. In case those rules are not followed, the UE shall set the variable INVALID_CONFIGURATION to TRUE.

8.6.6.1 Frequency info

10.3.5.23 Transport Format Set

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *Transport channel type*	MP			
>Dedicated transport channels				The transport channel that is configured with this TFS is of type DCH
>>Dynamic Transport Format Information	MP	1 to <maxTF>		Note 1
>>>RLC Size	MP		Integer(0..4992)	Unit is bits Note 2
>>>Number of TBs and TTI List	MP	1 to <maxTF>		Present for every valid number of TB's (and TTI) for this RLC Size.
>>>>Transmission Time Interval	CV-*dynamicTTI*		Integer(10,20,40,80)	Unit is ms.
>>>>Number of Transport blocks	MP		Integer(0..512)	Note 3
>>>CHOICE *Logical Channel List*	MP			The logical channels that are allowed to use this RLC Size ~~For radio bearers mapped to RACH, the UE shall regard "Explicit list" as an undefined IE value and handle these as specified in clause 9.~~ For the downlink, "ALL" is the only valid choice. The UE shall regard all other choices as undefined IE values and handle these as specified in clause 9.
>>>>ALL			Null	All logical channels mapped to this transport channel.
>>>>Configured			Null	The logical channels configured to use this RLC size in the *RB mapping info*. 10.3.4.21 if present in this message or in the previously stored configuration otherwise
>>>>Explicit List		1 to 15		Lists the logical channels that are allowed to use this RLC size.
>>>>>RB Identity	MP		RB identity 10.3.4.16	
>>>>>LogicalChannel	CH-*UL-RLCLogicalChannels*		Integer(0..1)	Indicates the relevant UL logical channel for this RB. "0" corresponds to the first, "1" corresponds to the second UL logical channel configured for this RB in the IE "RB mapping info".
>>Semi-static Transport Format Information	MP		Semi-static Transport Format Information 10.3.5.11	
>Common transport channels				The transport channel that is configured with this TFS is of a type not equal to DCH
>>Dynamic Transport Format Information	MP	1 to <maxTF>		Note
>>>RLC Size	MP		Integer(0..4992)	Unit is bits Note 2

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>>Number of TBs and TTI List	MP	1 to <maxTF>		Present for every valid number of TB's (and TTI) for this RLC Size.
>>>>Number of Transport blocks	MP		Integer(0..512)	Note 3
>>>>CHOICE mode	MP			
>>>>>FDD				(no data)
>>>>>TDD				
>>>>>>Transmission Time Interval	CV-*dynamicTTI*		Integer(10,20,40,80)	Unit is ms.
>>>CHOICE *Logical Channel List*	MP			The logical channels that are allowed to use this RLC Size. For radio bearers mapped to RACH, the UE shall regard "Explicit list" as an undefined IE value and handle these as specified in clause 9.
>>>>ALL			Null	All logical channels mapped to this transport channel.
>>>>Configured			Null	The logical channels configured to use this RLC size in the *RB mapping info*. 10.3.4.21 if present in this message or in the previously stored configuration otherwise
>>>>Explicit List		1 to 15		Lists the logical channels that are allowed to use this RLC size.
>>>>>RB Identity	MP		RB identity 10.3.4.16	
>>>>>LogicalChannel	CV-*UL-RLCLogicalChannels*		Integer(0..1)	Indicates the relevant UL logical channel for this RB. "0" corresponds to the first, "1" corresponds to the second UL logical channel configured for this RB in the IE "RB mapping info".
>>Semi-static Transport Format Information	MP		Semi-static Transport Format Information 10.3.5.11	

Condition	Explanation
dynamicTTI	This IE is included if dynamic TTI usage is indicated in IE Transmission Time Interval in Semi-static Transport Format Information. Otherwise it is not needed.
UL-RLCLogicalChannels	If "Number of uplink RLC logical channels" in IE "RB mapping info" in this message is 2 or the IE "RB mapping info" is not present in this message and 2 UL logical channels are configured for this RB, then this IE is present. Otherwise this IE is not needed.

NOTE: The parameter "rate matching attribute" is in line with the RAN WG1 specifications. However, it is not currently in line with the description in [34].

NOTE 1: The first instance of the parameter *Number of TBs and TTI List* within the *Dynamic transport format information* correspond to transport format 0 for this transport channel, the second to transport format 1 and so on. The total number of configured transport formats for each transport channel does not exceed <maxTF>.

NOTE 2: For dedicated channels, 'RLC size' reflects RLC PDU size. In FDD for common channels 'RLC size' reflects actual TB size. In TDD for common channels since MAC headers are not octet aligned, to calculate TB size the MAC header bit offset is added to the specified size (similar to the dedicated case). Therefore for TDD DCH TrCHs the 4 bit C/T is added if MAC multiplexing is applied, for FACH the 3 bit TCTF offset is added and for RACH the 2 bit TCTF offset is added.

NOTE 3: If the number of transport blocks <> 0, and Optional IE "CHOICE RLC mode" or "CHOICE Transport block size is absent, it implies that no RLC PDU data exists but only parity bits exist. If the number of transport blocks = 0, it implies that neither RLC PDU data nor parity bits exist. In order to ensure the possibility of CRC based Blind Transport Format Detection, UTRAN should configure a transport format with number of transport block <> 0, with a zero-size transport block.

3GPP TSG-RAN WG2 Meeting #21
Busan, Korea, May 21st-25th, 2001

Tdoc R2-011474

CR-Form-v3

CHANGE REQUEST

⌘ **25.331** **CR** **754** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Configuration consistency checks
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-05-25
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘ This CR covers some consistency checks that shall be performed when setting up the multiplexing options for a RB, the transport channels or the physical resources.

1. When configuring the multiplexing options for an RB:
   - If a multiplexing option defined in the “RB mapping info” refers to a non-existing transport channel, that could not be used by the UE.
   - A multiplexing option in the “RB mapping info” that allows for a RB realised through TM-RLC to be mapped on RACH, FACH, DSCH or CPCH can be defined according to the current text in 25.331. This is not consistent with chapter 3.5 of 25.301, which describes the different data flows through layer 2.
   - If a radio bearer is realised using two logical channels, the two logical channels could, according to the current text, be mapped onto transport channels of different types. If the DTCH used for data and the one used for the status PDU are not mapped onto transport channels of the same type (for example having one mapped onto a DCH and the other onto RACH), the mapping option could not be used.
   - ~~Neither the RACH selection procedure not the current signalling procedures fully support the use of more than one RACH with different transport format sets. The proposal is to clarify this within the part concerning the signalling limitation.~~
2. When configuring the uplink transport channels:
   - The PRACH TFCS can be received in dedicated messages. The way the UE shall act on it is not clear. The same issue was brought up in document R2-010910.

3. When configuring the physical resources:

- There is no mention in 25.331 about the fact that the consistency rules defined in the physical layer specification shall apply when sending physical layer information in an RRC message.

Some inconsistencies between the procedure and the message definitions was also detected.

4 - The current mechanism to signal the uplink RLC size to the UE can lead to cases where contradicting information is signalled to the UE in the same message. For example, if 'RB mapping info' uses the 'explicit list' to indicate the RLC size and the 'TFS' also uses 'explicit list' to indicate the allowed logical channels. The semantic column in the tabular description 'suggests' that this is a disallowed combination but does not clearly state it.

5 - When 'RB mapping info' maps a logical channel onto a RACH transport channel the RLC size can only be indicated by the 'explicit list' of TFs. However, there is no identification of the RACH transport channel to which this TF corresponds. If SIB5/6 includes several PRACHs/RACH with different TFSs then the allowed RLC size(s) will be ambiguous.

6. The procedures handling the reception of "RB mapping info" and "Transport format set" do not mention configuring the TFs used by MAC for each logical channel, even though both these messages affect them.
7. There is no mention in RRC that RLC needs to be re-established when the RLC size is modified. Also, the HFN value needs to be reset to guaranty synchronization between the peer entities.
8. There is no mention that it is necessary to configure RLC depending on the PDCP configuration. This is necessary since RLC behaviour changes depending on whether lossless SRNS relocation is configured for PDCP.
9. The use of a "UTRAN should" statement to avoid the erroneous configuration where multiple RLC sizes are allowed for an AM entity is not strong enough.

R2-ADHOC13:
It was agreed that it was not necessary to re-establish UM entities.
In the case of non-segmented TM, the need to transmit multiple PDU in the same TTI requires that a single RLC size is used.
It was agreed that selecting the HFN when re-establishing the RLC entity should be adapted to the message flow used for the particular message.

Summary of change: ⌘ 1/2 - It is proposed that all cases in 1 and 2 be treated as erroneous, by setting the variable INVALID_CONFIGURATION to TRUE.

3 - Point 3 is covered by a reference to L1 specifications, which is included at the beginning of chapter 8.6.6 to ensure that the compatibility rules defined in those documents be followed in the RRC messages.

The statement that transport channel identity is not needed for RACH and FACH has been removed from the general description for Transport format set (that IE is included in for these cases in IE "PRACH system information list" and IE "Secondary CCPCH system information" respectively)
The statement about restrictions regarding the use of RLC size list configuration for RACH has been moved from the part describing dedicated channels to the part describing common channels.

4 - Extra rules are added so that the UE treats these potentially conflicting cases as invalid configuration

5 - An extra rule is added to clearly indicate that in the case of RACH transport channels the RLC size must be indicated by the 'explicit' list. In order to solve the potential ambiguity that occurs when there is more than one PRACH/RACH, the best approach would be to include the RACH transport channel identity in the IE.

However, this would require a non backward compatible change to the ASN.1 and so it is proposed here that the explicit list always refers to the *first* RACH TFS that was received in system information. In this way the allowed RLC size(s) is determined from a single RACH TFS, but other RACH TFSs are allowed in the cell.

6. A new step was added to the procedure describing the handling of "Transport format set" to configure the TFS for the corresponding transport channel in MAC.
7. A new step was added to the procedures describing the handling of "Transport format set" to indicate that whenever the set of allowed RLC sizes for an AM or UM RB is modified, the corresponding RLC entity has to be re-established. If both are present then the re-establishment is performed when "RB mapping info" is read.
8. A new step was added to the procedures describing the handling of "Transport format set" and "RB mapping info" to configure the set of allowed RLC sizes for each logical channel in MAC.
9. A new step was added to the procedures describing the handling of "Transport format set" and "RB mapping info" to reject the configuration when multiple RLC sizes are introduced for an AM entity.
10. Eliminated the original check of the set of RLC sizes configured for AM entities.
11. A new step was added to the procedure describing the handling of "PDCP Info" to indicate that RLC also needs to be reconfigured based on this information

Modifications for R2-ADHOC13:
Incorporated the changes in R2-011161.
The reference to UM entities was removed.
"RLC value" was replace with "RLC values" since uplink and downlink values are specified.
Made the restriction of having a single RLC size valid also for non-segmented TM channels.
Specified explicitly how to handle the cases where the RLC size is changed by system information, reconfiguration message, cell update confirm, active set update, RRC connection setup and handover to UTRAN command.

Modification for R2-011319:
Eliminated the case where the IEs were included in messages RRC Connection Setup and Handover to UTRAN command.
Eliminated the case of Active Set Update in the handling of RB mapping info.
Clarified the wording of the initialisation of the HFN values.
Separated the checks for the RLC size in the case of AM and non-segmented TM to make the text more readable

Consequences if not approved:	⌘	Unspecified UE behaviour and inconsistency between procedures and message definition.

Clauses affected:	⌘	8.6.4.8, 8.6.5.1, 8.6.5.9, 8.6.6, 10.3.5.23, 8.6.4.10		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘	This contents of tdoc 1161 (CR 858), 1319 (CR 856) and 1129 (CR822) have been merged into this CR.		

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at:
http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6.4.8 RB mapping info

If the IE "RB mapping info" is included, the UE shall, for each ~~transport channel in each~~ multiplexing option of that RB:

- if the value of the IE "RLC size list" is set to "Explicit list":
  - if a "Transport format set" for that transport channel is included in the same message, and the value (index) of any IE "RLC size index" in the IE "RLC size index list" does not correspond to an "RLC size" in the IE transport format set of that transport channel given in the message; or [Hans - indent increased one level]
  - ~~-~~ if a "Transport format set" for that transport channel is not included in the same message, and the value (index) of any IE "RLC size index" in the IE "RLC size index list" does not correspond to an "RLC size" in the stored transport format set of that transport channel or~~:~~ [Hans - indent increased one level]
  - if a "Transport format set" for that transport channel is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
  - if a "Transport format set" for that transport channel is included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured";
    - set the variable INVALID_CONFIGURATION to TRUE;
- if the value of the IE "RLC size list" is set to "All":
  - if a "Transport format set" for that transport channel is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
  - if a "Transport format set" for that transport channel is included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured";
    - set the variable INVALID_CONFIGURATION to TRUE;
- if the value of the IE "RLC size list" is set to "Configured":
  - if a "Transport format set" for that transport channel is included in the same message, and the IE "Logical channel list" in the transport format set indicates that no "RLC size" is applicable for that RB
  - if a "Transport format set" for that transport channel is included in the same message, and the IE "Logical channel list" in the stored transport format set of that transport channel indicates that no "RLC size" is applicable for that RB;

~~if a mapping option is included with IE "Uplink transport channel type" set to RACH, and the Choice *RLC size list* is set to "Explicit", and more than one PRACH is defined in IE "PRACH system information list", and the transport format set is not the same for all RACHs:~~

- ~~keep the previously stored multiplexing options for that RB;~~
- set the variable INVALID_CONFIGURATION to TRUE;

- if that RB is using TM and the IE "Segmentation indication" is set to TRUE and, based on the multiplexing configuration resulting from this message, it is mapped onto the same transport channel as another RB:
  - set the variable INVALID_CONFIGURATION to true;

- else:
  - delete all previously stored multiplexing options for that radio bearer;
  - store each new multiplexing option for that radio bearer;
  - select and configure the multiplexing options applicable for the transport channels to be used;
  - if the IE "Uplink transport channel type" is set to the value "RACH" the UE shall refer the IE "RLC size index" to the RACH Transport Format Set of the first PRACH received in the IE "PRACH system information list" received in SIB5 or SIB6.
  - -determine the sets of RLC sizes that apply to the logical channels used by that RB, based on the "RLC size list" and/or the "Logical Channel List" included in the applicable "Transport format set" (either the one received in the same message or the one stored if none were received);
  - if that RB is using AM and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:
    - set the variable INVALID_CONFIGURATION to true.
  - ~~if that RB is using TM and the IE "Segmentation indication" is set to FALSE, and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:~~
    - ~~set the variable INVALID_CONFIGURATION to true.~~
  - if that RB is using AM and the RLC size applicable to the logical channel transporting data PDUs is different from the one derived from the previously stored configuration:
    - re-establish the corresponding RLC entity;
    - configure the corresponding RLC entity with the new RLC size;
    - if the variable CIPHERING_STATUS is set to "Started":
      - if this IE was included in system information then set the HFN values for the corresponding RLC entity equal to the value of the IE "START" for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN that will be included in the CELL UPDATE message that will be sent before the next transmission;
      - if this IE was included in CELL UPDATE CONFIRM, then set the HFN values for the corresponding RLC entity equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
      - if this IE was included in a reconfiguration message, then set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the reconfiguration complete message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
  - if that RB is using UM, indicate the largest applicable RLC size to the corresponding RLC entity
  - configure MAC multiplexing according to the selected multiplexing option;
  - configure the MAC with the logical channel priorities according to selected multiplexing option;
  - configure the MAC with the set of applicable RLC Sizes for each of the logical channels used for that RB;

- if a transport channel that would not exist as a result of the message is referred to:

  - set the variable INVALID_CONFIGURATION to TRUE;

- if a multiplexing option that maps a logical channel corresponding to a TM-RLC entity onto RACH, CPCH, FACH or DSCH is included:

  - set the variable INVALID_CONFIGURATION to TRUE;

- if a multiplexing option is included that realises the radio bearer on the uplink (resp. on the downlink) using two logical channels with different values of the IE "Uplink transport channel type" (resp. of the IE "Downlink transport channel type"):

  - set the variable INVALID_CONFIGURATION to TRUE;

- if there is no multiplexing option applicable for the transport channels to be used:

  - set the variable INVALID_CONFIGURATION to TRUE;

- if there is more than one multiplexing option applicable for the transport channels to be used:

  - set the variable INVALID_CONFIGURATION to TRUE.

In case IE "RB mapping info" includes IE "Downlink RLC logical channel info" but IE "Number of downlink RLC logical channels" is absent, the parameter values are exactly the same as for the corresponding UL logical channels. In case two multiplexing options are specified for the UL, the first options shall be used as default for the DL. As regards the IE "Channel type", the following rule should be applied to derive the DL channel type from the UL channel included in the IE:

Channel used in UL	**DL channel type implied by "same as"**
DCH	DCH
RACH	FACH
CPCH	FACH
USCH	DSCH

8.6.4.10 PDCP Info

If IE "PDCP info" is included, the UE shall:

- configure the PDCP entity for that radio bearer accordingly.
- configure the RLC entity for that radio bearer according to the value of the IE “Support for lossless SRNS relocation”. ~~SRNS relocation configuration.~~

8.6.5.1 Transport Format Set

If the IE "transport channel type", the IE "transport channel identity" ~~(not needed for RACH and FACH)~~ and the IE "Transport format set" are included, the UE shall, for the indicated transport channel:

- if the value ~~(index)~~ of any IE "RB identity" (and "Logical Channel" for RBs using two UL logical channels) in the IE "Logical channel list" does not correspond to a logical channel indicated to be mapped onto this transport channel in any RB multiplexing option (either included in the same message or previously stored and not changed by this message):
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- else:
  - remove a previously stored transport format set if this exists for that transport channel;
  - store the transport format set for that transport channel;
  - if the IE "Transport format Set" has the choice "Transport channel type" set to "Dedicated transport channel":
    - calculate the transport block size for all transport formats in the TFS using the following

      TB size = RLC PDU size + MAC header size,

      where:

      - MAC header size is calculated according to [15] if MAC multiplexing is used. Otherwise it is 0 bits.

  - configure the MAC with the new transport format set (with computed transport block sizes) for that transport channel;
  - if the RB multiplexing option for a RB mapped onto that transport channel (based on the stored RB multiplexing option) is not modified by this message:
    - determine the sets of RLC sizes that apply to the logical channels used by that RB, based on the IE “Logical Channel List” and/or the IE “RLC Size List” from the previously stored RB multiplexing option;
    - if that RB is using AM and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:
      - set the variable INVALID_CONFIGURATION to true;
    - ~~if that RB is using TM and the IE “Segmentation indication” is set to FALSE, and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:~~
      - ~~set the variable INVALID_CONFIGURATION to true.~~
    - if that RB is using AM and the RLC size applicable to the logical channel transporting data PDUs is different from the one derived from the previously stored configuration:
      - re-establish the corresponding RLC entity;
      - configure the corresponding RLC entity with the new RLC size;
      - if this IE was included in system information and if the variable CIPHERING_STATUS is set to "Started", then set the HFN values for the

corresponding RLC entity equal to the value of the IE “START” for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN that will be included in the CELL UPDATE message that will be sent before the next transmission;

- if this IE was included in CELL UPDATE CONFIRM and if the variable CIPHERING_STATUS is set to "Started", then set the HFN values for the corresponding RLC entity equal to the value of the IE “START” included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;

- if this IE was included in a reconfiguration message and if the variable CIPHERING_STATUS is set to "Started", then set the HFN values for the corresponding RLC entity equal to the value of the IE “START” that will be included in the reconfiguration complete message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;

- if this IE was included in ACTIVE SET UPDATE and if the variable CIPHERING_STATUS is set to "Started", then set the HFN values for the corresponding RLC entity equal to the value of the IE “START” that will be included in the ACTIVE SET UPDATE COMPLETE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;

- if that RB is using UM, indicate the largest applicable RLC size to the corresponding RLC entity

- configure MAC with the set of applicable RLC Sizes for each of the logical channels used for that RB.

If neither the IE "transport channel type" nor the IE "Transport format set" is included, the UE shall:

- consider the stored transport format set as valid information.

~~The UTRAN should not assign transport formats with different "RLC Size" to any logical channel transferring data using AM RLC. If an AM RLC entity is mapped to two logical channels, UTRAN may configure more than one "RLC Size" for the logical channel transferring control PDUs only.~~

8.6.5.9 UL Transport channel information common for all transport channels

If the IE "UL Transport channel information common for all transport channels" is included the UE shall:

- perform actions for the IE "TFC subset" as specified in subclause 8.6.5.3;
- if the IE "PRACH TFCS" is included:
  - set the variable INVALID_CONFIGURATION to TRUE~~perform actions for the IE "TFCS" for the selected PRACH as specified in subclause 8.6.5.2~~;
- if the IE has the choice "mode" set to FDD:
  - perform actions for the IE "UL DCH TFCS" as specified in subclause 8.6.5.2;
- if the IE has the choice "mode" set to TDD:
  - if the IE "Individual UL CCTRCH information" is included:
    - for each TFCS identified by IE "UL TFCS id":
      - perform actions for the IE "UL TFCS" as specified in subclause 8.6.5.2.

8.6.6 Physical channel information elements

This section specifies the actions upon reception and/or non-reception of the physical channel information elements. The combination of the values of those information elements included in a given message shall follow the compatibility rules that are specified in the physical layer specifications. In case those rules are not followed, the UE shall set the variable INVALID_CONFIGURATION to TRUE.

8.6.6.1 Frequency info

10.3.5.23 Transport Format Set

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *Transport channel type*	MP			
>Dedicated transport channels				The transport channel that is configured with this TFS is of type DCH
>>Dynamic Transport Format Information	MP	1 to <maxTF>		Note 1
>>>RLC Size	MP		Integer(0..4992)	Unit is bits Note 2
>>>Number of TBs and TTI List	MP	1 to <maxTF>		Present for every valid number of TB's (and TTI) for this RLC Size.
>>>>Transmission Time Interval	CV-*dynamicTTI*		Integer(10,20,40,80)	Unit is ms.
>>>>Number of Transport blocks	MP		Integer(0..512)	Note 3
>>>CHOICE *Logical Channel List*	MP			The logical channels that are allowed to use this RLC Size ~~For radio bearers mapped to RACH, the UE shall regard "Explicit list" as an undefined IE value and handle these as specified in clause 9.~~ For the downlink, "ALL" is the only valid choice. The UE shall regard all other choices as undefined IE values and handle these as specified in clause 9.
>>>>ALL			Null	All logical channels mapped to this transport channel.
>>>>Configured			Null	The logical channels configured to use this RLC size in the *RB mapping info*. 10.3.4.21 if present in this message or in the previously stored configuration otherwise
>>>>Explicit List		1 to 15		Lists the logical channels that are allowed to use this RLC size.
>>>>>RB Identity	MP		RB identity 10.3.4.16	
>>>>>LogicalChannel	CH-*UL-RLCLogicalChannels*		Integer(0..1)	Indicates the relevant UL logical channel for this RB. "0" corresponds to the first, "1" corresponds to the second UL logical channel configured for this RB in the IE "RB mapping info".
>>Semi-static Transport Format Information	MP		Semi-static Transport Format Information 10.3.5.11	
>Common transport channels				The transport channel that is configured with this TFS is of a type not equal to DCH
>>Dynamic Transport Format Information	MP	1 to <maxTF>		Note
>>>RLC Size	MP		Integer(0..4992)	Unit is bits Note 2

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>>Number of TBs and TTI List	MP	1 to <maxTF>		Present for every valid number of TB's (and TTI) for this RLC Size.
>>>>Number of Transport blocks	MP		Integer(0..512)	Note 3
>>>>CHOICE mode	MP			
>>>>>FDD				(no data)
>>>>>TDD				
>>>>>>Transmission Time Interval	CV-*dynamicTTI*		Integer(10,20,40,80)	Unit is ms.
>>>CHOICE *Logical Channel List*	MP			The logical channels that are allowed to use this RLC Size. For radio bearers mapped to RACH, the UE shall regard "Explicit list" as an undefined IE value and handle these as specified in clause 9.
>>>>ALL			Null	All logical channels mapped to this transport channel.
>>>>Configured			Null	The logical channels configured to use this RLC size in the *RB mapping info*. 10.3.4.21 if present in this message or in the previously stored configuration otherwise
>>>>Explicit List		1 to 15		Lists the logical channels that are allowed to use this RLC size.
>>>>>RB Identity	MP		RB identity 10.3.4.16	
>>>>>LogicalChannel	CV-*UL-RLCLogicalChannels*		Integer(0..1)	Indicates the relevant UL logical channel for this RB. "0" corresponds to the first, "1" corresponds to the second UL logical channel configured for this RB in the IE "RB mapping info".
>>Semi-static Transport Format Information	MP		Semi-static Transport Format Information 10.3.5.11	

Condition	Explanation
dynamicTTI	This IE is included if dynamic TTI usage is indicated in IE Transmission Time Interval in Semi-static Transport Format Information. Otherwise it is not needed.
UL-RLCLogicalChannels	If "Number of uplink RLC logical channels" in IE "RB mapping info" in this message is 2 or the IE "RB mapping info" is not present in this message and 2 UL logical channels are configured for this RB, then this IE is present. Otherwise this IE is not needed.

NOTE: The parameter "rate matching attribute" is in line with the RAN WG1 specifications. However, it is not currently in line with the description in [34].

NOTE 1: The first instance of the parameter *Number of TBs and TTI List* within the *Dynamic transport format information* correspond to transport format 0 for this transport channel, the second to transport format 1 and so on. The total number of configured transport formats for each transport channel does not exceed <maxTF>.

NOTE 2: For dedicated channels, 'RLC size' reflects RLC PDU size. In FDD for common channels 'RLC size' reflects actual TB size. In TDD for common channels since MAC headers are not octet aligned, to calculate TB size the MAC header bit offset is added to the specified size (similar to the dedicated case). Therefore for TDD DCH TrCHs the 4 bit C/T is added if MAC multiplexing is applied, for FACH the 3 bit TCTF offset is added and for RACH the 2 bit TCTF offset is added.

NOTE 3: If the number of transport blocks <> 0, and Optional IE "CHOICE RLC mode" or "CHOICE Transport block size is absent, it implies that no RLC PDU data exists but only parity bits exist. If the number of transport blocks = 0, it implies that neither RLC PDU data nor parity bits exist. In order to ensure the possibility of CRC based Blind Transport Format Detection, UTRAN should configure a transport format with number of transport block <> 0, with a zero-size transport block.