

TSG-RAN Meeting #28
Quebec, Canada, 01-03 June 2005

RP-050317
agenda item 8.11

Source: TSG-RAN WG2.

Subject: CRs on RLC LI optimisation for VoIP

The following CRs are in RP-050317:

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Workitem
25.306	0119	-	Rel-6	RLC LI Optimization for VoiP	B	6.4.1	6.5.0	R2-051682	TEI6
25.322	0280	-	Rel-6	RLC LI Optimization for VoIP	B	6.3.0	6.4.0	R2-051680	TEI6
25.331	2608	-	Rel-6	RLC LI Optimization for VoiP	B	6.5.0	6.6.0	R2-051681	TEI6

CR-Form-v7.1
CHANGE REQUEST
25.306 CR 0119 # rev - # Current version: 6.4.1

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

Proposed change affects: UICC apps# ME Radio Access Network Core Network

Title:	# RLC LI Optimization for VoiP		
Source:	# RAN WG2		
Work item code:	# TEI6	Date:	# 13/05/2005
Category:	# B	Release:	# Rel-6
	Use <u>one</u> 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 <u>one</u> of the following releases: Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	# CR0280 for 25.322 proposes an optimization for the RLC UM header structure to reduce the RLC UM overhead in case of services for which the UTRAN can tune the RLC-PDU sizes to the expected RLC-SDU sizes. This CR introduces the necessary support in 25.306
Summary of change:	# Introduction of the UE capability "Support for RLC-SDU alignment"
Consequences if not approved:	# The RLC overhead reduction as described in R2-051311 will not be achieved.

Clauses affected:	# 4.3; 5.1; 5.2.3										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;"></td> </tr> <tr> <td style="width: 20px; text-align: center;"></td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="width: 20px; text-align: center;"></td> <td style="width: 20px; text-align: center;">N</td> </tr> </table> Other core specifications	Y	N	Y			N		N	#	23.306 CR0119 25.331 CR2608
Y	N										
Y											
	N										
	N										
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/specs/CR.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.

4.3 RLC and MAC-hs parameters

Total RLC AM and MAC-hs buffer size

When HS-DSCH is not configured this is defined as the maximum total buffer size across all RLC AM entities supported by the UE. When HS-DSCH is configured this is defined as the maximum total buffer size across all MAC-hs reordering entities and all RLC AM entities supported by the UE. The memory signalled in this capability is dynamically shared by RLC AM entities and MAC-hs reordering entities at any time.

In order to evaluate memory consumption in the UE, it shall be assumed that:

- a stored AMD PDU of N octets requires a memory equal to N octets;
- a stored MAC-hs PDU of N bits requires a memory equal to $(N - 10)$ bits.

The UE shall only consider itself in a memory shortage situation as defined in [9] [10] when the amount of stored AM RLC PDUs and MAC-hs PDUs exceeds its capability.

Maximum number of AM entities

This is defined as the maximum number of RLC AM entities supported by the UE.

Maximum RLC AM Window Size

This is defined as the maximum transmission and receiving window size of RLC AM entities supported by the UE.

Support for RLC SDU alignment

Defines whether the UE is able to support the intention to align the start of RLC SDU's to the start of RLC PDU's.

It is FFS whether this UE capability needs to be defined in more detail, and if so how.

5 Possible UE radio access capability parameter settings

5.1 Value ranges

Table 5.1: UE radio access capability parameter value ranges

		UE radio access capability parameter	Value range
PDCP parameters	Support for RFC 2507		Yes/No
	Support for RFC 3095		Yes/No
	Support for RFC 3095 context relocation		Yes/No
	Support for loss-less SRNS relocation		Yes/No
	Support for loss-less DL RLC PDU size change		Yes/No
	Maximum header compression context space		1024, 2048, 4096, 8192, 16384, 32768, 65536, 131072 bytes
	Maximum number of ROHC context sessions		2, 4, 8, 12, 16, 24, 32, 48, 64, 128, 256, 512, 1024, 16384
	Support for Reverse Decompression		Not supported, 1..65535
RLC and MAC-hs parameters	Total RLC AM and MAC-hs buffer size		2, 10, 50, 100, 150, 200, 300, 400, 500, 750, 1000 kBytes
	Maximum number of AM entities		3, 4, 5, 6, 8, 16, 30
	Maximum RLC AM window size		2047, 4095
		Support for RLC-SDU alignment	Yes/No
PHY parameters	Transport channel parameters in downlink	Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum number of simultaneous transport channels	4, 8, 16, 32
		Maximum number of simultaneous CTrCH	1, 2, 3, 4, 5, 6, 7, 8
		Maximum total number of transport blocks received within TTIs that end within the same 10 ms interval	4, 8, 16, 32, 48, 64, 96, 128, 256, 512
		Maximum number of TFC	16, 32, 48, 64, 96, 128, 256, 512, 1024
		Maximum number of TF	32, 64, 128, 256, 512, 1024
		Support for turbo decoding	Yes/No
	Transport channel parameters in uplink	Maximum sum of number of bits of all transport blocks being transmitted at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all convolutionally coded transport blocks being transmitted at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all turbo coded transport blocks being transmitted at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum number of simultaneous transport channels	2, 4, 8, 16, 32
		Maximum number of simultaneous CTrCH of DCH type (TDD only)	1, 2, 3, 4, 5, 6, 7, 8

		UE radio access capability parameter	Value range		
		Maximum total number of transport blocks transmitted within TTIs that start at the same time	2, 4, 8, 16, 32, 48, 64, 96, 128, 256, 512		
		Maximum number of TFC	4, 8, 16, 32, 48, 64, 96, 128, 256, 512, 1024		
		Maximum number of TF	32, 64, 128, 256, 512, 1024		
		Support for turbo encoding	Yes/No		
FDD Physical channel parameters in downlink		Maximum number of DPCH/PDSCH codes to be simultaneously received	1, 2, 3, 4, 5, 6, 7, 8		
		Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH)	600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 48000, 57600, 67200, 76800		
		Support for SF 512	Yes/No		
		Support of PDSCH	Yes/No		
		Support of HS-PDSCH	Yes/No		
		Simultaneous reception of SCCPCH and DPCH	Yes/No		
		Simultaneous reception of SCCPCH, DPCH and PDSCH	Yes/No		
		Simultaneous reception of SCCPCH, DPCH and HS-PDSCH	Yes/No		
		Maximum number of simultaneous S-CCPCH radio links	1 NOTE: Only the value 1 is part of this release of the specification		
		Support of dedicated pilots for channel estimation	Yes		
		Support of dedicated pilots for channel estimation of HS-DSCH	Yes/No		
		FDD Physical channel parameters in uplink		Maximum number of DPDCH bits transmitted per 10 ms	600, 1200, 2400, 4800, 9600, 19200, 28800, 38400, 48000, 57600
				Support of PCPCH	Yes/No
Support of E-DPDCH	Yes/No				
TDD 3.84 Mcps physical channel parameters in downlink		Maximum number of timeslots per frame	1..14		
		Maximum number of physical channels per frame	1, 2, 3..224		
		Minimum SF	16, 1		
		Support of PDSCH	Yes/No		
		Support of HS-PDSCH	Yes/No		
TDD 3.84 Mcps physical channel parameters in uplink		Maximum number of physical channels per timeslot	1..16		
		Maximum Number of timeslots per frame	1..14		
		Maximum number of physical channels per timeslot	1, 2		
		Minimum SF	16, 8, 4, 2, 1		
TDD 1.28 Mcps physical channel parameters in downlink		Support of PUSCH	Yes/No		
		Maximum number of timeslots per subframe	1..6		
		Maximum number of physical channels per subframe	1, 2, 3, ..., 96		
		Minimum SF	16, 1		
		Support of PDSCH	Yes/No		
		Support of HS-PDSCH	Yes/No		
TDD 1.28 Mcps physical channel parameters in uplink		Maximum number of physical channels per timeslot	1..16		
		Support 8PSK	Yes/No		
		Maximum number of timeslots per subframe	1..6		
		Maximum number of physical channels per timeslot	1, 2		
		Minimum SF	16, 8, 4, 2, 1		
		Support of 8PSK	Yes/No		
		Support of PUSCH	Yes/No		

		UE radio access capability parameter	Value range
RF parameters	FDD RF parameters	UE power class	3, 4 NOTE: Only power classes 3 and 4 are part of this release of the specification
		Tx/Rx frequency separation	190 Mhz 174.8 MHz to 205.2 MHz 134.8 MHz to 245.2 MHz
RF parameters	TDD 3.84 Mcps RF parameters	UE power class	2, 3 NOTE: Only power classes 2 and 3 are part of this release of the specification
		Radio frequency bands	a), b), c), a+b), a+c), b+c), a+b+c)
	TDD 1.28 Mcps RF parameters	UE power class	2, 3
		Radio frequency bands	a), b), c), a+b), a+c), b+c), a+b+c)
Multi-mode related parameters		Support of UTRA FDD	Yes/No
		Support of UTRA TDD 3.84 Mcps	Yes/No
		Support of UTRA TDD 1.28 Mcps	Yes/No
Multi-RAT related parameters		Support of GSM	Yes/No (per GSM frequency band)
		Support of multi-carrier	Yes/No
		Support of UTRAN to GERAN Network Assisted Cell Change	Yes/No
Security parameters		Support of ciphering algorithm UEA0	Yes
		Support of ciphering algorithm UEA1	Yes
		Support of integrity protection algorithm UIA1	Yes
UE positioning related parameters		Standalone location method(s) supported	Yes/No
		Network assisted GPS support	Network based / UE based / Both/ None
		GPS reference time capable	Yes/No
		Support for IPDL	Yes/No
		Support for OTDOA UE based method	Yes/No
		Support for Rx-Tx time difference type 2 measurement	Yes/No
		Support for UE Positioning assisted GPS measurement validity in CELL_PCH and URA_PCH RRC states	Yes
		Support for SFN-SFN observed time difference type 2 measurement	Yes/No
Measurement related capabilities		Need for downlink compressed mode	Yes/No (per frequency band, UTRA mode and RAT)
		Need for uplink compressed mode	Yes/No (per frequency band, UTRA mode and RAT)
General capabilities		Access Stratum release indicator	R99, REL-4, REL-5
DL capabilities with simultaneous HS-DSCH		DL capability with simultaneous HS-DSCH configuration	32 kbps, 64 kbps, 128 kbps, 384 kbps
UL capabilities with simultaneous E-DCH		UL capabilities with simultaneous E-DCH	64 kbps

//partly omitted//

5.2.3 Combinations of UE Radio Access Parameters for UL

Table 5.2.3.1: UE radio access capability parameter combinations, UL parameters

Reference combination of UE Radio Access capability parameters in UL	12 kbps class	32 kbps class	64 kbps class	128 kbps class	384 kbps class	768 kbps class
Transport channel parameters						
Maximum sum of number of bits of all transport blocks being transmitted at an arbitrary time instant	640	640(FDD) 1280 (TDD)	3840	3840	6400	10240
Maximum sum of number of bits of all convolutionally coded transport blocks being transmitted at an arbitrary time instant	640	640	640	640	640	640
Maximum sum of number of bits of all turbo coded transport blocks being transmitted at an arbitrary time instant	NA	NA(FDD) 1280 (TDD)	3840	3840	6400	10240
Maximum number of simultaneous transport channels	4	4	8	8	8	8
Maximum number of simultaneous CCTrCH(TDD only)	1 NOTE 3	1 NOTE 3	2 NOTE 3	2 NOTE 3	2 NOTE 3	2 NOTE 3
Maximum total number of transport blocks transmitted within TTIs that start at the same time	4	4	8	8	16	32
Maximum number of TFC	16	16	32	48	64	128
Maximum number of TF	32	32	32	32	32	64
Support for turbo encoding	No	No (FDD) Yes (TDD)	Yes	Yes	Yes	Yes
Support for RLC-SDU alignment	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Physical channel parameters (FDD)						
Maximum number of DPDCH bits transmitted per 10 ms	600	1200	2400	4800	9600	19200
Simultaneous reception of SCCPCH and DPCH NOTE 2	No	No	No	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1
Simultaneous reception of SCCPCH, DPCH and PDSCH NOTE 2	No	No	No	No	No	No
Simultaneous reception of SCCPCH, DPCH and HS-PDSCH NOTE 2	No	No	No	No	No	No
Support of PCPCH NOTE 4	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1
Support of E-DPDCH	No	No	Yes/No	Yes/No	Yes/No	Yes/No
Physical channel parameters (TDD 3.84 Mcps)						
Maximum Number of timeslots per frame	1	1	2	3	7	9
Maximum number of physical channels per timeslot	1	1	1	1	1	2
Minimum SF	8	4	2	2	2	2
Support of PUSCH	No	Yes/No NOTE 1	Yes	Yes	Yes	Yes
Physical channel parameters (TDD 1.28 Mcps)						
Maximum Number of timeslots per subframe	1	1	2	3	5	5
Maximum number of physical channels per timeslot	1	1	1	1	1	2
Minimum SF	8	4	2	2	2	2
Support of PUSCH	No	Yes/No NOTE 1	Yes	Yes	Yes	Yes
Support of 8PSK	No	No	No	No	No	No

NOTE 1: Options represent different combinations that should be supported with conformance tests.

NOTE 2: The downlink parameters 'Simultaneous reception of SCCPCH and DPCH' and 'Simultaneous reception of SCCPCH, DPCH and PDSCH' are included in the combinations for uplink as their requirements relate to the uplink data rate. Simultaneous reception of SCCPCH and DPCH is required for the DRAC procedure that is intended for controlling uplink transmissions. In this release of the specification, this is limited to 1 SCCPCH.

NOTE 3: This number does not contain the RACH CCTrCH.

NOTE 4: Support of PCPCH means that the UE supports PCPCH access for both the CA not active case and for the CA active case.

CR-Form-v7

CHANGE REQUEST

25.322 CR 0280 # rev - # Current version: 6.3.0

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	# RLC LI Optimization for VoIP #		
Source:	# RAN WG2 #		
Work item code:	# TEI6 #	Date:	# #
Category:	# B #		Release: # Rel-6 #
	<i>Use one of the following categories:</i> 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 .		<i>Use one of the following releases:</i> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	# An optimization for the RLC UM header structure is proposed to reduce the RLC UM overhead in case of services for which the UTRAN can tune the RLC-PDU sizes to the expected RLC-SDU sizes. #
Summary of change:	# 1) Introduce “alternative E-bit interpretation” to be optionally used for the RLC UM 2) Introduce new predefined “Length Indicator” to be used when a RLC PDU contains neither the first octet of a RLC SDU nor the last octet of a RLC SDU #
Consequences if not approved:	# The RLC overhead reduction as described in R2-051311 will not be achieved. #

Clauses affected:	# 4.2.1.2.1; 8.2, 9.2.2.5, 9.2.2.8; 9.2.2.9; 11.2.2.2; 11.2.3.1 #								
Other specs Affected:	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td>Y</td> <td>N</td> </tr> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table> Other core specifications Test specifications O&M Specifications	Y	N					# 25.306, 25.331. #	
Y	N								
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/specs/CR.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.

4.2.1.2.1 Transmitting UM RLC entity

The transmitting UM-RLC entity receives RLC SDUs from upper layers through the UM-SAP.

The transmitting UM RLC entity segments the RLC SDU into UMD PDUs of appropriate size, if the RLC SDU is larger than the length of available space in the UMD PDU. The UMD PDU may contain segmented and/or concatenated RLC SDUs. UMD PDU may also contain padding to ensure that it is of a valid length. Length Indicators are used to define boundaries between RLC SDUs within UMD PDUs unless the "Extension bit" already indicates that a UMD PDU contains exactly one complete SDU. Length Indicators are also used to define whether Padding is included in the UMD PDU.

If ciphering is configured and started, an UMD PDU is ciphered (except for the UMD PDU header) before it is submitted to the lower layer.

The transmitting UM RLC entity submits UMD PDUs to the lower layer through either a CCCH, SHCCH, DCCH, CTCH, DTCH, MCCH, MSCH or an MTCH logical channel.

8.2 Primitive parameters

Following parameters are used in the primitives:

- 1) The parameter Data is the RLC SDU that is mapped onto the Data field in RLC PDUs. When AM or UM RLC entities are used, the length of the Data parameter is a multiple of 8 bits, otherwise (TM RLC entity) the length of Data parameter is a bit-string whose length may not be a multiple of 8 bits.
- 2) The parameter Confirmation Request (CNF) indicates whether the transmitting side of the AM RLC entity needs to confirm the reception of the RLC SDU by the peer-RLC AM entity. If required, once all AMD PDUs that make up the RLC SDU are positively acknowledged by the receiving AM RLC entity, the transmitting AM RLC entity notifies upper layers.
- 3) The parameter Message Unit Identifier (MUI) is an identity of the RLC SDU, which is used to indicate which RLC SDU that is confirmed with the RLC-AM-DATA-Conf. primitive, or discarded with the RLC-AM/UM/TM-DATA-Conf. Primitive.
- 4) The parameter E/R indicates establishment, re-establishment, release or modification of an RLC entity, where re-establishment is applicable to AM and UM RLC entities only. If re-establishment is requested, the state variables and configurable parameters are initialised according to subclause 9.7.7. If release is requested, all protocol parameters, variables and timers are released and the RLC entity enters the NULL state. If modification is requested, the protocol parameters indicated by upper layers (e.g. ciphering parameters) are only modified, while keeping the other protocol parameters, such as the protocol variables, protocol timers and protocol state unchanged. AM RLC entities are always re-established if any of the uplink or downlink AMD PDU size is changed. The modification of other protocol parameters does not require a re-establishment.
- 5) The parameter Event Code (EVC) indicates the reason for the CRLC-STATUS-Ind e.g., unrecoverable errors such as data link layer loss or recoverable status events such as reset.
- 6) The parameter Ciphering Elements are only applicable for UM and AM operations. These parameters are Ciphering Mode, Ciphering Key, Transmitting Activation Time (Sequence Number to activate a new ciphering configuration at the Sender), Receiving Activation Time (Sequence Number to activate a new ciphering configuration at the Receiver) and HFN (Hyper Frame Number).
- 7) The AM_parameters are only applicable for AM operation. These parameters are AMD PDU size, In-sequence Delivery Indication (indicating that RLC SDUs are delivered to upper layers in sequence or that they can be delivered out of sequence), Timer values (see subclause 9.5), Protocol parameter values (see subclause 9.6), Polling triggers (see subclause 9.7.1), Status triggers (see subclause 9.7.2), Periodical Status blocking configuration (see subclause 9.7.2), SDU discard mode (see subclause 9.7.3), Minimum WSN (see subclause 9.2.2.11.3), and Send MRW. The Minimum WSN is always greater than or equal to the number of transport blocks in the smallest transport block set. The Send MRW indicates that the information of each discarded RLC

SDU is sent to the Receiver, and the MRW SUFI is sent to the Receiver even if no segments of the RLC SDU to be discarded were submitted to a lower layer.

- 8) The parameter DiscardInfo indicates to upper layer the discarded RLC SDU in the peer-RLC AM entity. It is applicable only when in-sequence delivery is configured and it is to be used when upper layers require the reliable data transfer.
- 9) The Stop parameter is applicable to AM and UM RLC entities only and indicates to the RLC entity to (see subclause 9.7.6):
 - not transmit nor receive any RLC PDUs.
- 10) The Continue parameter is applicable to AM and UM RLC entities only and indicates to the RLC entity to continue transmission and reception of RLC PDUs.
- 11) The UM_parameters are only applicable for UM operation. It contains Timer_Discard value (see subclause 9.5), [use Alternative E-bit interpretation \(see subclause 9.2.2.5\)](#), largest UL UMD PDU size (see subclause 9.2.2.8) and DL RLC UM LI size (see subclause 9.2.2.8). For a receiving UM RLC in a UE, an additional parameter indicating use/ no use of out of sequence SDU delivery is included (see subclause 11.2.3.2). If out of sequence SDU delivery is used, the parameters OSD_Window_Size (see subclause 9.6) and the timeout value of Timer_OSD (see subclause 9.5) are included. For a receiving UM RLC in a UE, an additional parameter indicating use/ no use of duplicate avoidance and reordering is included (see subclause 9.7.10). If duplicate avoidance and reordering is used, the parameters DAR_Window_Size (see subclause 9.6) and the timeout value of Timer_DAR (see subclause 9.5) are included.
- 12) The TM_parameters are only applicable for TM operation. It contains e.g. segmentation indication (see subclauses 9.2.2.9 and 11.1.2.1), Timer_Discard value (see subclause 9.5) and delivery of erroneous SDU indication (see subclause 11.1.3).
- 13) The N parameter indicates that an RLC entity will not send a PDU with "Sequence Number" \geq VT(S)+N for AM and "Sequence Number" \geq VT(US)+N for UM, where N is a non-negative integer.
- 14) The VT(S) parameter indicates the value of the Send State Variable for the case of the AM.
- 15) The VT(US) parameter indicates the value of the UM Data State Variable, for the case of the UM.
- 16) The Error_Indicator parameter indicates that the RLC SDU is erroneous (see subclause 11.1.3).
- 17) The parameter UE-ID type indicator indicates the RNTI type (U-RNTI or C-RNTI) to be used for the associated RLC SDU. This parameter is not required at the UE.
- 18) The parameter DiscardReq indicates whether the transmitting RLC entity needs to inform the upper layers of the discarded RLC SDU. If required, the transmitting RLC entity notifies upper layers when the SDU is discarded.
- 19) The parameter Status is only applicable for AM operation. This parameter indicates whether a RLC SDU is successfully transmitted or discarded.

SECTIONS DELETED

9.2.2.5 Extension bit (E)

Length: 1bit.

~~This~~ [The interpretation of this bit depends on RLC mode and higher layer configuration:](#)

- [In the UMD PDU, the "Extension bit" in the first octet has either the normal E-bit interpretation or the alternative E-bit interpretation depending on higher layer configuration. The "Extension bit" in all the other octets always has the normal E-bit interpretation.](#)
- [In the AMD PDU, the "Extension bit" always has the normal E-bit interpretation.](#)

[Normal E-bit interpretation:](#) ~~indicates if the next octet will be a "Length Indicator" and E.~~

Bit	Description
0	The next field is data, piggybacked STATUS PDU or padding
1	The next field is Length Indicator and E bit

[Alternative E-bit interpretation:](#)

Bit	Description
0	The next field is a complete SDU, which is not segmented, concatenated or padded.
1	The next field is Length Indicator and E bit

[Ediotrs Note] A paragraph is deleted

SECTIONS DELETED

9.2.2.8 Length Indicator (LI)

Unless the "Extension bit" indicates that a UMD PDU contains a complete SDU which is not segmented, concatenated or padded, a "Length Indicator" is used to indicate the last octet of each RLC SDU ending within the PDU. If the "Extension bit" indicates that the UMD PDU contains a complete SDU which is not segmented, concatenated or padded, no LIs are present in this UMD PDU.

Except for the predefined values reserved for special purposes and listed in the tables below, the "Length Indicator" shall:

- be set to the number of octets between the end of the RLC header and up to and including the last octet of an RLC SDU segment;
- be included in the PDUs that they refer to.

The size of the "Length Indicator" may be either 7 bits or 15 bits. The "Length Indicator" size is determined independently for uplink and downlink. The value of a "Length Indicator" shall not exceed the values specified in subclauses 11.2.4.2 and 11.3.4.5 respectively for UMD and AMD PDUs.

The "Length Indicators" which refer to the same PDU shall:

- not be reordered in case of retransmission;
- be in the same order as the RLC SDUs that they refer to.

For AM:

- if the "AMD PDU size" is ≤ 126 octets:
 - 7-bit "Length Indicators" shall be used.
- else:
 - 15-bit "Length Indicators" shall be used.
- the size of the "Length Indicator" is always the same for all AMD PDUs, for one RLC entity.

For UM uplink:

- if the "largest UL UMD PDU size" is ≤ 125 octets:
 - 7-bit "Length Indicators" shall be used.
- else:
 - 15-bit "Length Indicators" shall be used.

For UM downlink:

- the "Length Indicator" size provided in "DL RLC UM LI size" shall be used.

For UM:

- between modifications of the "largest UMD PDU size", the size of the "Length Indicator" is the same for all UMD PDUs;
- if the RLC SDU begins in the beginning of the RLC PDU; and
- if the RLC PDU is transmitted in uplink; and
- if the "Length Indicators" indicating that a RLC SDU ended exactly in the end or one octet short (only when 15-bit "Length Indicators" is used) of the previous RLC PDU are not present; and
- if the "Extension bit" does not indicate that the UMD PDU contains a complete SDU which is not segmented, concatenated or padded:
 - if 7-bit "Length Indicator" is used:
 - the "Length Indicator" with value "111 1100" shall be used;
 - if 15-bit "Length Indicator" is used:
 - the "Length Indicator" with value "111 1111 1111 1100" shall be used.
- in downlink:
 - if 7-bit "Length Indicator" is used:
 - the Receiver shall be prepared to receive the "Length Indicator" with value "111 1100";
 - the Receiver shall follow the discard rules in subclause 11.2.3 both when the "Length Indicator" with value "111 1100" is present and when it is absent.
 - if 15-bit "Length Indicator" is used:
 - the Receiver shall be prepared to receive the "Length Indicator" with value "111 1111 1111 1100";
 - the Receiver shall follow the discard rules in subclause 11.2.3 both when the "Length Indicator" with value "111 1111 1111 1100" is present and when it is absent.

In the case where the end of the last segment of an RLC SDU exactly ends at the end of a PDU and there is no "Length Indicator" that indicates the end of the RLC SDU, and the "Extension bit" of the following PDU does not indicate that the UMD PDU contains a complete SDU which is not segmented, concatenated or padded:

- if 7-bit "Length Indicator" is used:
 - a "Length Indicator" with value "000 0000" shall be placed as the first "Length Indicator" in the following PDU;
- if 15-bit "Length Indicator" is used:
 - a "Length Indicator" with value "000 0000 0000 0000" shall be placed as the first "Length Indicator" in the following PDU.

In the case where a PDU contains a 15-bit "Length Indicator" indicating that an RLC SDU ends with one octet left in the PDU, the last octet of this PDU shall:

- be padded by the Sender and ignored by the Receiver though there is no "Length Indicator" indicating the existence of Padding; and
- not be filled with the first octet of the next RLC SDU data.

In the case where 15-bit "Length Indicators" are used in a PDU and the last segment of an RLC SDU is one octet short of exactly filling the PDU:

- if a 15-bit "Length Indicator" is used for the following PDU:
 - the "Length Indicator" with value "111 1111 1111 1011" shall be placed as the first "Length Indicator" in the following PDU;

- the remaining one octet in the current PDU shall be padded by the Sender and ignored at the Receiver though there is no "Length Indicator" indicating the existence of Padding;
- if a 7-bit "Length Indicator" size is configured ~~used~~ for the following PDU:
 - if RLC is configured for UM mode:
 - if the "Extension bit" of that PDU does not indicate that the UMD PDU contains a complete SDU which is not segmented, concatenated or padded:
 - the "Length Indicator" with value "000 0000" shall be placed as the first "Length indicator" in the following PDU;
 - ~~and its~~ the "Sequence Number" shall be incremented by 2 before it is transmitted.

For UM and AM RLC:

- if a 7 bit "Length Indicator" is used in a RLC PDU and one or more padding octets are present in the RLC PDU after the end of the last RLC SDU:
 - indicate the presence of padding by including a "Length Indicator" with value "1111111" as the last "Length Indicator" in the PDU.
- if a 15 bit "Length Indicator" is used in a RLC PDU and two or more padding octets are present in the RLC PDU after the end of the last RLC SDU:
 - indicate the presence of padding by including a "Length Indicator" with value "111 1111 1111 1111" as the last "Length Indicator" in the PDU.

NOTE: After the "Length Indicator" indicating the presence of padding has been included in the RLC PDU, the length of the padding may be zero.

In the case where the "alternative E-bit interpretation" is configured for UM RLC and an RLC PDU contains a segment of an SDU but neither the first octet nor the last octet of this SDU:

- if a 7-bit "Length Indicator" is used:
 - the "Length Indicator" with value "111 1110" shall be used:
- if a 15-bit "Length Indicator" is used:
 - the "Length Indicator" with value "111 1111 1111 1110" shall be used:

If a "Length Indicator" is still awaiting transmission and there is no RLC SDU available, an RLC PDU consisting of this "Length Indicator", the appropriate padding "Length Indicator" and padding may be transmitted.

Predefined values of the "Length Indicator" are used to indicate padding. The values that are reserved for special purposes are listed in the tables below depending on the size of the "Length Indicator". Only predefined "Length Indicator" values can refer to the padding space. These values shall only be placed after all other "Length Indicators" for a PDU.

STATUS PDUs can be piggybacked on the AMD PDU by using part or all of the padding space. A predefined "Length Indicator" shall be used to indicate the presence of a piggybacked STATUS PDU. This "Length Indicator" replaces the padding "Length Indicator". The piggybacked STATUS PDU shall be appended immediately following the PDU data. When only part of the padding space is used, the end of the piggybacked STATUS PDU is indicated by one of the SUFI fields NO_MORE or ACK. Thus no additional "Length Indicator" is required to show that there is still padding in the AMD PDU.

If "SDU discard with explicit signalling" is configured:

- an AMD PDU can contain a maximum number of 15 "Length Indicators" indicating the end of 15 corresponding SDUs; and
- the rest of the AMD PDU space shall be used as padding or as piggybacked STATUS PDU.

Length: 7 bits

Bit	Description
0000000	The previous RLC PDU was exactly filled with the last segment of an RLC SDU and there is no "Length Indicator" that indicates the end of the RLC SDU in the previous RLC PDU.
1111100	UMD PDU: The first data octet in this RLC PDU is the first octet of an RLC SDU. AMD PDU: Reserved (PDUs with this coding will be discarded by this version of the protocol).
1111101	Reserved (PDUs with this coding will be discarded by this version of the protocol).
1111110	AMD PDU: The rest of the RLC PDU includes a piggybacked STATUS PDU. UMD PDU: Reserved (PDUs with this coding will be discarded by this version of the protocol) <u>The RLC PDU contains a segment of an SDU but neither the first octet nor the last octet of this SDU.</u>
1111111	The rest of the RLC PDU is padding. The padding length can be zero.

Length: 15bits

Bit	Description
000000000000000	The previous RLC PDU was exactly filled with the last segment of an RLC SDU and there is no "Length Indicator" that indicates the end of the RLC SDU in the previous RLC PDU.
11111111111011	The last segment of an RLC SDU was one octet short of exactly filling the previous RLC PDU and there is no "Length Indicator" that indicates the end of the RLC SDU in the previous RLC PDU. The remaining one octet in the previous RLC PDU is ignored.
11111111111100	UMD PDU: The first data octet in this RLC PDU is the first octet of an RLC SDU. AMD PDU: Reserved (PDUs with this coding will be discarded by this version of the protocol).
11111111111101	Reserved (PDUs with this coding will be discarded by this version of the protocol).
11111111111110	AMD PDU: The rest of the RLC PDU includes a piggybacked STATUS PDU. UMD PDU: Reserved (PDUs with this coding will be discarded by this version of the protocol) <u>The RLC PDU contains a segment of an SDU but neither the first octet nor the last octet of this SDU.</u>
11111111111111	The rest of the RLC PDU is padding. The padding length can be zero.

SECTIONS DELETED

9.2.2.9 Data field

RLC SDUs or segments of RLC SDUs are mapped to this field in transparent, unacknowledged and acknowledged modes.

Transparent mode data:

- the length of RLC SDUs is not constrained to a multiple of 8 bits;
- if "Segmentation" is configured:
 - all the RLC PDUs carrying segments of a RLC SDU shall be sent in one TTI;
 - only RLC PDUs carrying segments from a single RLC SDU shall be sent in one TTI;
- otherwise (Segmentation is not configured):
 - TMD PDU size is fixed within a single TTI and is equal to the RLC SDU size.

Unacknowledged mode data and Acknowledged mode data:

- the length of RLC SDUs is constrained to a multiple of 8 bits;
- the last segment of an RLC SDU shall be concatenated with the first segment of the next RLC SDU in order to fill the data field completely and avoid unnecessary padding unless otherwise specified in subclause 9.2.2.8 or subclause 11.2.2.2. The "Length Indicator" field is used to point the borders between RLC SDUs (see subclause 9.2.2.8).

11.2.2.2 Submission of UMD PDUs to the lower layer

If one or more SDUs have been scheduled for transmission according to subclause 11.2.2, the Sender shall:

- inform the lower layer of the number and size of SDUs scheduled for transmission;
- segment, and if possible concatenate the SDUs according to the PDU sizes indicated by the lower layer (see subclause 9.2.2.9). Concatenation may not be performed in all cases if the "alternative E-bit interpretation" is configured and the UE supports RLC-SDU alignment;
- submit to the lower layer, the requested number of UMD PDUs;
- update VT(US) for each UMD PDU submitted to the lower layer (see subclause 9.4);
- buffer the SDUs that are not submitted to the lower layer according to the discard configuration (see subclause 9.7.3).

11.2.3.1 SDU discard and re-assembly

Upon delivery of a set of UMD PDUs from the lower layer or from the duplicate avoidance and reordering subentity, the Receiver shall:

- update VR(US) according to each received UMD PDU (see subclause 9.4);
- if the updating step of VR(US) is not equal to one (i.e. one or more UMD PDUs are missing):
 - discard the SDUs that could have segments or "Length Indicators" indicating the end of the SDUs in the missing UMD PDUs according to subclauses 9.2.2.8 and 9.2.2.9.
- if the special "Length Indicator" "1111 100" or "1111 1111 1111 100" is the first "Length Indicator" of a UMD PDU received on the downlink:
 - consider the first data octet in this UMD PDU as the first octet of an RLC SDU.
 - if the "Extension bit" indicates that the UMD PDU contains a complete SDU which is not segmented, concatenated or padded:
 - consider the data part in this UMD PDU as one complete RLC SDU.
- reassemble the received UMD PDUs into RLC SDUs;
- submit the RLC SDUs to upper layers through the UM-SAP.

CHANGE REQUEST

25.331 CR 2608 # rev - # Current version: 6.5.0

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	# RLC LI Optimization for VoIP		
Source:	# RAN WG2		
Work item code:	# TEI6	Date:	#
Category:	# B	Release:	# Rel-6
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		Ph2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
	B (addition of feature),		R97 (Release 1997)
	C (functional modification of feature)		R98 (Release 1998)
	D (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)
			Rel-7 (Release 7)

Reason for change:	# CR0280 for 25.322 proposes an optimization for the RLC UM header structure to reduce the RLC UM overhead in case of services for which the UTRAN can tune the RLC-PDU sizes to the expected RLC-SDU sizes. This CR introduces the necessary support in 25.331
Summary of change:	# 1) Enable the UTRAN to configure the RLC to use the "Alternative E-bit interpretation" in UL and in DL; 2) Introduction of the UE capability "Support for RLC-SDU alignment"
Consequences if not approved:	# The RLC overhead reduction as described in R2-051311 will not be achieved.

Clauses affected:	# 8.6.4.9, 10.3.4.23; 10.3.3.34										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td>Y</td> <td></td> </tr> <tr> <td></td> <td>N</td> </tr> <tr> <td></td> <td>N</td> </tr> </table>	Y	N	Y			N		N	Other core specifications	# 23.306 CR0119 25.322 CR0280
Y	N										
Y											
	N										
	N										
		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/specs/CR.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.

8.6.4.9 RLC Info

Upon reception of the IE "RLC Info", the UE shall:

- 1> configure the transmitting and receiving RLC entities in the UE for that radio bearer accordingly;
 - 1> if the IE "Polling info" is present in the IE "RLC info":
 - 2> for each present IE in the IE "Polling info":
 - 3> configure RLC to use the corresponding function according to the value of the IE.
 - 2> for each absent IE in the IE "Polling info":
 - 3> configure RLC to not use the corresponding function.
 - 1> if the IE "Polling info" is absent:
 - 2> configure RLC to not use the polling functionality.
 - 1> if the IE "Downlink RLC STATUS info" is present in the IE "RLC info" (this IE is present for AM RLC):
 - 2> for each present IE in the IE "Downlink RLC STATUS info":
 - 3> configure RLC to use the corresponding function according to value of the IE.
 - 2> for each absent IE in the IE "Downlink RLC STATUS info":
 - 3> configure RLC to not use the corresponding function.
 - 1> if the IE "Transmission RLC discard" is present:
 - 2> configure the discard procedure in RLC according to the IE "Transmission RLC discard"
 - 1> if the IE "Transmission RLC discard" is absent (only possible for TM RLC and UM RLC):
 - 2> do not configure SDU discard in RLC.
 - 1> if the IE "Uplink RLC mode" is present and is set to "UM RLC":
 - 2> if the IE "Alternative E-bit interpretation" is present:
 - 3> configure the uplink RLC entity to use the alternative E-bit interpretation and corresponding LI's;
 - 2> if the IE "Alternative E-bit interpretation" is not present:
 - 3> configure the uplink RLC entity to use the normal E-bit interpretation and corresponding LI's;
 - 1> if the IE "Downlink RLC mode" is present and is set to "AM RLC":
 - 2> if IE "DL RLC PDU size" is not present:
 - 3> determining the downlink RLC PDU size will be handled at RLC level as described in [16], without any configuration from RRC.
- NOTE: The case where this mandatory IE is not present is meant to handle the interaction with a network using an earlier release of the specification.
- 2> else, if the IE "DL RLC PDU size" is present and no downlink RLC PDU size is currently set in the RLC entity:
 - 3> configure the corresponding RLC entity with the downlink RLC PDU size.
 - 2> else, if the IE "DL RLC PDU size" is present and its value is different from the one currently set in the RLC entity:
- NOTE: The downlink RLC PDU size set in the RLC entity can either be explicitly configured or, in case no explicit configuration is provided, derived by the first received RLC PDU [16].

- 3> if the IE "one sided RLC re-establishment" is set to TRUE:
 - 4> re-establish the receiving side of the corresponding RLC entity.
- 3> else:
 - 4> re-establish the corresponding RLC entity.
- 3> configure the corresponding RLC entity with the new downlink RLC PDU size;
- 3> if the UE supports the lossless DL RLC PDU size change and PDCP was configured for that radio bearer with the IE "Support for lossless SRNS relocation or for lossless DL RLC PDU size change" set to TRUE:
 - 4> include the current DL PDCP receive sequence number and the radio bearer identity for that radio bearer in the variable PDCP_SN_INFO.
- 3> if the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" for this radio bearer is set to "Started":
 - 4> if the RLC re-establishment is caused by a CELL UPDATE CONFIRM:
 - 5> if only the receiving side of the RLC entity was re-established:
 - 6> set the HFN values for the corresponding RLC entity in downlink equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for this CN domain.
 - 5> if the whole RLC entity was re-established:
 - 6> set the HFN values for the corresponding RLC entity in uplink and downlink equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for this CN domain.
 - 4> if the RLC re-establishment is caused by a reconfiguration message:
 - 5> if only the receiving side of the RLC entity was re-established:
 - 6> set the HFN values for the corresponding RLC entity in downlink equal to the value of the IE "START" that will be included in the reconfiguration complete message for this CN domain.
 - 5> if the whole RLC entity was re-established:
 - 6> set the HFN values for the corresponding RLC entity in uplink and downlink equal to the value of the IE "START" that will be included in the reconfiguration complete message for this CN domain.
- 1> if the IE "Downlink RLC mode" is present and is set to "UM RLC":
 - 2> if the IE "DL UM RLC LI size" is not present:
 - 3> configure the corresponding RLC entity with an LI size of 7 bits;

NOTE: The case where this mandatory IE is not present is meant to handle the interaction with a network using an earlier release of the specification.

 - 2> else:
 - 3> configure the corresponding RLC entity with the LI size indicated in the IE "DL UM RLC LI size".

NOTE: If the "Uplink RLC mode" or the "Downlink RLC mode" of an existing radio bearer is modified by a reconfiguration message, the UE behaviour is unspecified.

 - 2> if the IE "DL Duplication Avoidance and Reordering info" is present:

3> configure the corresponding RLC entity to use the UM duplication avoidance and reordering functionality.

2> if the IE "DL Out of sequence delivery info" is present:

3> configure the corresponding RLC entity to use the UM Out of sequence delivery functionality.

2> if the IE "Alternative E-bit interpretation" is present:

3> configure the downlink RLC entity to use the alternative E-bit interpretation and corresponding LI's.

2> if the IE "Alternative E-bit interpretation" is not present:

3> configure the downlink RLC entity to use the normal E-bit interpretation and corresponding LI's.

SECTIONS DELETED

10.3.4.23 RLC info

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE <i>Uplink RLC mode</i>	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.	
>>Max_RST	MP		Integer(1, 4, 6, 8, 12, 16, 24, 32)	Defined in [16]	
>>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 <i>Downlink RLC mode</i>	OP			Indicates if Acknowledged, Unacknowledged or Transparent mode RLC shall	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
>AM RLC				be used	
>>DL RLC PDU size	MP		Integer(16..5000 by step of 8)	Unit is bits	REL-5
>>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)	
>>DL UM RLC LI size	MP		Integer(7,15)	Size in bits to use for the downlink RLC UM LI.	REL-5
>>DL Duplication Avoidance and Reordering info	OP		UM Duplication Avoidance and Reordering info 10.3.4.26		REL-6
>>DL Out of sequence delivery info	OP		UM Out of sequence delivery info 10.3.4.27		REL-6
>TM RLC					
>>Segmentation indication	MP		Boolean	TRUE indicates that segmentation is performed.	
One sided RLC re-establishment	MP		Boolean	TRUE indicates that only one side of the AM RLC entity is re-established.	REL-5
Alternative E-bit interpretation	MD		Enumerated (true)	Default: "normal E-bit interpretation" .	REL-6

NOTE: This information element is included within IE "Predefined RB configuration".

10.3.3.34 RLC capability

Information Element/Group name	Need	Multi	Type and Reference	Semantics description	Version
Total RLC AM buffer size	MP		Integer (10, 50, 100, 150, 500, 1000,	Total receiving and transmitting RLC AM buffer and MAC-hs reordering buffer capability in kBytes. Note 1.	REL-5
			200, 300, 400, 750)		
Maximum RLC AM Window Size	MP		Integer(20 47,4095)	Maximum supported RLC TX and RX window in UE	
Maximum number of AM entities	MP		Integer (4,5,6,8,16,30)		
Support for RLC-SDU alignment	MD		Enumerated (true)	Default value is "not supported"	REL-6
Note 1: The IE "Total RLC AM buffer size" values 200, 300, 400 and 750 are not used in the INTER RAT HANDOVER INFO message.					

11.2 PDU definitions

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,
  CN-InformationInfoFull,
  NAS-Message,
  PagingRecordTypeID,
  PLMN-Identity,
-- UTRAN Mobility IEs :
  CellIdentity,
  CellIdentity-PerRL-List,
  URA-Identity,
-- User Equipment IEs :
  UE-RadioAccessCapabBandFDDList2,
  UE-RadioAccessCapabBandFDDList-ext,
  AccessStratumReleaseIndicator,
  ActivationTime,
  C-RNTI,
  CapabilityUpdateRequirement,
  CapabilityUpdateRequirement-r4,
  CapabilityUpdateRequirement-r4-ext,
  CapabilityUpdateRequirement-r5,
  CellUpdateCause,
  CellUpdateCause-ext,
  CipheringAlgorithm,
  CipheringModeInfo,
  DSCH-RNTI,
  E-RNTI,
  EstablishmentCause,
  FailureCauseWithProtErr,
  FailureCauseWithProtErrTrId,
  GroupReleaseInformation,
  H-RNTI,
  UESpecificBehaviourInformationlidle,
  UESpecificBehaviourInformationlinterRAT,
  InitialUE-Identity,
  IntegrityProtActivationInfo,
  IntegrityProtectionModeInfo,
  N-308,
  PagingCause,
  PagingRecordList,
  PagingRecord2List-r5,
  ProtocolErrorIndicator,
  ProtocolErrorIndicatorWithMoreInfo,
  RadioFrequencyBandTDDList,
  Rb-timer-indicator,
  RedirectionInfo,
  RedirectionInfo-r6,
  RejectionCause,
  ReleaseCause,
  RF-CapabilityComp,

```

```

RRC-StateIndicator,
RRC-TransactionIdentifier,
SecurityCapability,
START-Value,
STARTList,
SystemSpecificCapUpdateReq-v590ext,
U-RNTI,
U-RNTI-Short,
UE-RadioAccessCapability,
UE-RadioAccessCapability-v370ext,
UE-RadioAccessCapability-v380ext,
UE-RadioAccessCapability-v3a0ext,
UE-RadioAccessCapability-v3g0ext,
UE-RadioAccessCapability-v4b0ext,
UE-RadioAccessCapability-v590ext,
UE-RadioAccessCapability-v6xyext,
UE-RadioAccessCapability-v5c0ext,
UE-RadioAccessCapability-v650ext,
UE-RadioAccessCapabilityComp,
DL-PhysChCapabilityFDD-v380ext,
UE-ConnTimersAndConstants,
UE-ConnTimersAndConstants-v3a0ext,
UE-ConnTimersAndConstants-r5,
UE-SecurityInformation,
URA-UpdateCause,
UTRAN-DRX-CycleLengthCoefficient,
WaitTime,
-- Radio Bearer IEs :
DefaultConfigIdentity,
DefaultConfigIdentity-r4,
DefaultConfigIdentity-r5,
DefaultConfigMode,
DL-CounterSynchronisationInfo,
DL-CounterSynchronisationInfo-r5,
PredefinedConfigIdentity,
PredefinedConfigStatusList,
PredefinedConfigStatusListComp,
PredefinedConfigSetWithDifferentValueTag,
RAB-Info,
RAB-Info-Post,
RAB-InformationList,
RAB-InformationReconfigList,
RAB-InformationSetupList,
RAB-InformationSetupList-r4,
RAB-InformationSetupList-r5,
RAB-InformationSetupList-r6-ext,
RAB-InformationSetupList-r6,
RB-ActivationTimeInfoList,
RB-COUNT-C-InformationList,
RB-COUNT-C-MSB-InformationList,
RB-IdentityList,
RB-InformationAffectedList,
RB-InformationAffectedList-r5,
RB-InformationAffectedList-r6,
RB-InformationReconfigList,
RB-InformationReconfigList-r4,
RB-InformationReconfigList-r5,
RB-InformationReconfigList-r6,
RB-InformationReleaseList,
RB-PDCPContextRelocationList,
SRB-InformationSetupList,
SRB-InformationSetupList-r5,
SRB-InformationSetupList-r6,
SRB-InformationSetupList2,
UL-CounterSynchronisationInfo,
-- Transport Channel IEs:
CPCH-SetID,
DL-AddReconfTransChInfo2List,
DL-AddReconfTransChInfoList,
DL-AddReconfTransChInfoList-r4,
DL-AddReconfTransChInfoList-r5,
DL-CommonTransChInfo,
DL-CommonTransChInfo-r4,
DL-DeletedTransChInfoList,
DL-DeletedTransChInfoList-r5,
DRAC-StaticInformationList,
TFC-Subset,
TFCS-Identity,

```

```
UL-AddReconfTransChInfoList,
UL-AddReconfTransChInfoList-r6,
UL-CommonTransChInfo,
UL-CommonTransChInfo-r4,
UL-DeletedTransChInfoList,
UL-DeletedTransChInfoList-r6,
-- Physical Channel IEs :
Alpha,
BEACON-PL-Est,
CCTrCH-PowerControlInfo,
CCTrCH-PowerControlInfo-r4,
CCTrCH-PowerControlInfo-r5,
ConstantValue,
ConstantValueTdd,
CPCH-SetInfo,
DL-CommonInformation,
DL-CommonInformation-r4,
DL-CommonInformation-r5,
DL-CommonInformation-r6,
DL-CommonInformationPost,
DL-HSPDSCH-Information,
DL-InformationPerRL-List,
DL-InformationPerRL-List-r4,
DL-InformationPerRL-List-r5,
DL-InformationPerRL-List-r5bis,
DL-InformationPerRL-List-r6,
DL-InformationPerRL-ListPostFDD,
DL-InformationPerRL-PostTDD,
DL-InformationPerRL-PostTDD-LCR-r4,
DL-PDSCH-Information,
DL-TPC-PowerOffsetPerRL-List,
DPC-Mode,
DPCH-CompressedModeStatusInfo,
FrequencyInfo,
FrequencyInfoFDD,
FrequencyInfoTDD,
HARQ-Preamble-Mode,
HS-SICH-Power-Control-Info-TDD384,
MaxAllowedUL-TX-Power,
OpenLoopPowerControl-IPDL-TDD-r4,
PDSCH-CapacityAllocationInfo,
PDSCH-CapacityAllocationInfo-r4,
PDSCH-Identity,
PrimaryCPICH-Info,
PrimaryCCPCH-TX-Power,
PUSCH-CapacityAllocationInfo,
PUSCH-CapacityAllocationInfo-r4,
PUSCH-Identity,
PUSCH-SysInfoList-HCR-r5,
PDSCH-SysInfoList-HCR-r5,
RL-AdditionInformationList,
RL-AdditionInformationList-r6,
RL-RemovalInformationList,
SpecialBurstScheduling,
SSDT-Information,
SSDT-Information-r4,
TFC-ControlDuration,
SSDT-UL,
TimeslotList,
TimeslotList-r4,
TX-DiversityMode,
UL-ChannelRequirement,
UL-ChannelRequirement-r4,
UL-ChannelRequirement-r5,
UL-ChannelRequirement-r6,
UL-ChannelRequirementWithCPCH-SetID,
UL-ChannelRequirementWithCPCH-SetID-r4,
UL-ChannelRequirementWithCPCH-SetID-r5,
UL-ChannelRequirementWithCPCH-SetID-r6,
UL-DPCH-Info,
UL-DPCH-Info-r4,
UL-DPCH-Info-r5,
UL-DPCH-Info-r6,
UL-DPCH-InfoPostFDD,
UL-DPCH-InfoPostTDD,
UL-DPCH-InfoPostTDD-LCR-r4,
UL-EDCH-Information-r6,
UL-SynchronisationParameters-r4,
```

```

    UL-TimingAdvance,
    UL-TimingAdvanceControl,
    UL-TimingAdvanceControl-r4,
-- Measurement IEs :
    AdditionalMeasurementID-List,
    DeltaRSCP,
    Frequency-Band,
    EventResults,
    Inter-FreqEventCriteriaList-v590ext,
    Intra-FreqEventCriteriaList-v590ext,
    IntraFreqReportingCriteria-lb-r5,
    IntraFreqEvent-lb-r5,
    InterFreqEventResults-LCR-r4-ext,
    InterRATCellInfoIndicator,
    InterRAT-TargetCellDescription,
    MeasuredResults,
    MeasuredResults-v390ext,
    MeasuredResults-v590ext,
    MeasuredResultsList,
    MeasuredResultsList-LCR-r4-ext,
    MeasuredResultsOnRACH,
    MeasurementCommand,
    MeasurementCommand-r4,
    MeasurementIdentity,
    MeasurementReportingMode,
    PrimaryCCPCH-RSCP,
    SFN-Offset-Validity,
    TimeslotListWithISCP,
    TrafficVolumeMeasuredResultsList,
    UE-Positioning-GPS-AssistanceData,
    UE-Positioning-Measurement-v390ext,
    UE-Positioning-OTDOA-AssistanceData,
    UE-Positioning-OTDOA-AssistanceData-r4ext,
    UE-Positioning-OTDOA-AssistanceData-UEB,
-- Other IEs :
    BCCH-ModificationInfo,
    CDMA2000-MessageList,
    GSM-TargetCellInfoList,
    GERANIu-MessageList,
    GERAN-SystemInformation,
    GSM-MessageList,
    InterRAT-ChangeFailureCause,
    InterRAT-HO-FailureCause,
    InterRAT-UE-RadioAccessCapabilityList,
    InterRAT-UE-RadioAccessCapability-v590ext,
    InterRAT-UE-SecurityCapList,
    IntraDomainNasNodeSelector,
    ProtocolErrorMoreInformation,
    Rplmn-Information,
    Rplmn-Information-r4,
    SegCount,
    SegmentIndex,
    SFN-Prime,
    SIB-Data-fixed,
    SIB-Data-variable,
    SIB-Type,
-- MBMS IEs:
    MBMS-CellGroupIdentity-r6,
    MBMS-CommonRBInformationList-r6,
    MBMS-CurrentCell-SCCPCHList-r6,
    MBMS-JoinedInformation-r6,
    MBMS-MICHConfigurationInfo-r6,
    MBMS-ModifiedServiceList-r6,
    MBMS-MSCHConfigurationInfo-r6,
    MBMS-NeighbouringCellSCCPCHList-r6,
    MBMS-PhyChInformationList-r6,
    MBMS-PL-ServiceRestrictInfo-r6,
    MBMS-PreferredFreqRequest-r6,
    MBMS-PreferredFrequencyList-r6,
    MBMS-ServiceAccessInfoList-r6,
    MBMS-ServiceSchedulingInfoList-r6,
    MBMS-SIBType5-SCCPCHList-r6,
    MBMS-TimersAndCounters-r6,
    MBMS-TranspChInfoForEachCCTrCh-r6,
    MBMS-TranspChInfoForEachTrCh-r6,
    MBMS-UnmodifiedServiceList-r6
FROM InformationElements

    maxSIBperMsg,

```

```
maxURNTI-Group
FROM Constant-definitions;
```

```
-- *****
--
-- INTER RAT HANDOVER INFO
--
-- *****

InterRATHandoverInfo ::= SEQUENCE {
  -- This structure is defined for historical reasons, backward compatibility with 04.18
  predefinedConfigStatusList CHOICE {
    absent NULL,
    present PredefinedConfigStatusList
  },
  ue-SecurityInformation CHOICE {
    absent NULL,
    present UE-SecurityInformation
  },
  ue-CapabilityContainer CHOICE {
    absent NULL,
    -- present is an octet aligned string containing IE UE-RadioAccessCapabilityInfo
    present OCTET STRING (SIZE (0..63))
  },
  -- Non critical extensions
  v390NonCriticalExtensions CHOICE {
    absent NULL,
    present SEQUENCE {
      interRATHandoverInfo-v390ext InterRATHandoverInfo-v390ext-IEs,
      v3a0NonCriticalExtensions SEQUENCE {
        interRATHandoverInfo-v3a0ext InterRATHandoverInfo-v3a0ext-IEs,
        laterNonCriticalExtensions SEQUENCE {
          interRATHandoverInfo-v3d0ext InterRATHandoverInfo-v3d0ext-IEs,
          -- Container for additional R99 extensions
          interRATHandoverInfo-r3-add-ext BIT STRING OPTIONAL,
          v3g0NonCriticalExtensions SEQUENCE {
            interRATHandoverInfo-v3g0ext InterRATHandoverInfo-v3g0ext-IEs,
            v4b0NonCriticalExtensions SEQUENCE {
              interRATHandoverInfo-v4b0ext InterRATHandoverInfo-v4b0ext-IEs,
              v4d0NonCriticalExtensions SEQUENCE {
                interRATHandoverInfo-v4d0ext InterRATHandoverInfo-v4d0ext-IEs,
                -- Reserved for future non critical extension
                v590NonCriticalExtensions SEQUENCE {
                  interRATHandoverInfo-v590ext
                    InterRATHandoverInfo-v590ext-IEs,
                  v6xyNonCriticalExtensions SEQUENCE {
                    interRATHandoverInfo-v6xy0ext
                      InterRATHandoverInfo-v6xyext-IEs,
                    nonCriticalExtensions SEQUENCE {} OPTIONAL
                  } OPTIONAL
                } OPTIONAL
              } OPTIONAL
            } OPTIONAL
          } OPTIONAL
        } OPTIONAL
      } OPTIONAL
    } OPTIONAL
  }
}

InterRATHandoverInfo-v390ext-IEs ::= SEQUENCE {
  -- User equipment IEs
  ue-RadioAccessCapability-v380ext UE-RadioAccessCapability-v380ext OPTIONAL,
  dl-PhysChCapabilityFDD-v380ext DL-PhysChCapabilityFDD-v380ext
}

InterRATHandoverInfo-v3a0ext-IEs ::= SEQUENCE {
  -- User equipment IEs
  ue-RadioAccessCapability-v3a0ext UE-RadioAccessCapability-v3a0ext OPTIONAL
}

InterRATHandoverInfo-v3d0ext-IEs ::= SEQUENCE {
  -- User equipment IEs
  ueSpecificBehaviourInformationlinterRAT UESpecificBehaviourInformationlinterRAT
  OPTIONAL
}
}
```

```

InterRATHandoverInfo-v3g0ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v3g0ext    UE-RadioAccessCapability-v3g0ext    OPTIONAL
}
InterRATHandoverInfo-v4b0ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    accessStratumReleaseIndicator      AccessStratumReleaseIndicator
}

InterRATHandoverInfo-v4d0ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    tddl128-RF-Capability               RadioFrequencyBandTDDList    OPTIONAL
}

InterRATHandoverInfo-v590ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    predefinedConfigStatusListComp      PredefinedConfigStatusListComp    OPTIONAL,
    ue-RadioAccessCapabilityComp        UE-RadioAccessCapabilityComp      OPTIONAL
}

InterRATHandoverInfo-v6xyext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v6xyext    UE-RadioAccessCapability-v6xyext
}

-- *****
--
-- 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 extensions
    v370NonCriticalExtensions             SEQUENCE {
        rrcConnectionSetupComplete-v370ext RRCConnectionSetupComplete-v370ext,
        v380NonCriticalExtensions          SEQUENCE {
            rrcConnectionSetupComplete-v380ext RRCConnectionSetupComplete-v380ext-IEs,
            -- Reserved for future non critical extension
            v3a0NonCriticalExtensions        SEQUENCE {
                rrcConnectionSetupComplete-v3a0ext RRCConnectionSetupComplete-v3a0ext-IEs,
                laterNonCriticalExtensions      SEQUENCE {
                    -- Container for additional R99 extensions
                    rrcConnectionSetupComplete-r3-add-ext BIT STRING
                    (CONTAINING RRCConnectionSetupComplete-r3-add-ext-IEs) OPTIONAL,
                    v3g0NonCriticalExtensions  SEQUENCE {
                        rrcConnectionSetupComplete-v3g0ext RRCConnectionSetupComplete-v3g0ext-IEs,
                        v4b0NonCriticalExtensions SEQUENCE {
                            rrcConnectionSetupComplete-v4b0ext
                                RRCConnectionSetupComplete-v4b0ext-IEs,
                            v590NonCriticalExtensions SEQUENCE {
                                rrcConnectionSetupComplete-v590ext
                                    RRCConnectionSetupComplete-v590ext-IEs,
                                v5c0NonCriticalExtensions SEQUENCE {
                                    rrcConnectionSetupComplete-v5c0ext
                                        RRCConnectionSetupComplete-v5c0ext-IEs,
                                    v6xyNonCriticalExtensions SEQUENCE {
                                        rrcConnectionSetupComplete-v6xyext
                                            RRCConnectionSetupComplete-v6xyext-IEs,
                                        nonCriticalExtensions SEQUENCE {} OPTIONAL
                                    } OPTIONAL
                                } OPTIONAL
                            } OPTIONAL
                        } OPTIONAL
                    } OPTIONAL
                } OPTIONAL
            } OPTIONAL
        } OPTIONAL
    } OPTIONAL
}

```

```

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

RRCCConnectionSetupComplete-v380ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v380ext    UE-RadioAccessCapability-v380ext    OPTIONAL,
    dl-PhysChCapabilityFDD-v380ext      DL-PhysChCapabilityFDD-v380ext
}

RRCCConnectionSetupComplete-v3a0ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v3a0ext    UE-RadioAccessCapability-v3a0ext    OPTIONAL
}

RRCCConnectionSetupComplete-v3g0ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v3g0ext    UE-RadioAccessCapability-v3g0ext    OPTIONAL
}

RRCCConnectionSetupComplete-r3-add-ext-IEs ::= SEQUENCE {
    rrcConnectionSetupComplete-v650ext  RRCCConnectionSetupComplete-v650ext-IEs  OPTIONAL,
    nonCriticalExtensions                 SEQUENCE {}  OPTIONAL
}

RRCCConnectionSetupComplete-v4b0ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v4b0ext    UE-RadioAccessCapability-v4b0ext    OPTIONAL
}

RRCCConnectionSetupComplete-v590ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v590ext    UE-RadioAccessCapability-v590ext    OPTIONAL,
    -- Other IEs
    ue-RATSpecificCapability-v590ext    InterRAT-UE-RadioAccessCapability-v590ext  OPTIONAL
}

RRCCConnectionSetupComplete-v5c0ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v5c0ext    UE-RadioAccessCapability-v5c0ext    OPTIONAL
}

RRCCConnectionSetupComplete-v650ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v650ext    UE-RadioAccessCapability-v650ext
}

RRCCConnectionSetupComplete-v6xyext ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v6xyext    UE-RadioAccessCapability-v6xyext
}

-- *****
--
-- 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,
    v370NonCriticalExtensions            SEQUENCE {
        ueCapabilityInformation-v370ext  UECapabilityInformation-v370ext,
        v380NonCriticalExtensions       SEQUENCE {
            ueCapabilityInformation-v380ext  UECapabilityInformation-v380ext-IEs,
            v3a0NonCriticalExtensions      SEQUENCE {
                ueCapabilityInformation-v3a0ext  UECapabilityInformation-v3a0ext-IEs,
                laterNonCriticalExtensions     SEQUENCE {
                    -- Container for additional R99 extensions
                    ueCapabilityInformation-r3-add-ext  BIT STRING
                    (CONTAINING UECapabilityInformation-r3-add-ext-IEs) OPTIONAL,
                }
            }
        }
    }
}

```



```

-- Reserved for future non critical extension
v4b0NonCriticalExtensions SEQUENCE {
    ueCapabilityInformation-v4b0ext UECapabilityInformation-v4b0ext,
    v590NonCriticalExtensions SEQUENCE {
        ueCapabilityInformation-v590ext UECapabilityInformation-v590ext,
        v5c0NonCriticalExtensions SEQUENCE {
            ueCapabilityInformation-v5c0ext
                UECapabilityInformation-v5c0ext,
            v6xyNonCriticalExtensions SEQUENCE {
                ueCapabilityInformation-v6xyext
                    UECapabilityInformation-v6xyext,
            nonCriticalExtensions SEQUENCE {} OPTIONAL
        } OPTIONAL
    } OPTIONAL
} OPTIONAL
} OPTIONAL
} OPTIONAL
} OPTIONAL
} OPTIONAL
}

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

UECapabilityInformation-v380ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v380ext UE-RadioAccessCapability-v380ext OPTIONAL,
    dl-PhysChCapabilityFDD-v380ext DL-PhysChCapabilityFDD-v380ext
}

UECapabilityInformation-v3a0ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v3a0ext UE-RadioAccessCapability-v3a0ext OPTIONAL
}

UECapabilityInformation-r3-add-ext-IEs ::= SEQUENCE {
    ueCapabilityInformation-v650ext UECapabilityInformation-v650ext-IEs OPTIONAL,
    nonCriticalExtensions SEQUENCE {} OPTIONAL
}

UECapabilityInformation-v4b0ext ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v4b0ext UE-RadioAccessCapability-v4b0ext OPTIONAL
}

UECapabilityInformation-v590ext ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v3g0ext UE-RadioAccessCapability-v3g0ext OPTIONAL,
    ue-RadioAccessCapability-v590ext UE-RadioAccessCapability-v590ext OPTIONAL,
    -- Other IEs
    ue-RATSpecificCapability-v590ext InterRAT-UE-RadioAccessCapability-v590ext OPTIONAL
}

UECapabilityInformation-v5c0ext ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v5c0ext UE-RadioAccessCapability-v5c0ext OPTIONAL
}

UECapabilityInformation-v650ext-IEs ::= SEQUENCE {
    ue-RadioAccessCapability-v650ext UE-RadioAccessCapability-v650ext
}

UECapabilityInformation-v6xyext-IEs ::= SEQUENCE {
    ue-RadioAccessCapability-v6xyext UE-RadioAccessCapability-v6xyext
}

```

11.3 Information element definitions

```

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

```

```

UE-RadioAccessCapability-v6xyext ::= SEQUENCE {
    rlc-SupportOfSDUALignment      ENUMERATED { true }      OPTIONAL
}

-- *****
--
--     RADIO BEARER INFORMATION ELEMENTS (10.3.4)
--
-- *****

RB-InformationReconfig-r6 ::=          SEQUENCE {
    rb-Identity                RB-Identity,
    pdcp-Info                  PDCP-InfoReconfig-r4          OPTIONAL,
    pdcp-SN-Info               PDCP-SN-Info                 OPTIONAL,
    rlc-Info                   RLC-Info-r65                OPTIONAL,
    rb-MappingInfo             RB-MappingInfo-r6            OPTIONAL,
    rb-StopContinue            RB-StopContinue              OPTIONAL
}

RB-InformationSetup-r6 ::=           SEQUENCE {
    rb-Identity                RB-Identity,
    pdcp-Info                  PDCP-Info-r4                  OPTIONAL,
    rlc-InfoChoice              RLC-InfoChoice-r65,
    rb-MappingInfo             RB-MappingInfo-r6
}

RLC-Info-r6 ::=                     SEQUENCE {
    ul-RLC-Mode                UL-RLC-Mode                  OPTIONAL,
    dl-RLC-Mode-r5             DL-RLC-Mode-r6               OPTIONAL,
    rlc-OneSidedReEst          BOOLEAN,
    altE-bitInterpretation      ENUMERATED { true }      OPTIONAL
}

RLC-InfoChoice-r5 ::=              CHOICE {
    rlc-Info-r5                RLC-Info-r5,
    same-as-RB                 RB-Identity
}

RLC-InfoChoice-r6 ::=              CHOICE {
    rlc-Info-r6                RLC-Info-r6,
    same-as-RB                 RB-Identity
}

SRB-InformationSetup-r6 ::=         SEQUENCE {
    -- The default value for rb-Identity is the smallest value not used yet.
    rb-Identity                RB-Identity                  OPTIONAL,
    rlc-InfoChoice              RLC-InfoChoice-r5,
    rb-MappingInfo             RB-MappingInfo-r6
}

-- *****
--
--     MBMS INFORMATION ELEMENTS (10.3.9a)
--
-- *****

MBMS-CommonRBInformation-r6 ::=     SEQUENCE {
    commonRBIdentity           MBMS-CommonRBIdentity,
    pdcp-Info                  PDCP-Info-r4,
    rlc-Info                   RLC-Info-r6
}

MBMS-MCCH-ConfigurationInfo-r6 ::= SEQUENCE {
    accessInfoPeriodCoefficient INTEGER (0..3),
    repetitionPeriodCoefficient INTEGER (0..3),
    modificationPeriodCoefficient INTEGER (7..10),
    rlc-Info                   RLC-Info-r6,
    tctf-Presence              MBMS-TCTF-Presence          OPTIONAL
}

```

```

}

MBMS-MSCHConfigurationInfo-r6 ::= SEQUENCE {
    mschSchedulingInfo          MBMS-MSCHSchedulingInfo    OPTIONAL,
    rlc-Info                    RLC-Info-r6                OPTIONAL,
    tctf-Presence               MBMS-TCTF-Presence        OPTIONAL
}

```

11.5 RRC information between network nodes

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

```
BEGIN
```

```
IMPORTS
```

```

    HandoverToUTRANCommand,
    MeasurementReport,
    PhysicalChannelReconfiguration,
    RadioBearerReconfiguration,
    RadioBearerRelease,
    RadioBearerSetup,
    RRC-FailureInfo,
    TransportChannelReconfiguration
FROM PDU-definitions

-- Core Network IES :
    CN-DomainIdentity,
    CN-DomainInformationList,
    CN-DomainInformationListFull,
    CN-DRX-CycleLengthCoefficient,
    NAS-SystemInformationGSM-MAP,
-- UTRAN Mobility IES :
    CellIdentity,
    URA-Identity,
-- User Equipment IES :
    AccessStratumReleaseIndicator,
    C-RNTI,
    ChipRateCapability,
    DL-CapabilityWithSimultaneousHS-DSCHConfig,
    DL-PhysChCapabilityFDD-v380ext,
    DL-PhysChCapabilityTDD,
    DL-PhysChCapabilityTDD-LCR-r4,
    GSM-Measurements,
    HSDSCH-physical-layer-category,
    FailureCauseWithProtErr,
    MaxHcContextSpace,
    MaximumAM-EntityNumberRLC-Cap,
    MaximumRLC-WindowSize,
    MaxNoPhysChBitsReceived,
    MaxPhysChPerFrame,
    MaxPhysChPerSubFrame-r4,
    MaxPhysChPerTS,
    MaxROHC-ContextSessions-r4,
    MaxTS-PerFrame,
    MaxTS-PerSubFrame-r4,
    MinimumSF-DL,
    MultiModeCapability,
    MultiRAT-Capability,
    NetworkAssistedGPS-Supported,
    RadioFrequencyBandTDDList,
    RLC-Capability,
    RRC-MessageSequenceNumber,
    SecurityCapability,
    SimultaneousSCCPCH-DPCH-Reception,
    STARTList,
    STARTSingle,
    START-Value,
    SupportOfDedicatedPilotsForChEstimation,
    TransportChannelCapability,
    TxRxFrequencySeparation,
    U-RNTI,
    UE-MultiModeRAT-Capability,
    UE-PowerClassExt,

```

```

UE-RadioAccessCapabBandFDDList,
UE-RadioAccessCapabBandFDDList2,
UE-RadioAccessCapabBandFDDList-ext,
UE-RadioAccessCapability,
UE-RadioAccessCapability-v370ext,
UE-RadioAccessCapability-v380ext,
UE-RadioAccessCapability-v3a0ext,
UE-RadioAccessCapability-v3g0ext,
UE-RadioAccessCapability-v4b0ext,
UE-RadioAccessCapability-v590ext,
UE-RadioAccessCapability-v5c0ext,
UE-RadioAccessCapability-v650ext,
UE-RadioAccessCapability-v6xyext,
UL-PhysChCapabilityFDD,
UL-PhysChCapabilityTDD,
UL-PhysChCapabilityTDD-LCR-r4,
-- Radio Bearer IEs :
PredefinedConfigStatusList,
PredefinedConfigValueTag,
RAB-InformationSetupList,
RAB-InformationSetupList-r4,
RAB-InformationSetupList-r5,
RAB-InformationSetupList-r6-ext,
RAB-InformationSetupList-r6,
RB-Identity,
SRB-InformationSetupList,
SRB-InformationSetupList-r5,
SRB-InformationSetupList-r6,
-- Transport Channel IEs :
CPCH-SetID,
DL-CommonTransChInfo,
DL-CommonTransChInfo-r4,
DL-AddReconfTransChInfoList,
DL-AddReconfTransChInfoList-r4,
DL-AddReconfTransChInfoList-r5,
DRAC-StaticInformationList,
UL-CommonTransChInfo,
UL-CommonTransChInfo-r4,
UL-AddReconfTransChInfoList,
UL-AddReconfTransChInfoList-r6,
-- Physical Channel IEs :
PrimaryCPICH-Info,
TPC-CombinationIndex,
ScramblingCodeChange,
TGCFN,
TGPSI,
TGPS-ConfigurationParams,
-- Measurement IEs :
Inter-FreqEventCriteriaList-v590ext,
Intra-FreqEventCriteriaList-v590ext,
IntraFreqEvent-ld-r5,
IntraFreqReportingCriteria-1b-r5,
InterRATCellInfoIndicator,
MeasurementIdentity,
MeasurementReportingMode,
MeasurementType,
MeasurementType-r4,
AdditionalMeasurementID-List,
PositionEstimate,
-- MBMS IEs :
MBMS-JoinedInformation-r6,
-- Other IEs :
GERANIu-RadioAccessCapability,
InterRAT-UE-RadioAccessCapabilityList,
InterRAT-UE-RadioAccessCapability-v590ext,
UESpecificBehaviourInformationIdle,
UESpecificBehaviourInformationInterRAT

FROM InformationElements

maxCNdomains,
maxNoOfMeas,

maxRB,
maxRBallRABs,
maxRFC3095-CID,
maxSRBsetup,
maxRL,

```

```

maxTGPS
FROM Constant-definitions
;

-- *****
--
-- SRNC Relocation information
--
-- *****

SRNC-RelocationInfo-r3 ::= CHOICE {
  r3
    SEQUENCE {
      sRNC-RelocationInfo-r3          SRNC-RelocationInfo-r3-IEs,
      v380NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v380ext  SRNC-RelocationInfo-v380ext-IEs,
        -- Reserved for future non critical extension
      },
      v390NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v390ext  SRNC-RelocationInfo-v390ext-IEs,
      },
      v3a0NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v3a0ext  SRNC-RelocationInfo-v3a0ext-IEs,
      },
      v3b0NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v3b0ext  SRNC-RelocationInfo-v3b0ext-IEs,
      },
      v3c0NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v3c0ext  SRNC-RelocationInfo-v3c0ext-IEs,
      },
      laterNonCriticalExtensions     SEQUENCE {
        sRNC-RelocationInfo-v3d0ext  SRNC-RelocationInfo-v3d0ext-IEs,
        -- Container for additional R99 extensions
      },
      sRNC-RelocationInfo-r3-add-ext BIT STRING
        (CONTAINING SRNC-RelocationInfo-v3h0ext-IEs) OPTIONAL,
      v3g0NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v3g0ext  SRNC-RelocationInfo-v3g0ext-IEs,
      },
      v4b0NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v4b0ext  SRNC-RelocationInfo-v4b0ext-IEs,
      },
      v590NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v590ext  SRNC-RelocationInfo-v590ext-IEs,
      },
      v5a0NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v5a0ext  SRNC-RelocationInfo-v5a0ext-IEs,
      },
      v5b0NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v5b0ext  SRNC-RelocationInfo-v5b0ext-IEs,
      },
      v5c0NonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v5c0ext  SRNC-RelocationInfo-v5c0ext-IEs,
      },
      v6xyNonCriticalExtensions      SEQUENCE {
        sRNC-RelocationInfo-v6xyext  SRNC-RelocationInfo-v6xyext-IEs,
        -- Reserved for future non critical extension
      },
      nonCriticalExtensions          SEQUENCE {} OPTIONAL
    } OPTIONAL
  } OPTIONAL
} OPTIONAL
},
later-than-r3
  r4
    CHOICE {
      SEQUENCE {
        sRNC-RelocationInfo-r4          SRNC-RelocationInfo-r4-IEs,
        v4d0NonCriticalExtensions      SEQUENCE {
          sRNC-RelocationInfo-v4d0ext  SRNC-RelocationInfo-v4d0ext-IEs,
          -- Container for adding non critical extensions after freezing REL-5
        },
        sRNC-RelocationInfo-r4-add-ext BIT STRING
          (CONTAINING SRNC-RelocationInfo-v650ext1-IEs) OPTIONAL,
        v590NonCriticalExtensions      SEQUENCE {
          sRNC-RelocationInfo-v590ext  SRNC-RelocationInfo-v590ext-IEs,
        },
        v5a0NonCriticalExtensions      SEQUENCE {
          sRNC-RelocationInfo-v5a0ext  SRNC-RelocationInfo-v5a0ext-IEs,
        },
        v5b0NonCriticalExtensions      SEQUENCE {
          sRNC-RelocationInfo-v5b0ext  SRNC-RelocationInfo-v5b0ext-IEs,
        }
      }
    }
  }
}

```

```

        v5c0NonCriticalExtensions SEQUENCE {
            sRNC-RelocationInfo-v5c0ext SRNC-RelocationInfo-v5c0ext-IEs,
            v6xyNonCriticalExtensions SEQUENCE {
                sRNC-RelocationInfo-v6xyext
                SRNC-RelocationInfo-v6xyext-IEs,
                nonCriticalExtensions SEQUENCE {} OPTIONAL
            } OPTIONAL
        } OPTIONAL
    } OPTIONAL
},
criticalExtensions CHOICE {
    r5 SEQUENCE {
        sRNC-RelocationInfo-r5 SRNC-RelocationInfo-r5-IEs,
        sRNC-RelocationInfo-r5-add-ext BIT STRING OPTIONAL,
        v5a0NonCriticalExtensions SEQUENCE {
            sRNC-RelocationInfo-v5a0ext SRNC-RelocationInfo-v5a0ext-IEs,
            v5b0NonCriticalExtensions SEQUENCE {
                sRNC-RelocationInfo-v5b0ext SRNC-RelocationInfo-v5b0ext-IEs,
                v5c0NonCriticalExtensions SEQUENCE {
                    sRNC-RelocationInfo-v5c0ext SRNC-RelocationInfo-v5c0ext-IEs,
                    v650NonCriticalExtensions SEQUENCE {
                        sRNC-RelocationInfo-v650ext2 SRNC-RelocationInfo-v650ext2-IEs,
                        v6xyNonCriticalExtensions SEQUENCE {
                            sRNC-RelocationInfo-v6xyext SRNC-RelocationInfo-v6xyext-IEs,
                            nonCriticalExtensions SEQUENCE {} OPTIONAL
                        } OPTIONAL
                    } OPTIONAL
                } OPTIONAL
            } OPTIONAL
        } OPTIONAL
    },
    criticalExtensions CHOICE {
        r6 SEQUENCE {
            sRNC-RelocationInfo-r6 SRNC-RelocationInfo-r6-IEs,
            sRNC-RelocationInfo-r6-add-ext BIT STRING OPTIONAL,
            nonCriticalExtensions SEQUENCE {} OPTIONAL
        },
        criticalExtensions SEQUENCE {}
    }
},
}
}
}

SRNC-RelocationInfo-r3-IEs ::= SEQUENCE {
-- Non-RRC IEs
stateOfRRC StateOfRRC,
stateOfRRC-Procedure StateOfRRC-Procedure,
-- Ciphering related information IEs
-- If the extension v380 is included use the extension for the ciphering status per CN domain
cipheringStatus CipheringStatus,
calculationTimeForCiphering CalculationTimeForCiphering OPTIONAL,
-- The order of occurrence in the IE cipheringInfoPerRB-List is the
-- same as the RBs in SRB-InformationSetupList in RAB-InformationSetupList.
-- The signalling RBs are supposed to be listed
-- first. Only UM and AM RBs that are ciphered are listed here
cipheringInfoPerRB-List CipheringInfoPerRB-List OPTIONAL,
count-C-List COUNT-C-List OPTIONAL,
integrityProtectionStatus IntegrityProtectionStatus,
-- In the IE srb-SpecificIntegrityProtInfo, the first information listed corresponds to
-- signalling radio bearer RB0 and after the order of occurrence is the same as the SRBs in
-- SRB-InformationSetupList
-- The target RNC may ignore the IE srb-SpecificIntegrityProtInfo if the
-- IE integrityProtectionStatus has the value "not started".
srb-SpecificIntegrityProtInfo SRB-SpecificIntegrityProtInfoList,
implementationSpecificParams ImplementationSpecificParams OPTIONAL,
-- User equipment IEs
u-RNTI U-RNTI,
c-RNTI C-RNTI OPTIONAL,
ue-RadioAccessCapability UE-RadioAccessCapability,
ue-Positioning-LastKnownPos UE-Positioning-LastKnownPos OPTIONAL,
-- Other IEs
ue-RATSpecificCapability InterRAT-UE-RadioAccessCapabilityList 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
    predefinedConfigStatusList        PredefinedConfigStatusList,
    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
}

SRNC-RelocationInfo-v380ext-IEs ::= SEQUENCE {
-- Ciphering related information IEs
    cn-DomainIdentity                 CN-DomainIdentity,
    cipheringStatusList                CipheringStatusList
}

SRNC-RelocationInfo-v390ext-IEs ::= SEQUENCE {
    cn-DomainInformationList-v390ext   CN-DomainInformationList-v390ext   OPTIONAL,
    ue-RadioAccessCapability-v370ext   UE-RadioAccessCapability-v370ext   OPTIONAL,
    ue-RadioAccessCapability-v380ext   UE-RadioAccessCapability-v380ext   OPTIONAL,
    dl-PhysChCapabilityFDD-v380ext     DL-PhysChCapabilityFDD-v380ext,
    failureCauseWithProtErr           FailureCauseWithProtErr            OPTIONAL
}

SRNC-RelocationInfo-v3a0ext-IEs ::= SEQUENCE {
    cipheringInfoForSRB1-v3a0ext       CipheringInfoPerRB-List-v3a0ext,
    ue-RadioAccessCapability-v3a0ext   UE-RadioAccessCapability-v3a0ext   OPTIONAL,
-- cn-domain identity for IE startValueForCiphering-v3a0ext is specified
-- in subsequent extension (SRNC-RelocationInfo-v3b0ext-IEs)
    startValueForCiphering-v3a0ext     START-Value
}

SRNC-RelocationInfo-v3b0ext-IEs ::= SEQUENCE {
-- cn-domain identity for IE startValueForCiphering-v3a0ext included in previous extension
    cn-DomainIdentity                 CN-DomainIdentity,
-- the IE startValueForCiphering-v3b0ext contains the start values for each CN Domain. The
-- value of start indicated by the IE startValueForCiphering-v3a0ext should be set to the
-- same value as the start-Value for the corresponding cn-DomainIdentity in the IE
-- startValueForCiphering-v3b0ext
    startValueForCiphering-v3b0ext     STARTList2                          OPTIONAL
}

SRNC-RelocationInfo-v3c0ext-IEs ::= SEQUENCE {
-- IE rb-IdentityForHOMessage includes the identity of the RB used by the source SRNC
-- to send the message contained in the IE "TargetRNC-ToSourceRNC-Container".
-- Only included if type is "UE involved"
    rb-IdentityForHOMessage            RB-Identity                          OPTIONAL
}

SRNC-RelocationInfo-v3d0ext-IEs ::= SEQUENCE {
-- User equipment IEs
    uESpecificBehaviourInformationIdle UESpecificBehaviourInformationIdle  OPTIONAL,
    uESpecificBehaviourInformationInterRAT UESpecificBehaviourInformationInterRAT
    OPTIONAL
}

SRNC-RelocationInfo-v3g0ext-IEs ::= SEQUENCE {
    ue-RadioAccessCapability-v3g0ext   UE-RadioAccessCapability-v3g0ext   OPTIONAL
}

SRNC-RelocationInfo-v3h0ext-IEs ::= SEQUENCE {
    tpc-CombinationInfoList            TPC-CombinationInfoList            OPTIONAL,
    v650NonCriticalExtensions          SEQUENCE {
        ue-RadioAccessCapability-v650ext UE-RadioAccessCapability-v650ext   OPTIONAL,

```

```

        nonCriticalExtension          SEQUENCE {}          OPTIONAL
    } OPTIONAL
}

SRNC-RelocationInfo-v4d0ext-IEs ::= SEQUENCE {
    tpc-CombinationInfoList          TPC-CombinationInfoList    OPTIONAL
}

TPC-CombinationInfoList ::= SEQUENCE (SIZE (1..maxRL)) OF
    TPC-Combination-Info

STARTList2 ::=
    SEQUENCE (SIZE (2..maxCNdomains)) OF
        STARTSingle

SRNC-RelocationInfo-v4b0ext-IEs ::= SEQUENCE {
    ue-RadioAccessCapability-v4b0ext UE-RadioAccessCapability-v4b0ext    OPTIONAL
}

SRNC-RelocationInfo-v590ext-IEs ::= SEQUENCE {
    ue-RadioAccessCapability-v590ext UE-RadioAccessCapability-v590ext    OPTIONAL,
    ue-RATSpecificCapability-v590ext InterRAT-UE-RadioAccessCapability-v590ext    OPTIONAL
}

SRNC-RelocationInfo-v5a0ext-IEs ::= SEQUENCE {
    storedCompressedModeInfo          StoredCompressedModeInfo    OPTIONAL
}

SRNC-RelocationInfo-v5b0ext-IEs ::= SEQUENCE {
    interRATCellInfoIndicator          InterRATCellInfoIndicator    OPTIONAL
}

SRNC-RelocationInfo-v5c0ext-IEs ::= SEQUENCE {
    ue-RadioAccessCapability-v5c0ext   UE-RadioAccessCapability-v5c0ext    OPTIONAL
}

SRNC-RelocationInfo-v650ext1-IEs ::= SEQUENCE {
    ue-RadioAccessCapability-v650ext   UE-RadioAccessCapability-v650ext    OPTIONAL,
    nonCriticalExtension                SEQUENCE {}          OPTIONAL
}

SRNC-RelocationInfo-v650ext2-IEs ::= SEQUENCE {
    ue-RadioAccessCapability-v650ext   UE-RadioAccessCapability-v650ext
}

CipheringInfoPerRB-List-v3a0ext ::= SEQUENCE {
    dl-UM-SN                            BIT STRING (SIZE (7))
}

CipheringStatusList ::=
    SEQUENCE (SIZE (1..maxCNdomains)) OF
        CipheringStatusCNdomain

CipheringStatusCNdomain ::=
    SEQUENCE {
        cn-DomainIdentity                CN-DomainIdentity,
        cipheringStatus                  CipheringStatus
    }

CodeChangeStatusList ::= SEQUENCE (SIZE (1..maxRL)) OF
    CodeChangeStatus

CodeChangeStatus ::= SEQUENCE {
    primaryCPICH-Info                    PrimaryCPICH-Info,
    scramblingCodeChange                  ScramblingCodeChange
}

StoredCompressedModeInfo ::= SEQUENCE {
    storedTGP-SequenceList                StoredTGP-SequenceList,
    codeChangeStatusList                  CodeChangeStatusList    OPTIONAL
}

StoredTGP-SequenceList ::=
    SEQUENCE (SIZE (1..maxTGPS)) OF
        StoredTGP-Sequence

StoredTGP-Sequence ::=
    SEQUENCE {
        tgpsi                             TGPSI,
        current-tgps-Status                CHOICE {
            active                          SEQUENCE {
                tgcfn                        TGCFN
            }
        }
    }

```



```

    },
    inactive                               NULL
  },
  tgps-ConfigurationParams                 TGPS-ConfigurationParams           OPTIONAL
}

SRNC-RelocationInfo-r4-IEs ::=           SEQUENCE {
  -- Non-RRC IEs
  -- IE rb-IdentityForHOMessage includes the identity of the RB used by the source SRNC
  -- to send the message contained in the IE "TargetRNC-ToSourceRNC-Container".
  -- Only included if type is "UE involved"
  rb-IdentityForHOMessage                 RB-Identity                               OPTIONAL,
  stateOfRRC                             StateOfRRC,
  stateOfRRC-Procedure                   StateOfRRC-Procedure,
  -- Ciphering related information IEs
  cipheringStatusList                   CipheringStatusList-r4,
  latestConfiguredCN-Domain              CN-DomainIdentity,
  calculationTimeForCiphering             CalculationTimeForCiphering               OPTIONAL,
  count-C-List                           COUNT-C-List                             OPTIONAL,
  cipheringInfoPerRB-List                CipheringInfoPerRB-List-r4              OPTIONAL,
  -- Integrity protection related information IEs
  integrityProtectionStatus              IntegrityProtectionStatus,
  -- The target RNC may ignore the IE srb-SpecificIntegrityProtInfo if the
  -- IE integrityProtectionStatus has the value "not started".
  srb-SpecificIntegrityProtInfo          SRB-SpecificIntegrityProtInfoList,
  implementationSpecificParams           ImplementationSpecificParams             OPTIONAL,
  -- User equipment IEs
  u-RNTI                                  U-RNTI,
  c-RNTI                                  C-RNTI                                   OPTIONAL,
  ue-RadioAccessCapability                UE-RadioAccessCapability-r4,
  ue-RadioAccessCapability-ext            UE-RadioAccessCapabBandFDDList         OPTIONAL,
  ue-Positioning-LastKnownPos             UE-Positioning-LastKnownPos             OPTIONAL,
  ueSpecificBehaviourInformationIdle      UESpecificBehaviourInformationIdle      OPTIONAL,
  ueSpecificBehaviourInformationInterRAT  UESpecificBehaviourInformationInterRAT
OPTIONAL,
  -- Other IEs
  ue-RATSpecificCapability                InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
  -- UTRAN mobility IEs
  ura-Identity                            URA-Identity                             OPTIONAL,
  -- Core network IEs
  cn-CommonGSM-MAP-NAS-SysInfo            NAS-SystemInformationGSM-MAP,
  cn-DomainInformationList                CN-DomainInformationListFull            OPTIONAL,
  -- Measurement IEs
  ongoingMeasRepList                     OngoingMeasRepList-r4                  OPTIONAL,
  -- Radio bearer IEs
  predefinedConfigStatusList              PredefinedConfigStatusList,
  srb-InformationList                     SRB-InformationSetupList,
  rab-InformationList                     RAB-InformationSetupList-r4            OPTIONAL,
  -- Transport channel IEs
  ul-CommonTransChInfo                   UL-CommonTransChInfo-r4                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-r4                OPTIONAL,
  dl-TransChInfoList                     DL-AddReconfTransChInfoList-r4         OPTIONAL,
  -- Measurement report
  measurementReport                       MeasurementReport                       OPTIONAL,
  failureCause                            FailureCauseWithProtErr                 OPTIONAL
}

SRNC-RelocationInfo-r5-IEs ::=           SEQUENCE {
  -- Non-RRC IEs
  -- IE rb-IdentityForHOMessage includes the identity of the RB used by the source SRNC
  -- to send the message contained in the IE "TargetRNC-ToSourceRNC-Container".
  -- Only included if type is "UE involved"
  rb-IdentityForHOMessage                 RB-Identity                               OPTIONAL,
  stateOfRRC                             StateOfRRC,
  stateOfRRC-Procedure                   StateOfRRC-Procedure,
  -- Ciphering related information IEs
  cipheringStatusList                   CipheringStatusList-r4,
  latestConfiguredCN-Domain              CN-DomainIdentity,
  calculationTimeForCiphering             CalculationTimeForCiphering               OPTIONAL,
  count-C-List                           COUNT-C-List                             OPTIONAL,

```

```

    cipheringInfoPerRB-List          CipheringInfoPerRB-List-r4          OPTIONAL,
-- Integrity protection related information IEs
    integrityProtectionStatus        IntegrityProtectionStatus,
    srb-SpecificIntegrityProtInfo    SRB-SpecificIntegrityProtInfoList  OPTIONAL,
    implementationSpecificParams    ImplementationSpecificParams      OPTIONAL,
-- User equipment IEs
    u-RNTI                            U-RNTI,
    c-RNTI                            C-RNTI                            OPTIONAL,
    ue-RadioAccessCapability          UE-RadioAccessCapability-r5,
    ue-RadioAccessCapability-ext      UE-RadioAccessCapabBandFDDList    OPTIONAL,
    ue-Positioning-LastKnownPos      UE-Positioning-LastKnownPos      OPTIONAL,
    uESpecificBehaviourInformationIdle UEspecificBehaviourInformationIdle  OPTIONAL,
    uESpecificBehaviourInformationInterRAT UEspecificBehaviourInformationInterRAT  OPTIONAL,
-- Other IEs
    ue-RATSpecificCapability          InterRAT-UE-RadioAccessCapabilityList-r5  OPTIONAL,
-- UTRAN mobility IEs
    ura-Identity                      URA-Identity                      OPTIONAL,
-- Core network IEs
    cn-CommonGSM-MAP-NAS-SysInfo     NAS-SystemInformationGSM-MAP,
    cn-DomainInformationList          CN-DomainInformationListFull      OPTIONAL,
-- Measurement IEs
    ongoingMeasRepList                OngoingMeasRepList-r5            OPTIONAL,
-- Radio bearer IEs
    predefinedConfigStatusList        PredefinedConfigStatusList,
    srb-InformationList                SRB-InformationSetupList-r5,
    rab-InformationList                RAB-InformationSetupList-r5      OPTIONAL,
-- Transport channel IEs
    ul-CommonTransChInfo              UL-CommonTransChInfo-r4          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-r4          OPTIONAL,
    dl-TransChInfoList                DL-AddReconfTransChInfoList-r5   OPTIONAL,
-- PhyCH IEs
    tpc-CombinationInfoList           TPC-CombinationInfoList          OPTIONAL,
-- Measurement report
    measurementReport                 MeasurementReport                  OPTIONAL,
-- Other IEs
    failureCause                       FailureCauseWithProtErr           OPTIONAL,
}

SRNC-RelocationInfo-v6xyext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v6xyext   UE-RadioAccessCapability-v6xyext,
-- Radio bearer IEs
    rab-InformationSetupList           RAB-InformationSetupList-r6-ext   OPTIONAL,
-- MBMS IEs
    mbms-JoinedInformation             MBMS-JoinedInformation-r6         OPTIONAL,
}

SRNC-RelocationInfo-r6-IEs ::= SEQUENCE {
-- Non-RRC IEs
    -- IE rb-IdentityForHOMessage includes the identity of the RB used by the source SRNC
    -- to send the message contained in the IE "TargetRNC-ToSourceRNC-Container".
    -- Only included if type is "UE involved"
    rb-IdentityForHOMessage            RB-Identity                        OPTIONAL,
    stateOfRRC                        StateOfRRC,
    stateOfRRC-Procedure               StateOfRRC-Procedure,
-- Ciphering related information IEs
    cipheringStatusList                CipheringStatusList-r4,
    latestConfiguredCN-Domain          CN-DomainIdentity,
    calculationTimeForCiphering        CalculationTimeForCiphering        OPTIONAL,
    count-C-List                       COUNT-C-List                       OPTIONAL,
    cipheringInfoPerRB-List            CipheringInfoPerRB-List-r4        OPTIONAL,
-- Integrity protection related information IEs
    integrityProtectionStatus          IntegrityProtectionStatus,
    srb-SpecificIntegrityProtInfo      SRB-SpecificIntegrityProtInfoList  OPTIONAL,
    implementationSpecificParams        ImplementationSpecificParams        OPTIONAL,
-- User equipment IEs
    u-RNTI                            U-RNTI,
    c-RNTI                            C-RNTI                            OPTIONAL,

```

```

ue-RadioAccessCapability          UE-RadioAccessCapability-r65,
ue-RadioAccessCapability-ext      UE-RadioAccessCapabBandFDDList  OPTIONAL,
ue-Positioning-LastKnownPos      UE-Positioning-LastKnownPos     OPTIONAL,
ueSpecificBehaviourInformationIdle UESpecificBehaviourInformationIdle OPTIONAL,
ueSpecificBehaviourInformationInterRAT UESpecificBehaviourInformationInterRAT OPTIONAL,
-- Other IEs
  ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList-r5  OPTIONAL,
-- UTRAN mobility IEs
  ura-Identity                    URA-Identity                            OPTIONAL,
-- Core network IEs
  cn-CommonGSM-MAP-NAS-SysInfo    NAS-SystemInformationGSM-MAP,
  cn-DomainInformationList        CN-DomainInformationListFull           OPTIONAL,
-- Measurement IEs
  ongoingMeasRepList              OngoingMeasRepList-r5                 OPTIONAL,
  interRATCellInfoIndicator       InterRATCellInfoIndicator             OPTIONAL,
-- Radio bearer IEs
  predefinedConfigStatusList      PredefinedConfigStatusList,
  srb-InformationList              SRB-InformationSetupList-r6,
  rab-InformationList              RAB-InformationSetupList-r6           OPTIONAL,
-- Transport channel IEs
  ul-CommonTransChInfo            UL-CommonTransChInfo-r4               OPTIONAL,
  ul-TransChInfoList              UL-AddReconfTransChInfoList-r6       OPTIONAL,
  modeSpecificInfo                CHOICE {
    fdd                            SEQUENCE {
      cpch-SetID                   CPCH-SetID                            OPTIONAL,
      transChDRAC-Info              DRAC-StaticInformationList            OPTIONAL,
    },
    tdd                            NULL
  }
  dl-CommonTransChInfo            DL-CommonTransChInfo-r4               OPTIONAL,
  dl-TransChInfoList              DL-AddReconfTransChInfoList-r5       OPTIONAL,
-- PhyCH IEs
  tpc-CombinationInfoList         TPC-CombinationInfoList              OPTIONAL,
  storedCompressedModeInfo        StoredCompressedModeInfo              OPTIONAL,
-- Measurement report
  measurementReport               MeasurementReport                      OPTIONAL,
-- Other IEs
  failureCause                    FailureCauseWithProtErr                OPTIONAL,
-- MBMS IEs
  mbms-JoinedInformation          MBMS-JoinedInformation-r6             OPTIONAL,
}

-- IE definitions

RLC-Capability-r5 ::=             SEQUENCE {
  totalRLC-AM-BufferSize          TotalRLC-AM-BufferSize-r5,
  maximumRLC-WindowSize           MaximumRLC-WindowSize,
  maximumAM-EntityNumber          MaximumAM-EntityNumberRLC-Cap
}

RLC-Capability-r6 ::=             SEQUENCE {
  totalRLC-AM-BufferSize          TotalRLC-AM-BufferSize-r5,
  maximumRLC-WindowSize           MaximumRLC-WindowSize,
  maximumAM-EntityNumber          MaximumAM-EntityNumberRLC-Cap,
  rlc-SupportOfSDUAlignment       ENUMERATED { true }                  OPTIONAL
}

UE-RadioAccessCapability-r5 ::=    SEQUENCE {
  accessStratumReleaseIndicator    AccessStratumReleaseIndicator,
  dl-CapabilityWithSimultaneousHS-DSCHConfig DL-CapabilityWithSimultaneousHS-DSCHConfig OPTIONAL,
  pdcp-Capability                 PDCP-Capability-r5,
  rlc-Capability                   RLC-Capability-r5,
  transportChannelCapability       TransportChannelCapability,
  rf-Capability                    RF-Capability-r4,
  physicalChannelCapability        PhysicalChannelCapability-r5,
  ue-MultiModeRAT-Capability       UE-MultiModeRAT-Capability-r5,
  securityCapability               SecurityCapability,
  ue-positioning-Capability         UE-Positioning-Capability-r4,
  measurementCapability            MeasurementCapability-r4              OPTIONAL
}

UE-RadioAccessCapability-r6 ::=    SEQUENCE {
  accessStratumReleaseIndicator    AccessStratumReleaseIndicator,
  dl-CapabilityWithSimultaneousHS-DSCHConfig DL-CapabilityWithSimultaneousHS-DSCHConfig OPTIONAL,

```

<u>pdcp-Capability</u>	<u>PDCP-Capability-r5,</u>	
<u>rlc-Capability</u>	<u>RLC-Capability-r6,</u>	
<u>transportChannelCapability</u>	<u>TransportChannelCapability,</u>	
<u>rf-Capability</u>	<u>RF-Capability-r4,</u>	
<u>physicalChannelCapability</u>	<u>PhysicalChannelCapability-r5,</u>	
<u>ue-MultiModeRAT-Capability</u>	<u>UE-MultiModeRAT-Capability-r5,</u>	
<u>securityCapability</u>	<u>SecurityCapability,</u>	
<u>ue-positioning-Capability</u>	<u>UE-Positioning-Capability-r4,</u>	
<u>measurementCapability</u>	<u>MeasurementCapability-r4</u>	<u>OPTIONAL</u>

}