

TSG-RAN Meeting #24
Seoul, Korea, 02-04 June 2004

RP-040214

Title: Rel-5 and Rel-6 CRs on DL RLC Size handling (25.322 and 25.331)

Source: TSG-RAN WG2

Agenda item: 7.3.2

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Workitem	Doc-2nd-Level
25.322	255	-	Rel-5	DL RLC Size handling	A	5.7.0	5.8.0	TEI	R2-041091
25.322	256	-	Rel-6	DL RLC Size handling	A	6.0.0	6.1.0	TEI	R2-041092
25.331	2297	2	Rel-5	DL RLC Size handling	F	5.8.0	5.9.0	TEI5	R2-041262
25.331	2298	2	Rel-6	DL RLC Size handling	A	6.1.0	6.2.0	TEI5	R2-041263

CR-Form-v7

CHANGE REQUEST

25.322 CR 255 # rev - # Current version: 5.7.0

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:	# DL RLC Size handling		
Source:	# RAN WG2		
Work item code:	# TEI	Date:	# 10/05/2004
Category:	# F	Release:	# Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(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)

Reason for change:	# Introduce a primitive to allow the network to configure the LI size to assume on the downlink for RLC UM.
Summary of change:	# Separate the configuration of the AMD PDU size in uplink and downlink. Clarify that the LI size is determined independently for uplink and downlink and is only linked to the PDU sizes in the same direction. Correct the fact that the downlink RLC PDU size is configured by RRC. It should instead be determined based on the first received PDU size.
Consequences if not approved:	# We would need to change the Layer 3 signalling to explicitly signal the RLC PDU size being used in downlink.

Clauses affected:	# 4.2.1.3.1, 4.2.1.3.2, 8.2, 9.2.2.8, 11.3.4.x										
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;">#</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;">#</td> </tr> <tr> <td style="width: 20px; text-align: center;">#</td> <td style="width: 20px; text-align: center;">#</td> </tr> </table> Other core specifications Test specifications O&M Specifications	Y	N	#	#	#	#	#	#		
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4.2.1.3 Acknowledged mode (AM) RLC entity

Figure 4.4 below shows the model of an acknowledged mode RLC entity.

The AM RLC entity can be configured to utilise one or two logical channels. The figure 4.4 shows the model of the AM RLC entity when one logical channel (shown as a solid line) and when two logical channels (shown as dashed lines) are used.

If one logical channel is configured, the transmitting side of the AM RLC entity submits AMD and Control PDUs to the lower layer on that logical channel. And the RLC PDU size shall be the same for AMD PDUs and control PDUs.

In case two logical channels are configured in the uplink, AMD PDUs are transmitted on the first logical channel, and control PDUs are transmitted on the second logical channel. In case two logical channels are configured in the downlink, AMD and Control PDUs can be transmitted on any of the two logical channels.

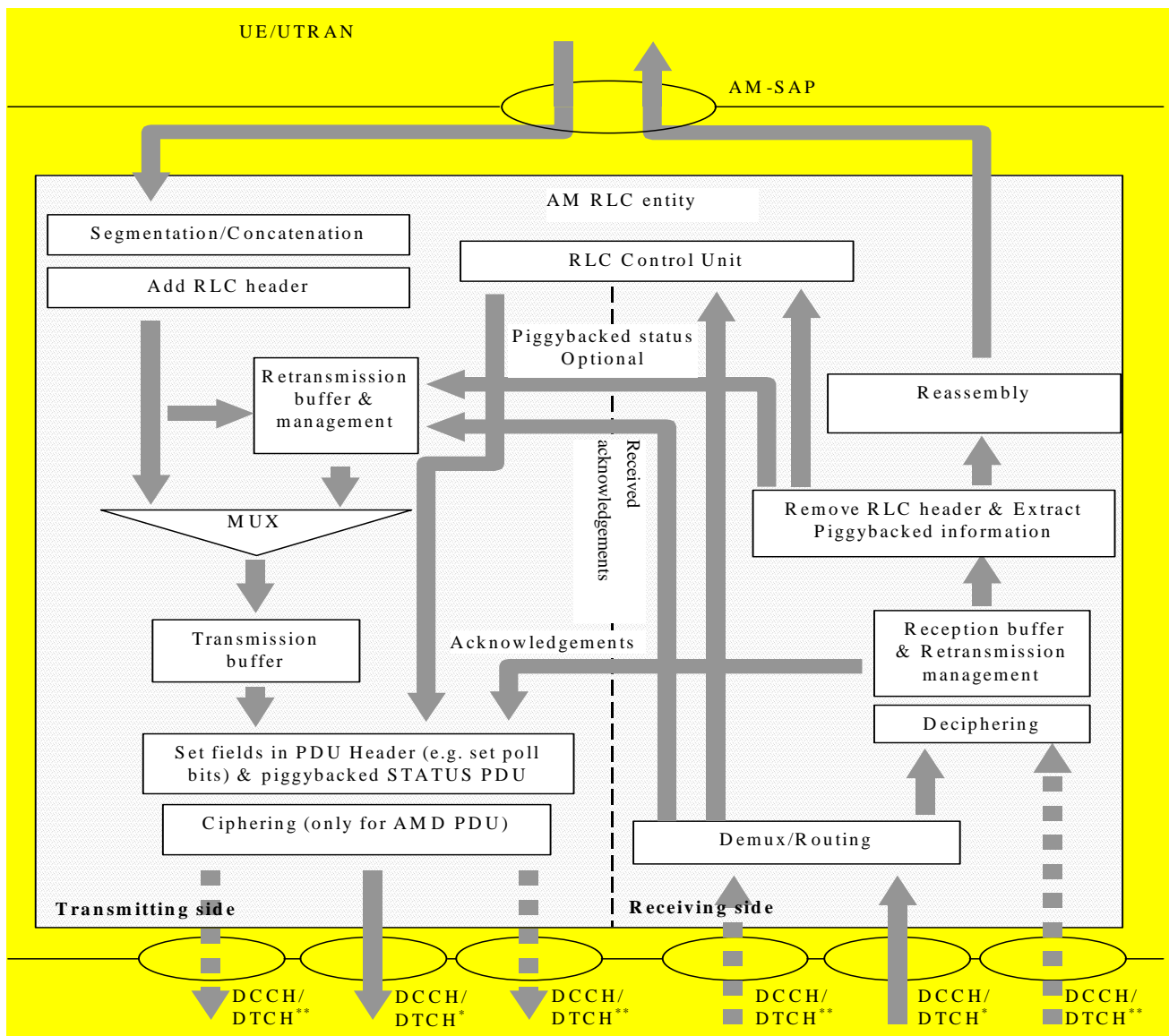


Figure 4.4: Model of an acknowledged mode entity

4.2.1.3.1 Transmitting side

The transmitting side of the AM-RLC entity receives RLC SDUs from upper layers through the AM-SAP.

RLC SDUs are segmented and/or concatenated into AMD PDUs of a fixed length. The segmentation is performed if the received RLC SDU is larger than the length of available space in the AMD PDU. The [uplink](#) AMD PDU size is a semi-static value that is configured by upper layers and can only be changed through re-establishment of the AM RLC entity by upper layers.

The AMD PDU may contain segmented and/or concatenated RLC SDUs. The AMD PDU may also contain Padding to ensure that it is of a valid size. Length Indicators are used to define boundaries between RLC SDUs within AMD PDUs. Length Indicators are also used to define whether Padding or Piggybacked STATUS PDU is included in the AMD PDU.

After the segmentation and/or concatenation are performed, the AMD PDUs are placed in the Retransmission buffer and at the MUX.

AMD PDUs buffered in the Retransmission buffer are deleted or retransmitted based on the status report found within a STATUS PDU or Piggybacked STATUS PDU sent by the peer AM RLC entity. This status report may contain positive or negative acknowledgements of individual AMD PDUs received by the peer AM RLC entity.

The MUX multiplexes AMD PDUs from the Retransmission buffer that need to be retransmitted, and the newly generated AMD PDUs delivered from the Segmentation/Concatenation function.

The PDUs are delivered to the function that completes the AMD PDU header and potentially replaces padding with piggybacked status information. A Piggybacked STATUS PDUs can be of variable size in order to match the amount of free space in the AMD PDU. The AMD PDU header is completed based on the input from the RLC Control Unit that indicates the values to set in various fields (e.g. Polling Bit). The function also multiplexes, if required, Control PDUs received from the RLC Control Unit (RESET and RESET ACK PDUs), and from the Reception buffer (Piggybacked STATUS and STATUS PDUs), with AMD PDUs.

The ciphering (if configured) is then applied to the AMD PDUs. The AMD PDU header is not ciphered. Piggybacked STATUS PDU and Padding in AMD PDU (when present) are ciphered. Control PDUs (i.e. STATUS PDU, RESET PDU, and RESET ACK PDU) are not ciphered.

The transmitting side of the AM RLC entity submits AMD PDUs to the lower layer through either one or two DCCH or DTCH logical channels.

4.2.1.3.2 Receiving side

The receiving side of the AM-RLC entity receives AMD and Control PDUs through the configured logical channels from the lower layer.

[The downlink AMD PDU size is a semi-static value that is configured by upper layers and can only be changed through re-establishment of the AM RLC entity by upper layers. In the case where the downlink AMD PDU size is not configured, it is determined based on the first PDU received. The downlink and uplink AMD PDU sizes need not be the same.](#)

AMD PDUs are routed to the Deciphering Unit, where AMD PDUs (minus the AMD PDU header) are deciphered (if ciphering is configured and started), and then delivered to the Reception buffer.

The AMD PDUs are placed in the Reception buffer until a complete RLC SDU has been received. The Receiver acknowledges successful reception or requests retransmission of the missing AMD PDUs by sending one or more STATUS PDUs to the AM RLC peer entity, through its transmitting side. If a Piggybacked STATUS PDU is found in an AMD PDU, it is delivered to the Retransmission buffer & Management Unit at the transmitting side of the AM RLC entity, in order to purge the buffer of positively acknowledged AMD PDUs, and to indicate which AMD PDUs need to be retransmitted.

Once a complete RLC SDU has been received, the associated AMD PDUs are reassembled by the Reassembly Unit and delivered to upper layers through the AM-SAP.

RESET and RESET ACK PDUs are delivered to the RLC Control Unit for processing. If a response to the peer AM RLC entity is needed, an appropriate Control PDU is delivered, by the RLC Control Unit to the transmitting side of the AM RLC entity. The received STATUS PDUs are delivered to the Retransmission buffer and Management Unit at the

transmitting side of the AM RLC entity, in order to purge the buffer of positively acknowledged AMD PDUs, and to indicate which AMD PDUs need to be retransmitted.

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.
- 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), ~~and~~ largest UL UMD PDU size (see subclause 9.2.2.8) and DL RLC UM LI size (see subclause 9.2.2.8).

- 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 Use special LI indicates that the LI indicating that an RLC SDU begins in the beginning of an RLC PDU is to be used (see subclause 9.2.2.8).

9.2.2.8 Length Indicator (LI)

A "Length Indicator" is used to indicate the last octet of each RLC SDU ending within the 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 \leq 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 \leq 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 parameter Use special LI is configured on the downlink; and
- if the RLC SDU begins in the beginning of the RLC PDU; 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:
 - 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 the uplink:
 - the "Length Indicator" with value "111 1100" or "111 1111 1111 1100" shall not be used.

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:

- 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" is used for the following PDU:
 - if RLC is configured for UM mode:
 - the "Length Indicator" with value "000 0000" shall be placed as the first "Length indicator" in the following PDU and its "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.

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).
1111111	The rest of the RLC PDU is padding. The padding length can be zero.

Length: 15bits

11.3.3 Reception of AMD PDU by the Receiver

Upon reception of an AMD PDU, the Receiver shall:

- in the UE:

- if the “downlink AMD PDU size” has not yet been set:

- set the “downlink AMD PDU size” to the size of the received PDU:

- update VR(R), VR(H) and VR(MR) state variables for each received AMD PDU (see clause 9.4);
- if a received AMD PDU includes a "Polling bit" set to "1", or "Missing PDU Indicator" is configured and the Receiver detects that a PDU is missing:
 - initiate the STATUS PDU transfer procedure;
- reassemble the received AMD PDUs into RLC SDUs;
- if "In-Sequence Delivery" is configured:
 - deliver the RLC SDUs in-sequence (i.e. in the same order as the RLC SDUs were originally transmitted by the peer entity) to upper layers through the AM-SAP.
- otherwise:
 - deliver the RLC SDUs in arbitrary order to upper layers through the AM-SAP.

11.2.4 Abnormal cases

11.2.4.1 Length Indicator value reserved for UMD PDU

Upon delivery by the lower layer of an UMD PDU that contains a "Length Indicator" value specified to be reserved for UMD PDUs in this version of the protocol, the Receiver shall:

- ignore that UMD PDU.

11.2.4.x Invalid PDU size

In the UE, if the “DL RLC UM LI size” is configured to 7 bits, if a received UMD PDU has a size larger than 125 octets, the Receiver shall:

- ignore that UMD PDU.

11.3.4 Abnormal cases

...

11.3.4.5 Invalid length indicator value

If the "Length Indicator" of an AMD PDU has a value that is larger than the PDU size – RLC header size and is not one of the predefined values listed in the table of subclause 9.2.2.8, the Receiver shall:

- ignore that AMD PDU.

11.3.4.6 Length Indicator value reserved for AMD PDU

Upon delivery by the lower layer of an AMD PDU that contains a "Length Indicator" value specified to be reserved for AMD PDUs in this version of the protocol, the Receiver shall:

- ignore that AMD PDU.

...

11.3.4.x Invalid PDU size

In the UE, if a received AMD PDU has a size different from the configured “downlink AMD PDU size”, the Receiver shall:

- ignore that AMD PDU.

CR-Form-v7

CHANGE REQUEST

25.322 CR 256 # rev - # Current version: 6.0.0

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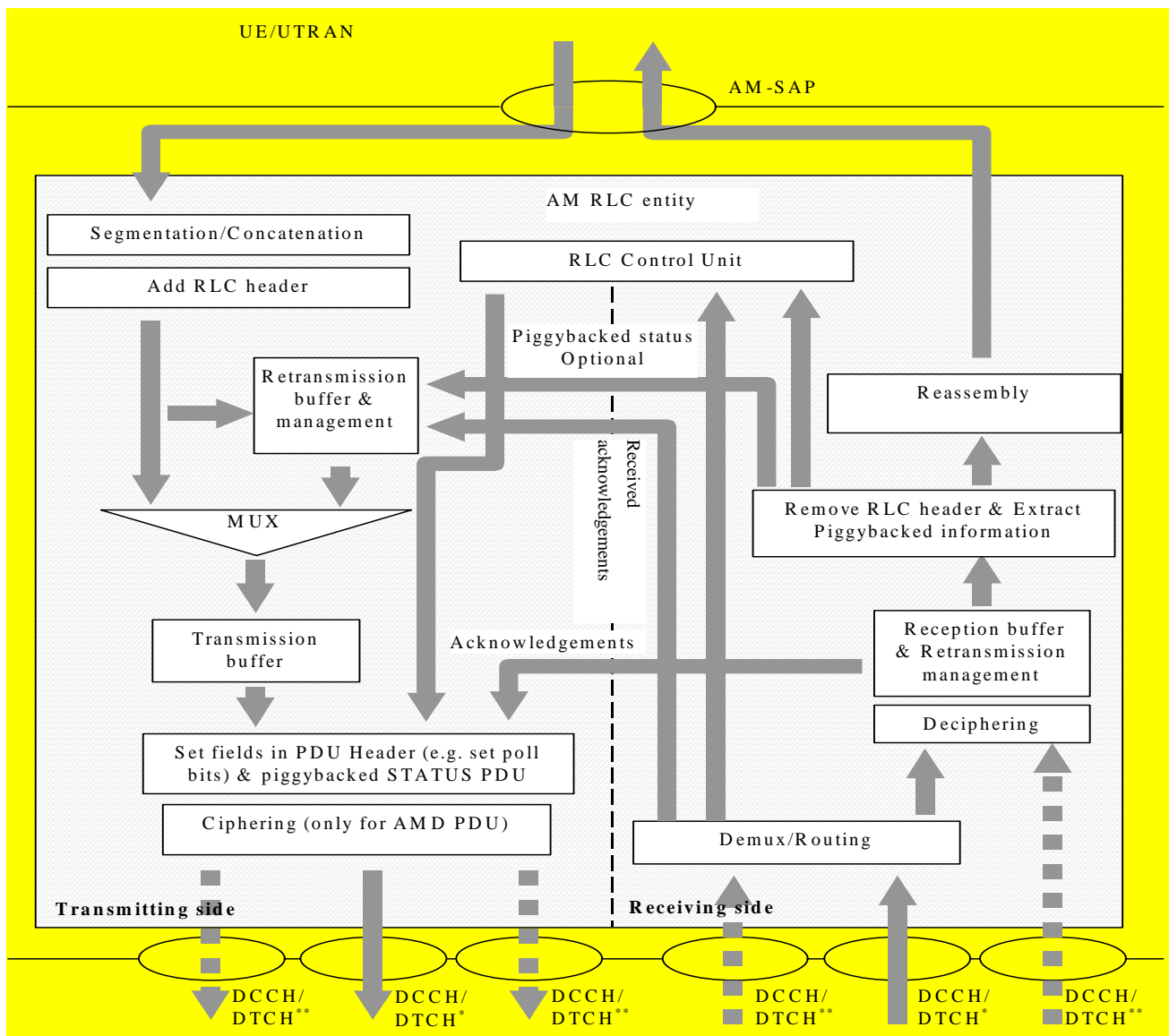


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The AMD PDU may contain segmented and/or concatenated RLC SDUs. The AMD PDU may also contain Padding to ensure that it is of a valid size. Length Indicators are used to define boundaries between RLC SDUs within AMD PDUs. Length Indicators are also used to define whether Padding or Piggybacked STATUS PDU is included in the AMD PDU.

After the segmentation and/or concatenation are performed, the AMD PDUs are placed in the Retransmission buffer and at the MUX.

AMD PDUs buffered in the Retransmission buffer are deleted or retransmitted based on the status report found within a STATUS PDU or Piggybacked STATUS PDU sent by the peer AM RLC entity. This status report may contain positive or negative acknowledgements of individual AMD PDUs received by the peer AM RLC entity.

The MUX multiplexes AMD PDUs from the Retransmission buffer that need to be retransmitted, and the newly generated AMD PDUs delivered from the Segmentation/Concatenation function.

The PDUs are delivered to the function that completes the AMD PDU header and potentially replaces padding with piggybacked status information. A Piggybacked STATUS PDUs can be of variable size in order to match the amount of free space in the AMD PDU. The AMD PDU header is completed based on the input from the RLC Control Unit that indicates the values to set in various fields (e.g. Polling Bit). The function also multiplexes, if required, Control PDUs received from the RLC Control Unit (RESET and RESET ACK PDUs), and from the Reception buffer (Piggybacked STATUS and STATUS PDUs), with AMD PDUs.

The ciphering (if configured) is then applied to the AMD PDUs. The AMD PDU header is not ciphered. Piggybacked STATUS PDU and Padding in AMD PDU (when present) are ciphered. Control PDUs (i.e. STATUS PDU, RESET PDU, and RESET ACK PDU) are not ciphered.

The transmitting side of the AM RLC entity submits AMD PDUs to the lower layer through either one or two DCCH or DTCH logical channels.

4.2.1.3.2 Receiving side

The receiving side of the AM-RLC entity receives AMD and Control PDUs through the configured logical channels from the lower layer.

[The downlink AMD PDU size is a semi-static value that is configured by upper layers and can only be changed through re-establishment of the AM RLC entity by upper layers. In the case where the downlink AMD PDU size is not configured, it is determined based on the first PDU received. The downlink and uplink AMD PDU sizes need not be the same.](#)

AMD PDUs are routed to the Deciphering Unit, where AMD PDUs (minus the AMD PDU header) are deciphered (if ciphering is configured and started), and then delivered to the Reception buffer.

The AMD PDUs are placed in the Reception buffer until a complete RLC SDU has been received. The Receiver acknowledges successful reception or requests retransmission of the missing AMD PDUs by sending one or more STATUS PDUs to the AM RLC peer entity, through its transmitting side. If a Piggybacked STATUS PDU is found in an AMD PDU, it is delivered to the Retransmission buffer & Management Unit at the transmitting side of the AM RLC entity, in order to purge the buffer of positively acknowledged AMD PDUs, and to indicate which AMD PDUs need to be retransmitted.

Once a complete RLC SDU has been received, the associated AMD PDUs are reassembled by the Reassembly Unit and delivered to upper layers through the AM-SAP.

RESET and RESET ACK PDUs are delivered to the RLC Control Unit for processing. If a response to the peer AM RLC entity is needed, an appropriate Control PDU is delivered, by the RLC Control Unit to the transmitting side of the AM RLC entity. The received STATUS PDUs are delivered to the Retransmission buffer and Management Unit at the

transmitting side of the AM RLC entity, in order to purge the buffer of positively acknowledged AMD PDUs, and to indicate which AMD PDUs need to be retransmitted.

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.
- 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), ~~and~~ largest UL UMD PDU size (see subclause 9.2.2.8) and DL RLC UM LI size (see subclause 9.2.2.8).

- 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 Use special LI indicates that the LI indicating that an RLC SDU begins in the beginning of an RLC PDU is to be used (see subclause 9.2.2.8).

9.2.2.8 Length Indicator (LI)

A "Length Indicator" is used to indicate the last octet of each RLC SDU ending within the 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 \leq 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 \leq 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 parameter Use special LI is configured on the downlink; and
- if the RLC SDU begins in the beginning of the RLC PDU; 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:
 - 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 the uplink:
 - the "Length Indicator" with value "111 1100" or "111 1111 1111 1100" shall not be used.

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:

- 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" is used for the following PDU:
 - if RLC is configured for UM mode:
 - the "Length Indicator" with value "000 0000" shall be placed as the first "Length indicator" in the following PDU and its "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.

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).
1111111	The rest of the RLC PDU is padding. The padding length can be zero.

Length: 15bits

11.3.3 Reception of AMD PDU by the Receiver

Upon reception of an AMD PDU, the Receiver shall:

- in the UE:

- if the “downlink AMD PDU size” has not yet been set:

- set the “downlink AMD PDU size” to the size of the received PDU:

- update VR(R), VR(H) and VR(MR) state variables for each received AMD PDU (see clause 9.4);
- if a received AMD PDU includes a "Polling bit" set to "1", or "Missing PDU Indicator" is configured and the Receiver detects that a PDU is missing:
 - initiate the STATUS PDU transfer procedure;
- reassemble the received AMD PDUs into RLC SDUs;
- if "In-Sequence Delivery" is configured:
 - deliver the RLC SDUs in-sequence (i.e. in the same order as the RLC SDUs were originally transmitted by the peer entity) to upper layers through the AM-SAP.
- otherwise:
 - deliver the RLC SDUs in arbitrary order to upper layers through the AM-SAP.

11.2.4 Abnormal cases

11.2.4.1 Length Indicator value reserved for UMD PDU

Upon delivery by the lower layer of an UMD PDU that contains a "Length Indicator" value specified to be reserved for UMD PDUs in this version of the protocol, the Receiver shall:

- ignore that UMD PDU.

11.2.4.x Invalid PDU size

In the UE, if the “DL RLC UM LI size” is configured to 7 bits, if a received UMD PDU has a size larger than 125 octets, the Receiver shall:

- ignore that UMD PDU.

11.3.4 Abnormal cases

...

11.3.4.5 Invalid length indicator value

If the "Length Indicator" of an AMD PDU has a value that is larger than the PDU size – RLC header size and is not one of the predefined values listed in the table of subclause 9.2.2.8, the Receiver shall:

- ignore that AMD PDU.

11.3.4.6 Length Indicator value reserved for AMD PDU

Upon delivery by the lower layer of an AMD PDU that contains a "Length Indicator" value specified to be reserved for AMD PDUs in this version of the protocol, the Receiver shall:

- ignore that AMD PDU.

...

11.3.4.x Invalid PDU size

In the UE, if a received AMD PDU has a size different from the configured “downlink AMD PDU size”, the Receiver shall:

- ignore that AMD PDU.

CR-Form-v7

CHANGE REQUEST

25.331 CR 2297 # rev 2 # Current version: 5.8.0

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:	# DL RLC Size handling		
Source:	# RAN WG2		
Work item code:	# TEI5	Date:	# 10/05/2004
Category:	# F	Release:	# Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(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)

Reason for change:	# DL RLC PDU size cannot be explicitly configured to the UE using the current signalling.		
Summary of change:	# It is clarified that the current configuration of RLC AM PDU size through RRC signalling is only applicable for UL. We introduce separate signalling of this size for DL within the RLC info. If this size is changed then the RLC entity should be re-established as is currently assumed for UL.		
Consequences if not approved:	# There would not be proper support for RLC PDU size change, leading to using the same PDU size everywhere and therefore under-utilizing HSDPA.		

Clauses affected:	# 8.2.2.3, 8.5.21, 8.6.4.8, 8.6.4.9, 10.3.4.23, 11.2										
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="text-align: center;">X</td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> </tr> </table>	Y	N	X		X			X	Other core specifications Test specifications O&M Specifications	# 25.322 CR 255 Test case for PDU size change should be included by T1.
Y	N										
X											
X											
	X										
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.

8.2.2.3 Reception of RADIO BEARER SETUP or RADIO BEARER RECONFIGURATION or RADIO BEARER RELEASE or TRANSPORT CHANNEL RECONFIGURATION or PHYSICAL CHANNEL RECONFIGURATION message by the UE

The UE shall:

1> be able to receive any of the following messages:

2> RADIO BEARER SETUP message; or

2> RADIO BEARER RECONFIGURATION message; or

2> RADIO BEARER RELEASE message; or

2> TRANSPORT CHANNEL RECONFIGURATION message; or

2> PHYSICAL CHANNEL RECONFIGURATION message;

1> be able to perform a hard handover and apply physical layer synchronisation procedure A as specified in [29], even if no prior UE measurements have been performed on the target cell and/or frequency.

In case the reconfiguration procedure is used to remove all existing RL(s) in the active set while new RL(s) are established the UE shall:

1> if the UE has a pending "TGPS reconfiguration CFN" at the activation time received in the reconfiguration message and the reconfiguration requests a timing re-initialised hard handover (see subclause 8.3.5.1), the UE may:

2> abort the pending CM activation;

2> set the CM_PATTERN_ACTIVATION_ABORTED to TRUE.

1> otherwise:

2> set the CM_PATTERN_ACTIVATION_ABORTED to FALSE.

If the UE receives:

- a RADIO BEARER SETUP message; or

- a RADIO BEARER RECONFIGURATION message; or

- a RADIO BEARER RELEASE message; or

- a TRANSPORT CHANNEL RECONFIGURATION message; or

- a PHYSICAL CHANNEL RECONFIGURATION message:

it shall:

1> set the variable ORDERED_RECONFIGURATION to TRUE;

1> if the UE will enter the CELL_DCH state from any state other than CELL_DCH state at the conclusion of this procedure:

2> perform the physical layer synchronisation procedure A as specified in [29] (FDD only).

1> act upon all received information elements as specified in subclause 8.6, unless specified in the following and perform the actions below.

The UE may:

1> maintain a list of the set of cells to which the UE has Radio Links if the IE "Cell ID" is present.

The UE may first release the physical channel configuration used at reception of the reconfiguration message. The UE shall then:

- 1> in FDD, if the IE "PDSCH code mapping" is included but the IE "PDSCH with SHO DCH Info" is not included and if the DCH has only one link in its active set:
 - 2> act upon the IE "PDSCH code mapping" as specified in subclause 8.6; and
 - 2> infer that the PDSCH will be transmitted from the cell from which the downlink DPCH is transmitted.
- 1> enter a state according to subclause 8.6.3.3.

In case the UE receives a RADIO BEARER RECONFIGURATION message including the IE "RB information to reconfigure" that only includes the IE "RB identity", the UE shall:

- 1> handle the message as if IE "RB information to reconfigure" was absent.

NOTE: The RADIO BEARER RECONFIGURATION message always includes the IE "RB information to reconfigure". UTRAN has to include it even if it does not require the reconfiguration of any RB.

If after state transition the UE enters CELL_DCH state, the UE shall, after the state transition:

- 1> in FDD; or
- 1> in TDD when "Primary CCPCH Info" is included indicating a new target cell and "New C-RNTI" is not specified:
 - 2> remove any C-RNTI from MAC;
 - 2> clear the variable C_RNTI.

If after state transition the UE leaves CELL_DCH state, the UE shall, after the state transition:

- 1> stop any HS-DSCH reception procedures;
- 1> clear any stored HS-PDSCH configuration;
- 1> act as if the IE "MAC-hs reset indicator" is received and set to TRUE;
- 1> release all HARQ resources;
- 1> remove any H-RNTI stored;
- 1> clear the variable H_RNTI;
- 1> set the variable HS_DSCH_RECEPTION to FALSE.

NOTE: If configured for HS-DSCH, the UE will have still stored the IEs "Added or Reconfigured MAC-d flow" and "RB mapping Info".

In FDD, if after state transition the UE leaves CELL_DCH state, the UE shall, after the state transition:

- 1> remove any DSCH-RNTI from MAC;
- 1> clear the variable DSCH_RNTI.

If the UE was in CELL_DCH state upon reception of the reconfiguration message and remains in CELL_DCH state, the UE shall:

- 1> if the IE "Uplink DPCH Info" is absent, not change its current UL Physical channel configuration;
- 1> in TDD:
 - 2> if "Primary CCPCH Info" is included indicating a new target cell and "New C-RNTI" is not specified:
 - 3> remove any C-RNTI from MAC;
 - 3> clear the variable C_RNTI.

- 1> if "DPCH frame offset" is included for one or more RLS in the active set:
 - 2> use its value to determine the beginning of the DPCH frame in accordance with the following:
 - 3> if the received IE "DPCH frame offset" is across the value range border compared to the DPCH frame offset currently used by the UE:
 - 4> consider it to be a request to adjust the timing with 256 chips across the frame border (e.g. if the UE receives value 0 while the value currently used is 38144 consider this as a request to adjust the timing with +256 chips).
 - 3> if after taking into account value range borders, the received IE "DPCH frame offset" corresponds to a request to adjust the timing with a step exceeding 256 chips:
 - 4> set the variable INVALID_CONFIGURATION to TRUE.
 - 3> and the procedure ends.
- 2> adjust the radio link timing accordingly.

If after state transition the UE enters CELL_FACH state, the UE shall, after the state transition:

- 1> if the IE "Frequency info" is included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4] on that frequency;
 - 2> if the UE finds a suitable UTRA cell on that frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> when the cell update procedure completed successfully:
 - 5> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.
 - 2> else, if the UE can not find a suitable UTRA cell on that frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> when the cell update procedure completed successfully:
 - 4> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.
- 1> if the IE "Frequency info" is not included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4];
 - 2> if the UE finds a suitable UTRA cell on the current frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> when the cell update procedure completed successfully:
 - 5> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.

- 2> else, if the UE can not find a suitable UTRA cell on the current frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> when the cell update procedure completed successfully:
 - 4> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.
- 1> start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in the variable TIMERS_AND_CONSTANTS;
- 1> select PRACH according to subclause 8.5.17;
- 1> select Secondary CCPCH according to subclause 8.5.19;
- 1> use the transport format set given in system information;
- 1> if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
 - 2> ignore that IE and stop using DRX.
- 1> if the contents of the variable C_RNTI is empty:
 - 2> perform a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 2> when the cell update procedure completed successfully:
 - 3> if the UE is in CELL_PCH or URA_PCH state:
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
 - 4> proceed as below.

If the UE was in CELL_FACH state upon reception of the reconfiguration message and remains in CELL_FACH state, the UE shall:

- 1> if the IE "Frequency info" is included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4] on that frequency;
 - 2> if the UE finds a suitable UTRA cell on that frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
 - 4> when the cell update procedure completed successfully:
 - 5> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.
 - 2> else, if the UE can not find a suitable UTRA cell on that frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> when the cell update procedure completed successfully:
 - 4> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.

- 1> if the IE "Frequency info" is not included in the received reconfiguration message:
 - 2> if the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD) is included the UE shall either:
 - 3> ignore the content of the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD) and proceed as below;
 - 2> or:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CPOCH info" (for TDD), and it is different from the current cell:
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> when the cell update procedure completed successfully:
 - 5> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.

If after state transition the UE enters CELL_PCH or URA_PCH state, the UE shall:

- 1> if the IE "UTRAN DRX cycle length coefficient" is not included in the same message:
 - 2> set the variable INVALID_CONFIGURATION to TRUE.

The UE shall transmit a response message as specified in subclause 8.2.2.4, setting the information elements as specified below. The UE shall:

- 1> if the received reconfiguration message included the IE "Downlink counter synchronisation info"; or
- 1> if the received reconfiguration message is a RADIO BEARER RECONFIGURATION and the IE "New U-RNTI" is included:
 - 2> if the variable PDCP_SN_INFO is empty:
 - 3> configure the corresponding RLC entity for all AM and UM radio bearers and AM and UM signalling radio bearers except RB2 to "stop".
 - 2> else:
 - 3> configure the RLC entity for signalling radio bearers RB1, RB3 and RB4 to "stop";
 - 3> configure the RLC entity for UM and AM radio bearers for which the IE "PDCP SN Info" is not included to "stop".
 - 2> re-establish RB2;
 - 2> for the downlink and the uplink, apply the ciphering configuration as follows:
 - 3> if the received re-configuration message included the IE "Ciphering Mode Info":
 - 4> use the ciphering configuration in the received message when transmitting the response message.
 - 3> if the ciphering configuration for RB2 from a previously received SECURITY MODE COMMAND has not yet been applied because the activation times not having been reached:
 - 4> if the previous SECURITY MODE COMMAND was received due to new keys being received:
 - 5> consider the new ciphering configuration to include the received new keys;
 - 5> initialise the HFN component of the uplink COUNT-C and downlink COUNT-C of SRB2 as indicated in subclause 8.1.12.3.1.
 - 4> if the ciphering configuration for RB2 from a previously received SECURITY MODE COMMAND has not yet been applied because of the corresponding activation times not having been reached and the previous SECURITY MODE COMMAND caused a change in LATEST_CONFIGURED_CN_DOMAIN:

- 5> consider the new ciphering configuration to include the keys associated with the LATEST_CONFIGURED_CN_DOMAIN;
- 5> initialise the HFN component of the uplink COUNT-C and downlink COUNT-C of SRB2 to the most recently transmitted IE "START list" or IE "START" for the LATEST_CONFIGURED_CN_DOMAIN at the reception of the previous SECURITY MODE COMMAND.
- 4> apply the new ciphering configuration immediately following RLC re-establishment.
- 3> else:
 - 4> continue using the current ciphering configuration.
- 2> set the new uplink and downlink component of COUNT-C HFN of RB2 to MAX(uplink HFN of RB2, downlink component of COUNT-C HFN of RB2);
- 2> increment by one the downlink and uplink HFN values for RB2;
- 2> calculate the START value according to subclause 8.5.9;
- 2> include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info".
- 1> if the received reconfiguration message did not include the IE "Downlink counter synchronisation info":
 - 2> if the variable START_VALUE_TO_TRANSMIT is set:
 - 3> include and set the IE "START" to the value of that variable.
 - 2> if the variable START_VALUE_TO_TRANSMIT is not set and the IE "New U-RNTI" is included:
 - 3> calculate the START value according to subclause 8.5.9;
 - 3> include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info".
 - 2> if the received reconfiguration message caused a change in the RLC size for any RB using RLC-AM:
 - 3> calculate the START value according to subclause 8.5.9;
 - 3> include the calculated START values for the CN domain associated with the corresponding RB identity in the IE "START list" in the IE "Uplink counter synchronisation info".
- 1> if the received reconfiguration message contained the IE "Ciphering mode info" or contained the IE "Integrity protection mode info":
 - 2> set the IE "Status" in the variable SECURITY_MODIFICATION for all the CN domains in the variable SECURITY_MODIFICATION to "Affected".
- 1> if the received reconfiguration message contained the IE "Ciphering mode info":
 - 2> if the reconfiguration message is not used to perform SRNS relocation with change of ciphering algorithm:
 - 3> the UE behaviour is not specified.
 - 2> if the message is used to perform a timing re-initialised hard handover:
 - 3> if IE "Ciphering activation time for DPCH" is included:
 - 4> the UE behaviour is not specified.
 - 2> else:
 - 3> if the reconfiguration message is used to setup radio bearer(s) using RLC-TM; or
 - 3> if radio bearer(s) using RLC-TM already exist:

- 4> if IE "Ciphering activation time for DPCH" is not included:
 - 5> the UE behaviour is not specified.
- 2> include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.
- 1> if the received reconfiguration message did not contain the IE "Ciphering activation time for DPCH" in IE "Ciphering mode info":
 - 2> if prior to this procedure there exist no transparent mode RLC radio bearers:
 - 3> if, at the conclusion of this procedure, the UE will be in CELL_DCH state; and
 - 3> if, at the conclusion of this procedure, at least one transparent mode RLC radio bearer exists:
 - 4> include the IE "COUNT-C activation time" and specify a CFN value for this IE that is a multiple of 8 frames ($CFN \bmod 8 = 0$) and lies at least 200 frames ahead of the CFN in which the response message is first transmitted.

NOTE: UTRAN should not include the IE "Ciphering mode info" in any reconfiguration message unless it is also used to perform an SRNS relocation with change of ciphering algorithm.

- 1> set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- 1> clear that entry;
- 1> if the variable PDCP_SN_INFO is not empty:
 - 2> include the IE "RB with PDCP information list" and set it to the value of the variable PDCP_SN_INFO.
- 1> in TDD, if the procedure is used to perform a handover to a cell where timing advance is enabled, and the UE can calculate the timing advance value in the new cell (i.e. in a synchronous TDD network):
 - 2> set the IE "Uplink Timing Advance" according to subclause 8.6.6.26.
- 1> if the IE "Integrity protection mode info" was present in the received reconfiguration message:
 - 2> start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message.

If after state transition the UE enters URA_PCH state, the UE shall, after the state transition and transmission of the response message:

- 1> if the IE "Frequency info" is included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4] on that frequency.
- 1> if the IE "Frequency info" is not included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4].
- 1> prohibit periodical status transmission in RLC;
- 1> remove any C-RNTI from MAC;
- 1> clear the variable C_RNTI;
- 1> start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in the variable TIMERS_AND_CONSTANTS;
- 1> select Secondary CCPCH according to subclause 8.5.19;
- 1> if the IE "UTRAN DRX cycle length coefficient" is included in the same message:

- 2> use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2.
- 1> if the criteria for URA update caused by "URA reselection" according to subclause 8.3.1 are fulfilled after cell selection:
 - 2> initiate a URA update procedure according to subclause 8.3.1 using the cause "URA reselection";
 - 2> when the URA update procedure is successfully completed:
 - 3> the procedure ends.

If after state transition the UE enters CELL_PCH state from CELL_DCH state, the UE shall, after the state transition and transmission of the response message:

- 1> if the IE "Frequency info" is included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4] on that frequency.
 - 2> if the UE finds a suitable UTRA cell on that frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> proceed as below.
 - 2> else, if the UE can not find a suitable UTRA cell on that frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> proceed as below.
- 1> if the IE "Frequency info" is not included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4].
 - 2> if the UE finds a suitable UTRA cell on the current frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> proceed as below.
 - 2> else, if the UE can not find a suitable UTRA cell on the current frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> proceed as below.
- 1> prohibit periodical status transmission in RLC;
- 1> remove any C-RNTI from MAC;
- 1> clear the variable C_RNTI;
- 1> start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in the variable TIMERS_AND_CONSTANTS;

- 1> select Secondary CCPCH according to subclause 8.5.19;
- 1> if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
 - 2> use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2.
- 1> the procedure ends.

If after state transition the UE enters CELL_PCH state from CELL_FACH state, the UE shall, after the state transition and transmission of the response message:

- 1> if the IE "Frequency info" is included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4] on that frequency.
 - 2> if the UE finds a suitable UTRA cell on that frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
 - 4> proceed as below.
 - 2> else, if the UE can not find a suitable UTRA cell on that frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> proceed as below.
- 1> if the IE "Frequency info" is not included in the received reconfiguration message:
 - 2> if the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD) is included the UE shall either:
 - 3> ignore the content of the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD) and proceed as below;
 - 2> or:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CPCH info" (for TDD), and it is different from the current cell:
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> proceed as below.
- 1> prohibit periodical status transmission in RLC;
- 1> remove any C-RNTI from MAC;
- 1> clear the variable C_RNTI;
- 1> start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in the variable TIMERS_AND_CONSTANTS;
- 1> select Secondary CCPCH according to subclause 8.5.19;
- 1> if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
 - 2> use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2.

1> the procedure ends.

8.5.21 Actions related to Radio Bearer mapping

When the UE receives the IE "RB mapping info" and/or the IE "Transport format set", when the UE performs a cell reselection or a state transition, or when the UE releases a RB, the UE shall for each of the configured Radio Bearers:

- 1> upon moving to CELL_FACH after detecting a radio link failure (see subclause 8.5.6) and upon subsequent cell reselections until the first successfully completed cell update procedure, perform the actions defined in the remainder of this subclause only for signalling radio bearers;
- 1> configure the MAC with the appropriate transport format set (with computed transport block sizes) for the transport channel used by that RB;
- 1> determine the sets of RLC sizes that apply to the logical channels used by that RB, based on the IEs "RLC size list" and/or the IEs "Logical Channel List" included in the applicable "Transport format set" (either the ones received in the same message or the ones stored if none were received);
- 1> in case the selected multiplexing option is a multiplexing option on RACH:
 - 2> ignore the RLC size indexes that do not correspond to any RLC size within the Transport Format Set stored for RACH.
 - 2> if there is no remaining RLC size index corresponding to an RLC size within the Transport Format Set stored for RACH:
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
- 1> if RACH is the transport channel to be used on the uplink, if that RB has a multiplexing option on RACH and if it is using AM:
 - 2> apply the largest size amongst the ones derived according to the previous bullet for the RLC size (or RLC sizes in case the RB is realised using two logical channels) for the corresponding RLC entity.

NOTE: The IE "RB mapping info" is only included in the IE "Predefined RB configurations" in system information when used for Inter-RAT handover to UTRAN and there is no AM RLC size change involved in this case.

- 1> if that RB is using AM and the RLC size applicable to the [uplink](#) logical channel transporting data PDUs is different from the one derived from the previously stored configuration:
 - 2> re-establish the corresponding RLC entity;
 - 2> configure the corresponding RLC entity with the new [uplink](#) RLC size;
 - 2> for each AM RLC radio bearer in the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS whose RLC size is changed; and
 - 2> for each AM RLC signalling radio bearer in the CN domain as indicated in the IE "CN domain identity" in the variable LATEST_CONFIGURED_CN_DOMAIN whose RLC size is changed:
 - 3> if the IE "Status" in the variable CIPHERING_STATUS of this CN domain is set to "Started":
 - 4> if the information causing the RLC re-establishment was included in system information:
 - 5> set the HFN values for the corresponding RLC entity equal to the value of the IE "START" for this CN domain that will be included in the CELL UPDATE message following cell reselection.

NOTE: Since the UE cannot predict the START value at the time of the next CELL UPDATE transmission in the future, UTRAN should desist from changing the RLC size for a signalling radio bearer within a cell. Other than this case the change in RLC size for a signalling radio bearer is known to the UE when reading system information following cell reselection.

- 4> if the RLC re-establishment is caused by a CELL UPDATE CONFIRM:
 - 5> set the HFN values for the corresponding RLC entity equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for this CN domain.
- 4> if the RLC re-establishment is caused by a reconfiguration message:
 - 5> set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the reconfiguration complete message for this CN domain.

NOTE: If the UTRAN modifies the RLC size for RB2 on any reconfiguration message or Cell Update Confirm message, the UE behaviour is unspecified in this version of the specification.

NOTE: The UE shall not rely on the configured Transport Formats to determine the RLC sizes to be used in downlink for a particular logical channel. This size can be signalled explicitly in the RLC Info IE.

- 1> if that RB is using UM:
 - 2> indicate the largest ~~applicable~~ RLC size applicable for uplink to the corresponding RLC entity.
- 1> configure MAC multiplexing according to the selected multiplexing option (MAC multiplexing shall only be configured for a logical channel if the transport channel it is mapped on according to the selected multiplexing option is the same as the transport channel another logical channel is mapped on according to the multiplexing option selected for it);
- 1> configure the MAC with the logical channel priorities according to selected multiplexing option;
- 1> configure the MAC with the set of applicable RLC Sizes for each of the logical channels used for that RB;
- 1> if there is no multiplexing option applicable for the transport channels to be used:
 - 2> set the variable INVALID_CONFIGURATION to TRUE.
- 1> if there is more than one multiplexing option applicable for the transport channels to be used:
 - 2> set the variable INVALID_CONFIGURATION to TRUE.

If upon cell re-selection or upon moving to CELL_FACH after detecting a radio link failure the UE sets variable INVALID_CONFIGURATION to TRUE as a result of the actions defined in this subclause, the UE should:

- 1> move to idle mode;
- 1> release (locally) the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and the established radio access bearers (as stored in the variable ESTABLISHED_RABS) and indicate this to upper layers;
- 1> perform other actions when entering idle mode from connected mode as specified in subclause 8.5.2.

8.6.4.8 RB mapping info

If the IE "RB mapping info" is included, the UE shall:

- 1> for each multiplexing option of the RB:
 - 2> if a transport channel that would not exist as a result of the message (i.e. removed in the same message in IE "Deleted DL TrCH information" and IE "Deleted UL TrCH information") is referred to:
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
 - 2> if a multiplexing option that maps a logical channel corresponding to a TM-RLC entity onto RACH, CPCH, FACH or DSCH or HS-DSCH is included:

- 3> set the variable INVALID_CONFIGURATION to TRUE.
- 2> if the multiplexing option realises the radio bearer on the uplink (resp. on the downlink) using two logical channels with different values of the IE "Uplink transport channel type" (resp. of the IE "Downlink transport channel type"):
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
 - 2> if that RB is using TM and the IE "Segmentation indication" is set to TRUE and, based on the multiplexing configuration resulting from this message, the logical channel corresponding to it is mapped onto the same transport channel as another logical channel:
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
 - 2> if the transport channel considered in that multiplexing option is different from RACH and if that RB is using AM and the set of RLC sizes applicable to the [uplink](#) logical channel transferring data PDUs has more than one element not equal to zero:
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
 - 2> if that RB is using UM or TM and the multiplexing option realises it using two logical channels:
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
 - 2> for each logical channel in that multiplexing option:
 - 3> if the value of the IE "RLC size list" is set to "Explicit list":
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value (index) of any IE "RLC size index" in the IE "Explicit list" does not correspond to an "RLC size" in the IE transport format set of that transport channel given in the message; or
 - 4> if the transport channel this logical channel is mapped on in this multiplexing option is different from RACH, and if a "Transport format set" for that transport channel is not included in the same message, and the value (index) of any IE "RLC size index" in the IE "Explicit list" does not correspond to an "RLC size" in the stored transport format set of that transport channel; or
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured":
 - 5> set the variable INVALID_CONFIGURATION to TRUE.
 - 3> if the value of the IE "RLC size list" is set to "All":
 - 4> if the transport channel this logical channel is mapped on is RACH; or
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured":
 - 5> set the variable INVALID_CONFIGURATION to TRUE.
 - 3> if the value of the IE "RLC size list" is set to "Configured":
 - 4> if the transport channel this logical channel is mapped on is RACH; or

- 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and for none of the RLC sizes defined for that transport channel in the "Transport format set", the "Logical Channel List" is set to "All" or given as an "Explicit List" which contains this logical channel; or
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and for none of the RLC sizes defined in the transport format set stored for that transport channel, the "Logical Channel List" is set to "All" or given as an "Explicit List" which contains this logical channel:
 - 5> set the variable INVALID_CONFIGURATION to TRUE.
- 1> if, as a result of the message this IE is included in, several radio bearers can be mapped onto the same transport channel, and the IE "Logical Channel Identity" was not included in the RB mapping info of any of those radio bearers for a multiplexing option on that transport channel or the same "Logical Channel Identity" was used more than once in the RB mapping info of those radio bearers for the multiplexing options on that transport channel:
- 2> set the variable INVALID_CONFIGURATION to TRUE.
- 1> if the "RB mapping info" is considered as valid according to the rules above:
- 2> delete all previously stored multiplexing options for that radio bearer;
 - 2> store each new multiplexing option for that radio bearer;
 - 2> perform the actions as specified in subclause 8.5.21.
- 1> if the IE "Uplink transport channel type" is set to the value "RACH":
- 2> in FDD:
 - 3> refer the IE "RLC size index" to the RACH Transport Format Set of the first PRACH received in the IE "PRACH system information list" received in System Information Block 5 or System Information Block 6.
 - 2> in TDD:
 - 3> use the first Transport Format of the PRACH of the IE "PRACH system information list" at the position equal to the value in the IE "RLC size index".

In case IE "RLC info" includes IE "Downlink RLC mode" ("DL RLC logical channel info" is mandatory present) but IE "Number of downlink RLC logical channels" is absent in the corresponding IE "RB mapping info", the parameter values are exactly the same as for the corresponding UL logical channels. In case two multiplexing options are specified for the UL, the first options shall be used as default for the DL. As regards the IE "Channel type", the following rule should be applied to derive the DL channel type from the UL channel included in the IE:

Channel used in UL	DL channel type implied by "same as"
DCH	DCH
RACH	FACH
CPCH	FACH
USCH	DSCH

If ciphering is applied, UTRAN should not map Transparent Mode RBs of different CN domains on the same transport channel and it should not map transparent mode SRBs and RBs onto the same transport channel. In such cases the UE behaviour is not specified.

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 "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> re-establish the corresponding RLC entity:

3> configure the corresponding RLC entity with the new downlink RLC PDU size:

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> set the HFN values for the corresponding RLC entity equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for this CN domain.

4> if the RLC re-establishment is caused by a reconfiguration message:

5> set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the reconfiguration complete message for 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".

8.6.5.1 Transport Format Set

If the IE "Transport format set" is included, the UE shall:

- 1> if the transport format set is a RACH TFS received in System Information Block type 5 or 6, and CHOICE "Logical Channel List" has a value different from "Configured":
 - 2> ignore that System Information Block.
- 1> if the transport format set for a downlink transport channel is received in a System Information Block, and CHOICE "Logical Channel List" has a value different from 'ALL':
 - 2> ignore that System Information Block.
- 1> if the transport format set for a downlink transport channel is received in a message on a DCCH, and CHOICE "Logical Channel List" has a value different from 'ALL':
 - 2> keep the transport format set if this exists for that transport channel;
 - 2> set the variable INVALID_CONFIGURATION to TRUE.
- 1> if the value of any IE "RB identity" (and "Logical Channel" for RBs using two UL logical channels) in the IE "Logical channel list" does not correspond to a logical channel indicated to be mapped onto this transport channel in any RB multiplexing option (either included in the same message or previously stored and not changed by this message); or
- 1> if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is set to "Configured" while it is set to "All" or given as an "Explicit List" for any other RLC size; or
- 1> if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is set to "All" and for any logical channel mapped to this transport channel, the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is not set to "Configured"; or
- 1> if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is given as an "Explicit List" that contains a logical channel for which the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is not set to "Configured"; or
- 1> if the "Logical Channel List" for all the RLC sizes defined for that transport channel are given as "Explicit List" and if one of the logical channels mapped onto this transport channel is not included in any of those lists; or
- 1> if the "Logical Channel List" for the RLC sizes defined for that transport channel is set to "Configured" and for any logical channel mapped onto that transport channel, the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is also set to "Configured"; or
- 1> if the IE "Transport Format Set" was not received within the IE "PRACH system information list" and if the "Logical Channel List" for the RLC sizes defined for that transport channel is set to "Configured" and for any logical channel mapped onto that transport channel, the "RLC size list" (either provided in the IE "RB mapping

info" if included in the same message, or stored) is given as an "Explicit List" that includes an "RLC size index" that does not correspond to any RLC size in this "Transport Format Set"; or

1> if the IE "Transport Format Set" was not received within the IE "PRACH system information list", and if that RB is using AM and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element not equal to zero:

2> keep the transport format set if this exists for that transport channel;

2> set the variable INVALID_CONFIGURATION to TRUE.

1> if the total number of configured transport formats for the transport channel exceeds maxTF:

2> keep the transport format set if this exists for that transport channel;

2> set the variable INVALID_CONFIGURATION to TRUE.

1> if the IE "Transport format set" is considered as valid according to the rules above:

2> remove a previously stored transport format set if this exists for that transport channel;

2> store the transport format set for that transport channel;

2> consider the first instance of the parameter *Number of TBs and TTI List* within the *Dynamic transport format information* to correspond to transport format 0 for this transport channel, the second to transport format 1 and so on;

2> if the IE "Transport format Set" has the choice "Transport channel type" set to "Dedicated transport channel":

3> calculate the transport block size for all transport formats in the TFS using the following

$$\begin{array}{ll} \text{TB size} = \text{RLC size} + \text{MAC header size} & \text{if "RLC size"} \neq 0, \\ \text{TB size} = 0 & \text{if "RLC size"} = 0, \end{array}$$

where:

- MAC header size is calculated according to [15] if MAC multiplexing is used. Otherwise it is 0 bits;
- 'RLC size' reflects the RLC PDU size.

2> if the IE "Transport format Set" has the choice "Transport channel type" set to "Common transport channel":

3> in FDD:

4> for transport channels other than DSCH calculate the transport block size for all transport formats in the TFS using the following:

$$\text{TB size} = \text{RLC size}.$$

4> for DSCH transport channels calculate the transport block size for all transport formats in the TFS using the following:

$$\begin{array}{ll} \text{TB size} = \text{RLC size} + \text{MAC header size} & \text{if "RLC size"} \neq 0, \\ \text{TB size} = 0 & \text{if "RLC size"} = 0, \end{array}$$

where:

- MAC header size is calculated according to [15];
- 'RLC size' reflects the RLC PDU size.

3> for TDD calculate the transport block size for all transport formats in the TFS using the following:

$$\text{TB size} = \text{RLC size}.$$

2> if the IE "Number of Transport blocks" $\neq 0$ and IE "RLC size" = 0, no RLC PDU data exists but only parity bits exist for that transport format;

- 2> if the IE "Number of Transport blocks" = 0, neither RLC PDU neither data nor parity bits exist for that transport format;
- 2> perform the actions as specified in subclause 8.5.21.

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

10.3.4.23 RLC info

Information Element/Group name	Need	Multi	Type and reference	Semantics description	
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	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	
>AM RLC				RLC shall be used	
>>DL RLC PDU size	MP		Integer(0..4992)	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
>TM RLC					
>>Segmentation indication	MP		Boolean	TRUE indicates that segmentation is performed.	

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

[...]

```
DL-AM-RLC-Mode ::= SEQUENCE {
    inSequenceDelivery      BOOLEAN,
    receivingWindowSize    ReceivingWindowSize,
    dl-RLC-StatusInfo      DL-RLC-StatusInfo
}
```

```
DL-AM-RLC-Mode-r5 ::= SEQUENCE {
    dl-RLC-PDU-size        DataModeRLC-SizeInfoType1DL-RLC-PDU-size,
    inSequenceDelivery    BOOLEAN,
    receivingWindowSize    ReceivingWindowSize,
    dl-RLC-StatusInfo      DL-RLC-StatusInfo
}
```

[...]

```
DL-RLC-PDU-size ::= INTEGER(0..4992)
```

[...]

```
DL-RLC-Mode ::= CHOICE {
    dl-AM-RLC-Mode    DL-AM-RLC-Mode,
    dl-UM-RLC-Mode    NULL,
}
```

```

    dl-TM-RLC-Mode                DL-TM-RLC-Mode
  }
  DL-RLC-Mode-r5 ::=                CHOICE {
    dl-AM-RLC-Mode-r5             DL-AM-RLC-Mode-r5,
    dl-UM-RLC-Mode-r5             DL-UM-RLC-Mode-r5,
    dl-TM-RLC-Mode                 DL-TM-RLC-Mode
  }
  [...]

  DL-UM-RLC-LI-size ::=             ENUMERATED {
    size7, size15 }
  DL-UM-RLC-Mode-r5 ::=            SEQUENCE {
    dl-UM-RLC-LI-size             DL-UM-RLC-LI-size
  }
  [...]

  RB-InformationReconfig-r5 ::=     SEQUENCE {
    rb-Identity                    RB-Identity,
    pdcp-Info                      PDCP-InfoReconfig-r4           OPTIONAL,
    pdcp-SN-Info                   PDCP-SN-Info             OPTIONAL,
    rlc-Info                       RLC-Info-r5              OPTIONAL,
    rb-MappingInfo                 RB-MappingInfo-r5       OPTIONAL,
    rb-StopContinue                RB-StopContinue       OPTIONAL
  }
  [...]

  RB-InformationSetup-r5 ::=        SEQUENCE {
    rb-Identity                    RB-Identity,
    pdcp-Info                      PDCP-Info-r4           OPTIONAL,
    rlc-InfoChoice                 RLC-InfoChoice-r5,
    rb-MappingInfo                 RB-MappingInfo-r5
  }
  [...]

  RLC-Info ::=                     SEQUENCE {
    ul-RLC-Mode                   UL-RLC-Mode           OPTIONAL,
    dl-RLC-Mode                   DL-RLC-Mode           OPTIONAL
  }
  RLC-Info-r5 ::=                  SEQUENCE {
    ul-RLC-Mode                   UL-RLC-Mode           OPTIONAL,
    dl-RLC-Mode-r5                DL-RLC-Mode-r5       OPTIONAL
  }

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

  SRB-InformationSetup-r5 ::=       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-r5
  }
  [...]

```

CR-Form-v7

CHANGE REQUEST

25.331 CR 2298 # rev 2 # Current version: 6.1.0

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:	# DL RLC Size handling		
Source:	# RAN WG2		
Work item code:	# TEI5	Date:	# 10/05/2004
Category:	# A	Release:	# Rel-6
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(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)

Reason for change:	# DL RLC PDU size cannot be explicitly configured to the UE using the current signalling.		
Summary of change:	# It is clarified that the current configuration of RLC AM PDU size through RRC signalling is only applicable for UL. We introduce separate signalling of this size for DL within the RLC info. If this size is changed then the RLC entity should be re-established as is currently assumed for UL.		
Consequences if not approved:	# There would not be proper support for RLC PDU size change, leading to using the same PDU size everywhere and therefore under-utilizing HSDPA.		

Clauses affected:	# 8.2.2.3, 8.5.21, 8.6.4.8, 8.6.4.9, 10.3.4.23, 11.2										
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="text-align: center;">X</td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> </tr> </table>	Y	N	X		X			X	Other core specifications Test specifications O&M Specifications	# 25.322 CR 256. Test case for PDU size change should be included by T1.
Y	N										
X											
X											
	X										
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.

8.2.2.3 Reception of RADIO BEARER SETUP or RADIO BEARER RECONFIGURATION or RADIO BEARER RELEASE or TRANSPORT CHANNEL RECONFIGURATION or PHYSICAL CHANNEL RECONFIGURATION message by the UE

The UE shall:

1> be able to receive any of the following messages:

- 2> RADIO BEARER SETUP message; or
- 2> RADIO BEARER RECONFIGURATION message; or
- 2> RADIO BEARER RELEASE message; or
- 2> TRANSPORT CHANNEL RECONFIGURATION message; or
- 2> PHYSICAL CHANNEL RECONFIGURATION message;

1> be able to perform a hard handover and apply physical layer synchronisation procedure A as specified in [29], even if no prior UE measurements have been performed on the target cell and/or frequency.

In case the reconfiguration procedure is used to remove all existing RL(s) in the active set while new RL(s) are established the UE shall:

- 1> if the UE has a pending "TGPS reconfiguration CFN" at the activation time received in the reconfiguration message and the reconfiguration requests a timing re-initialised hard handover (see subclause 8.3.5.1), the UE may:
 - 2> abort the pending CM activation;
 - 2> set the CM_PATTERN_ACTIVATION_ABORTED to TRUE.
- 1> otherwise:
 - 2> set the CM_PATTERN_ACTIVATION_ABORTED to FALSE.

If the UE receives:

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

it shall:

- 1> set the variable ORDERED_RECONFIGURATION to TRUE;
- 1> if the UE will enter the CELL_DCH state from any state other than CELL_DCH state at the conclusion of this procedure:
 - 2> perform the physical layer synchronisation procedure A as specified in [29] (FDD only).
- 1> act upon all received information elements as specified in subclause 8.6, unless specified in the following and perform the actions below.

The UE may:

- 1> maintain a list of the set of cells to which the UE has Radio Links if the IE "Cell ID" is present.

The UE may first release the physical channel configuration used at reception of the reconfiguration message. The UE shall then:

- 1> in FDD, if the IE "PDSCH code mapping" is included but the IE "PDSCH with SHO DCH Info" is not included and if the DCH has only one link in its active set:
 - 2> act upon the IE "PDSCH code mapping" as specified in subclause 8.6; and
 - 2> infer that the PDSCH will be transmitted from the cell from which the downlink DPCH is transmitted.
- 1> enter a state according to subclause 8.6.3.3.

In case the UE receives a RADIO BEARER RECONFIGURATION message including the IE "RB information to reconfigure" that only includes the IE "RB identity", the UE shall:

- 1> handle the message as if IE "RB information to reconfigure" was absent.

NOTE: The RADIO BEARER RECONFIGURATION message always includes the IE "RB information to reconfigure". UTRAN has to include it even if it does not require the reconfiguration of any RB.

If after state transition the UE enters CELL_DCH state, the UE shall, after the state transition:

- 1> in FDD; or
- 1> in TDD when "Primary CCPCH Info" is included indicating a new target cell and "New C-RNTI" is not specified:
 - 2> remove any C-RNTI from MAC;
 - 2> clear the variable C_RNTI.

If after state transition the UE leaves CELL_DCH state, the UE shall, after the state transition:

- 1> stop any HS-DSCH reception procedures;
- 1> clear any stored HS-PDSCH configuration;
- 1> act as if the IE "MAC-hs reset indicator" is received and set to TRUE;
- 1> release all HARQ resources;
- 1> remove any H-RNTI stored;
- 1> clear the variable H_RNTI;
- 1> set the variable HS_DSCH_RECEPTION to FALSE.

NOTE: If configured for HS-DSCH, the UE will have still stored the IEs "Added or Reconfigured MAC-d flow" and "RB mapping Info".

In FDD, if after state transition the UE leaves CELL_DCH state, the UE shall, after the state transition:

- 1> remove any DSCH-RNTI from MAC;
- 1> clear the variable DSCH_RNTI.

If the UE was in CELL_DCH state upon reception of the reconfiguration message and remains in CELL_DCH state, the UE shall:

- 1> if the IE "Uplink DPCH Info" is absent, not change its current UL Physical channel configuration;
- 1> in TDD:
 - 2> if "Primary CCPCH Info" is included indicating a new target cell and "New C-RNTI" is not specified:
 - 3> remove any C-RNTI from MAC;
 - 3> clear the variable C_RNTI.

- 1> if "DPCH frame offset" is included for one or more RLS in the active set:
 - 2> use its value to determine the beginning of the DPCH frame in accordance with the following:
 - 3> if the received IE "DPCH frame offset" is across the value range border compared to the DPCH frame offset currently used by the UE:
 - 4> consider it to be a request to adjust the timing with 256 chips across the frame border (e.g. if the UE receives value 0 while the value currently used is 38144 consider this as a request to adjust the timing with +256 chips).
 - 3> if after taking into account value range borders, the received IE "DPCH frame offset" corresponds to a request to adjust the timing with a step exceeding 256 chips:
 - 4> set the variable INVALID_CONFIGURATION to TRUE.
 - 3> and the procedure ends.
- 2> adjust the radio link timing accordingly.

If after state transition the UE enters CELL_FACH state, the UE shall, after the state transition:

- 1> if the IE "Frequency info" is included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4] on that frequency;
 - 2> if the UE finds a suitable UTRA cell on that frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> when the cell update procedure completed successfully:
 - 5> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.
 - 2> else, if the UE can not find a suitable UTRA cell on that frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> when the cell update procedure completed successfully:
 - 4> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.
- 1> if the IE "Frequency info" is not included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4];
 - 2> if the UE finds a suitable UTRA cell on the current frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> when the cell update procedure completed successfully:
 - 5> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.

- 2> else, if the UE can not find a suitable UTRA cell on the current frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> when the cell update procedure completed successfully:
 - 4> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.
- 1> start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in the variable TIMERS_AND_CONSTANTS;
- 1> select PRACH according to subclause 8.5.17;
- 1> select Secondary CCPCH according to subclause 8.5.19;
- 1> use the transport format set given in system information;
- 1> if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
 - 2> ignore that IE and stop using DRX.
- 1> if the contents of the variable C_RNTI is empty:
 - 2> perform a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 2> when the cell update procedure completed successfully:
 - 3> if the UE is in CELL_PCH or URA_PCH state:
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
 - 4> proceed as below.

If the UE was in CELL_FACH state upon reception of the reconfiguration message and remains in CELL_FACH state, the UE shall:

- 1> if the IE "Frequency info" is included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4] on that frequency;
 - 2> if the UE finds a suitable UTRA cell on that frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
 - 4> when the cell update procedure completed successfully:
 - 5> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.
 - 2> else, if the UE can not find a suitable UTRA cell on that frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> when the cell update procedure completed successfully:
 - 4> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.

- 1> if the IE "Frequency info" is not included in the received reconfiguration message:
 - 2> if the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD) is included the UE shall either:
 - 3> ignore the content of the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD) and proceed as below;
 - 2> or:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CPOCH info" (for TDD), and it is different from the current cell:
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> when the cell update procedure completed successfully:
 - 5> if the UE is in CELL_PCH or URA_PCH state, initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission" and proceed as below.

If after state transition the UE enters CELL_PCH or URA_PCH state, the UE shall:

- 1> if the IE "UTRAN DRX cycle length coefficient" is not included in the same message:
 - 2> set the variable INVALID_CONFIGURATION to TRUE.

The UE shall transmit a response message as specified in subclause 8.2.2.4, setting the information elements as specified below. The UE shall:

- 1> if the received reconfiguration message included the IE "Downlink counter synchronisation info"; or
- 1> if the received reconfiguration message is a RADIO BEARER RECONFIGURATION and the IE "New U-RNTI" is included:
 - 2> if the variable PDCP_SN_INFO is empty:
 - 3> configure the corresponding RLC entity for all AM and UM radio bearers and AM and UM signalling radio bearers except RB2 to "stop".
 - 2> else:
 - 3> configure the RLC entity for signalling radio bearers RB1, RB3 and RB4 to "stop";
 - 3> configure the RLC entity for UM and AM radio bearers for which the IE "PDCP SN Info" is not included to "stop".
 - 2> re-establish RB2;
 - 2> for the downlink and the uplink, apply the ciphering configuration as follows:
 - 3> if the received re-configuration message included the IE "Ciphering Mode Info":
 - 4> use the ciphering configuration in the received message when transmitting the response message.
 - 3> if the ciphering configuration for RB2 from a previously received SECURITY MODE COMMAND has not yet been applied because the activation times not having been reached:
 - 4> if the previous SECURITY MODE COMMAND was received due to new keys being received:
 - 5> consider the new ciphering configuration to include the received new keys;
 - 5> initialise the HFN component of the uplink COUNT-C and downlink COUNT-C of SRB2 as indicated in subclause 8.1.12.3.1.
 - 4> if the ciphering configuration for RB2 from a previously received SECURITY MODE COMMAND has not yet been applied because of the corresponding activation times not having been reached and the previous SECURITY MODE COMMAND caused a change in LATEST_CONFIGURED_CN_DOMAIN:

- 5> consider the new ciphering configuration to include the keys associated with the LATEST_CONFIGURED_CN_DOMAIN;
- 5> initialise the HFN component of the uplink COUNT-C and downlink COUNT-C of SRB2 to the most recently transmitted IE "START list" or IE "START" for the LATEST_CONFIGURED_CN_DOMAIN at the reception of the previous SECURITY MODE COMMAND.
- 4> apply the new ciphering configuration immediately following RLC re-establishment.
- 3> else:
 - 4> continue using the current ciphering configuration.
- 2> set the new uplink and downlink component of COUNT-C HFN of RB2 to MAX(uplink HFN of RB2, downlink component of COUNT-C HFN of RB2);
- 2> increment by one the downlink and uplink HFN values for RB2;
- 2> calculate the START value according to subclause 8.5.9;
- 2> include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info".
- 1> if the received reconfiguration message did not include the IE "Downlink counter synchronisation info":
 - 2> if the variable START_VALUE_TO_TRANSMIT is set:
 - 3> include and set the IE "START" to the value of that variable.
 - 2> if the variable START_VALUE_TO_TRANSMIT is not set and the IE "New U-RNTI" is included:
 - 3> calculate the START value according to subclause 8.5.9;
 - 3> include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info".
 - 2> if the received reconfiguration message caused a change in the RLC size for any RB using RLC-AM:
 - 3> calculate the START value according to subclause 8.5.9;
 - 3> include the calculated START values for the CN domain associated with the corresponding RB identity in the IE "START list" in the IE "Uplink counter synchronisation info".
- 1> if the received reconfiguration message contained the IE "Ciphering mode info" or contained the IE "Integrity protection mode info":
 - 2> set the IE "Status" in the variable SECURITY_MODIFICATION for all the CN domains in the variable SECURITY_MODIFICATION to "Affected".
- 1> if the received reconfiguration message contained the IE "Ciphering mode info":
 - 2> if the reconfiguration message is not used to perform SRNS relocation with change of ciphering algorithm:
 - 3> the UE behaviour is not specified.
 - 2> if the message is used to perform a timing re-initialised hard handover:
 - 3> if IE "Ciphering activation time for DPCH" is included:
 - 4> the UE behaviour is not specified.
 - 2> else:
 - 3> if the reconfiguration message is used to setup radio bearer(s) using RLC-TM; or
 - 3> if radio bearer(s) using RLC-TM already exist:

- 4> if IE "Ciphering activation time for DPCH" is not included:
 - 5> the UE behaviour is not specified.
- 2> include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.
- 1> if the received reconfiguration message did not contain the IE "Ciphering activation time for DPCH" in IE "Ciphering mode info":
 - 2> if prior to this procedure there exist no transparent mode RLC radio bearers:
 - 3> if, at the conclusion of this procedure, the UE will be in CELL_DCH state; and
 - 3> if, at the conclusion of this procedure, at least one transparent mode RLC radio bearer exists:
 - 4> include the IE "COUNT-C activation time" and specify a CFN value for this IE that is a multiple of 8 frames ($CFN \bmod 8 = 0$) and lies at least 200 frames ahead of the CFN in which the response message is first transmitted.

NOTE: UTRAN should not include the IE "Ciphering mode info" in any reconfiguration message unless it is also used to perform an SRNS relocation with change of ciphering algorithm.

- 1> set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- 1> clear that entry;
- 1> if the variable PDCP_SN_INFO is not empty:
 - 2> include the IE "RB with PDCP information list" and set it to the value of the variable PDCP_SN_INFO.
- 1> in TDD, if the procedure is used to perform a handover to a cell where timing advance is enabled, and the UE can calculate the timing advance value in the new cell (i.e. in a synchronous TDD network):
 - 2> set the IE "Uplink Timing Advance" according to subclause 8.6.6.26.
- 1> if the IE "Integrity protection mode info" was present in the received reconfiguration message:
 - 2> start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message.

If after state transition the UE enters URA_PCH state, the UE shall, after the state transition and transmission of the response message:

- 1> if the IE "Frequency info" is included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4] on that frequency.
- 1> if the IE "Frequency info" is not included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4].
- 1> prohibit periodical status transmission in RLC;
- 1> remove any C-RNTI from MAC;
- 1> clear the variable C_RNTI;
- 1> start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in the variable TIMERS_AND_CONSTANTS;
- 1> select Secondary CCPCH according to subclause 8.5.19;
- 1> if the IE "UTRAN DRX cycle length coefficient" is included in the same message:

- 2> use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2.
- 1> if the criteria for URA update caused by "URA reselection" according to subclause 8.3.1 are fulfilled after cell selection:
 - 2> initiate a URA update procedure according to subclause 8.3.1 using the cause "URA reselection";
 - 2> when the URA update procedure is successfully completed:
 - 3> the procedure ends.

If after state transition the UE enters CELL_PCH state from CELL_DCH state, the UE shall, after the state transition and transmission of the response message:

- 1> if the IE "Frequency info" is included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4] on that frequency.
 - 2> if the UE finds a suitable UTRA cell on that frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> proceed as below.
 - 2> else, if the UE can not find a suitable UTRA cell on that frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> proceed as below.
- 1> if the IE "Frequency info" is not included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4].
 - 2> if the UE finds a suitable UTRA cell on the current frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> proceed as below.
 - 2> else, if the UE can not find a suitable UTRA cell on the current frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> proceed as below.
- 1> prohibit periodical status transmission in RLC;
- 1> remove any C-RNTI from MAC;
- 1> clear the variable C_RNTI;
- 1> start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in the variable TIMERS_AND_CONSTANTS;

- 1> select Secondary CCPCH according to subclause 8.5.19;
- 1> if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
 - 2> use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2.
- 1> the procedure ends.

If after state transition the UE enters CELL_PCH state from CELL_FACH state, the UE shall, after the state transition and transmission of the response message:

- 1> if the IE "Frequency info" is included in the received reconfiguration message:
 - 2> select a suitable UTRA cell according to [4] on that frequency.
 - 2> if the UE finds a suitable UTRA cell on that frequency:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
 - 4> proceed as below.
 - 2> else, if the UE can not find a suitable UTRA cell on that frequency but it finds a suitable UTRA cell on another frequency:
 - 3> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 3> proceed as below.
- 1> if the IE "Frequency info" is not included in the received reconfiguration message:
 - 2> if the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD) is included the UE shall either:
 - 3> ignore the content of the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD) and proceed as below;
 - 2> or:
 - 3> if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CPCH info" (for TDD), and it is different from the current cell:
 - 4> initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
 - 4> proceed as below.
- 1> prohibit periodical status transmission in RLC;
- 1> remove any C-RNTI from MAC;
- 1> clear the variable C_RNTI;
- 1> start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in the variable TIMERS_AND_CONSTANTS;
- 1> select Secondary CCPCH according to subclause 8.5.19;
- 1> if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
 - 2> use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2.

1> the procedure ends.

8.5.21 Actions related to Radio Bearer mapping

When the UE receives the IE "RB mapping info" and/or the IE "Transport format set", when the UE performs a cell reselection or a state transition, or when the UE releases a RB, the UE shall for each of the configured Radio Bearers:

- 1> upon moving to CELL_FACH after detecting a radio link failure (see subclause 8.5.6) and upon subsequent cell reselections until the first successfully completed cell update procedure, perform the actions defined in the remainder of this subclause only for signalling radio bearers;
- 1> configure the MAC with the appropriate transport format set (with computed transport block sizes) for the transport channel used by that RB;
- 1> determine the sets of RLC sizes that apply to the logical channels used by that RB, based on the IEs "RLC size list" and/or the IEs "Logical Channel List" included in the applicable "Transport format set" (either the ones received in the same message or the ones stored if none were received);
- 1> in case the selected multiplexing option is a multiplexing option on RACH:
 - 2> ignore the RLC size indexes that do not correspond to any RLC size within the Transport Format Set stored for RACH.
 - 2> if there is no remaining RLC size index corresponding to an RLC size within the Transport Format Set stored for RACH:
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
- 1> if RACH is the transport channel to be used on the uplink, if that RB has a multiplexing option on RACH and if it is using AM:
 - 2> apply the largest size amongst the ones derived according to the previous bullet for the RLC size (or RLC sizes in case the RB is realised using two logical channels) for the corresponding RLC entity.

NOTE: The IE "RB mapping info" is only included in the IE "Predefined RB configurations" in system information when used for Inter-RAT handover to UTRAN and there is no AM RLC size change involved in this case.

- 1> if that RB is using AM and the RLC size applicable to the [uplink](#) logical channel transporting data PDUs is different from the one derived from the previously stored configuration:
 - 2> re-establish the corresponding RLC entity;
 - 2> configure the corresponding RLC entity with the new [uplink](#) RLC size;
 - 2> for each AM RLC radio bearer in the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS whose RLC size is changed; and
 - 2> for each AM RLC signalling radio bearer in the CN domain as indicated in the IE "CN domain identity" in the variable LATEST_CONFIGURED_CN_DOMAIN whose RLC size is changed:
 - 3> if the IE "Status" in the variable CIPHERING_STATUS of this CN domain is set to "Started":
 - 4> if the information causing the RLC re-establishment was included in system information:
 - 5> set the HFN values for the corresponding RLC entity equal to the value of the IE "START" for this CN domain that will be included in the CELL UPDATE message following cell reselection.

NOTE: Since the UE cannot predict the START value at the time of the next CELL UPDATE transmission in the future, UTRAN should desist from changing the RLC size for a signalling radio bearer within a cell. Other than this case the change in RLC size for a signalling radio bearer is known to the UE when reading system information following cell reselection.

- 4> if the RLC re-establishment is caused by a CELL UPDATE CONFIRM:
 - 5> set the HFN values for the corresponding RLC entity equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for this CN domain.
- 4> if the RLC re-establishment is caused by a reconfiguration message:
 - 5> set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the reconfiguration complete message for this CN domain.

NOTE: If the UTRAN modifies the RLC size for RB2 on any reconfiguration message or Cell Update Confirm message, the UE behaviour is unspecified in this version of the specification.

NOTE: The UE shall not rely on the configured Transport Formats to determine the RLC sizes to be used in downlink for a particular logical channel. This size can be signalled explicitly in the RLC Info IE.

- 1> if that RB is using UM:
 - 2> indicate the largest ~~applicable~~-RLC size applicable for uplink to the corresponding RLC entity.
- 1> configure MAC multiplexing according to the selected multiplexing option (MAC multiplexing shall only be configured for a logical channel if the transport channel it is mapped on according to the selected multiplexing option is the same as the transport channel another logical channel is mapped on according to the multiplexing option selected for it);
- 1> configure the MAC with the logical channel priorities according to selected multiplexing option;
- 1> configure the MAC with the set of applicable RLC Sizes for each of the logical channels used for that RB;
- 1> if there is no multiplexing option applicable for the transport channels to be used:
 - 2> set the variable INVALID_CONFIGURATION to TRUE.
- 1> if there is more than one multiplexing option applicable for the transport channels to be used:
 - 2> set the variable INVALID_CONFIGURATION to TRUE.

If upon cell re-selection or upon moving to CELL_FACH after detecting a radio link failure the UE sets variable INVALID_CONFIGURATION to TRUE as a result of the actions defined in this subclause, the UE should:

- 1> move to idle mode;
- 1> release (locally) the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and the established radio access bearers (as stored in the variable ESTABLISHED_RABS) and indicate this to upper layers;
- 1> perform other actions when entering idle mode from connected mode as specified in subclause 8.5.2.

8.6.4.8 RB mapping info

If the IE "RB mapping info" is included, the UE shall:

- 1> for each multiplexing option of the RB:
 - 2> if a transport channel that would not exist as a result of the message (i.e. removed in the same message in IE "Deleted DL TrCH information" and IE "Deleted UL TrCH information") is referred to:
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
 - 2> if a multiplexing option that maps a logical channel corresponding to a TM-RLC entity onto RACH, CPCH, FACH or DSCH or HS-DSCH is included:

- 3> set the variable INVALID_CONFIGURATION to TRUE.
- 2> if the multiplexing option realises the radio bearer on the uplink (resp. on the downlink) using two logical channels with different values of the IE "Uplink transport channel type" (resp. of the IE "Downlink transport channel type"):
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
 - 2> if that RB is using TM and the IE "Segmentation indication" is set to TRUE and, based on the multiplexing configuration resulting from this message, the logical channel corresponding to it is mapped onto the same transport channel as another logical channel:
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
 - 2> if the transport channel considered in that multiplexing option is different from RACH and if that RB is using AM and the set of RLC sizes applicable to the [uplink](#) logical channel transferring data PDUs has more than one element not equal to zero:
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
 - 2> if that RB is using UM or TM and the multiplexing option realises it using two logical channels:
 - 3> set the variable INVALID_CONFIGURATION to TRUE.
 - 2> for each logical channel in that multiplexing option:
 - 3> if the value of the IE "RLC size list" is set to "Explicit list":
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value (index) of any IE "RLC size index" in the IE "Explicit list" does not correspond to an "RLC size" in the IE transport format set of that transport channel given in the message; or
 - 4> if the transport channel this logical channel is mapped on in this multiplexing option is different from RACH, and if a "Transport format set" for that transport channel is not included in the same message, and the value (index) of any IE "RLC size index" in the IE "Explicit list" does not correspond to an "RLC size" in the stored transport format set of that transport channel; or
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured":
 - 5> set the variable INVALID_CONFIGURATION to TRUE.
 - 3> if the value of the IE "RLC size list" is set to "All":
 - 4> if the transport channel this logical channel is mapped on is RACH; or
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured":
 - 5> set the variable INVALID_CONFIGURATION to TRUE.
 - 3> if the value of the IE "RLC size list" is set to "Configured":
 - 4> if the transport channel this logical channel is mapped on is RACH; or

- 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and for none of the RLC sizes defined for that transport channel in the "Transport format set", the "Logical Channel List" is set to "All" or given as an "Explicit List" which contains this logical channel; or
 - 4> if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and for none of the RLC sizes defined in the transport format set stored for that transport channel, the "Logical Channel List" is set to "All" or given as an "Explicit List" which contains this logical channel:
 - 5> set the variable INVALID_CONFIGURATION to TRUE.
- 1> if, as a result of the message this IE is included in, several radio bearers can be mapped onto the same transport channel, and the IE "Logical Channel Identity" was not included in the RB mapping info of any of those radio bearers for a multiplexing option on that transport channel or the same "Logical Channel Identity" was used more than once in the RB mapping info of those radio bearers for the multiplexing options on that transport channel:
- 2> set the variable INVALID_CONFIGURATION to TRUE.
- 1> if the "RB mapping info" is considered as valid according to the rules above:
- 2> delete all previously stored multiplexing options for that radio bearer;
 - 2> store each new multiplexing option for that radio bearer;
 - 2> perform the actions as specified in subclause 8.5.21.
- 1> if the IE "Uplink transport channel type" is set to the value "RACH":
- 2> in FDD:
 - 3> refer the IE "RLC size index" to the RACH Transport Format Set of the first PRACH received in the IE "PRACH system information list" received in System Information Block 5 or System Information Block 6.
 - 2> in TDD:
 - 3> use the first Transport Format of the PRACH of the IE "PRACH system information list" at the position equal to the value in the IE "RLC size index".

In case IE "RLC info" includes IE "Downlink RLC mode" ("DL RLC logical channel info" is mandatory present) but IE "Number of downlink RLC logical channels" is absent in the corresponding IE "RB mapping info", the parameter values are exactly the same as for the corresponding UL logical channels. In case two multiplexing options are specified for the UL, the first options shall be used as default for the DL. As regards the IE "Channel type", the following rule should be applied to derive the DL channel type from the UL channel included in the IE:

Channel used in UL	DL channel type implied by "same as"
DCH	DCH
RACH	FACH
CPCH	FACH
USCH	DSCH

If ciphering is applied, UTRAN should not map Transparent Mode RBs of different CN domains on the same transport channel and it should not map transparent mode SRBs and RBs onto the same transport channel. In such cases the UE behaviour is not specified.

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 "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> re-establish the corresponding RLC entity:

3> configure the corresponding RLC entity with the new downlink RLC PDU size:

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> set the HFN values for the corresponding RLC entity equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for this CN domain.

4> if the RLC re-establishment is caused by a reconfiguration message:

5> set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the reconfiguration complete message for 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".

8.6.5.1 Transport Format Set

If the IE "Transport format set" is included, the UE shall:

- 1> if the transport format set is a RACH TFS received in System Information Block type 5 or 6, and CHOICE "Logical Channel List" has a value different from "Configured":
 - 2> ignore that System Information Block.
- 1> if the transport format set for a downlink transport channel is received in a System Information Block, and CHOICE "Logical Channel List" has a value different from 'ALL':
 - 2> ignore that System Information Block.
- 1> if the transport format set for a downlink transport channel is received in a message on a DCCH, and CHOICE "Logical Channel List" has a value different from 'ALL':
 - 2> keep the transport format set if this exists for that transport channel;
 - 2> set the variable INVALID_CONFIGURATION to TRUE.
- 1> if the value of any IE "RB identity" (and "Logical Channel" for RBs using two UL logical channels) in the IE "Logical channel list" does not correspond to a logical channel indicated to be mapped onto this transport channel in any RB multiplexing option (either included in the same message or previously stored and not changed by this message); or
- 1> if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is set to "Configured" while it is set to "All" or given as an "Explicit List" for any other RLC size; or
- 1> if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is set to "All" and for any logical channel mapped to this transport channel, the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is not set to "Configured"; or
- 1> if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is given as an "Explicit List" that contains a logical channel for which the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is not set to "Configured"; or
- 1> if the "Logical Channel List" for all the RLC sizes defined for that transport channel are given as "Explicit List" and if one of the logical channels mapped onto this transport channel is not included in any of those lists; or
- 1> if the "Logical Channel List" for the RLC sizes defined for that transport channel is set to "Configured" and for any logical channel mapped onto that transport channel, the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is also set to "Configured"; or
- 1> if the IE "Transport Format Set" was not received within the IE "PRACH system information list" and if the "Logical Channel List" for the RLC sizes defined for that transport channel is set to "Configured" and for any logical channel mapped onto that transport channel, the "RLC size list" (either provided in the IE "RB mapping

info" if included in the same message, or stored) is given as an "Explicit List" that includes an "RLC size index" that does not correspond to any RLC size in this "Transport Format Set"; or

1> if the IE "Transport Format Set" was not received within the IE "PRACH system information list", and if that RB is using AM and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element not equal to zero:

2> keep the transport format set if this exists for that transport channel;

2> set the variable INVALID_CONFIGURATION to TRUE.

1> if the total number of configured transport formats for the transport channel exceeds maxTF:

2> keep the transport format set if this exists for that transport channel;

2> set the variable INVALID_CONFIGURATION to TRUE.

1> if the IE "Transport format set" is considered as valid according to the rules above:

2> remove a previously stored transport format set if this exists for that transport channel;

2> store the transport format set for that transport channel;

2> consider the first instance of the parameter *Number of TBs and TTI List* within the *Dynamic transport format information* to correspond to transport format 0 for this transport channel, the second to transport format 1 and so on;

2> if the IE "Transport format Set" has the choice "Transport channel type" set to "Dedicated transport channel":

3> calculate the transport block size for all transport formats in the TFS using the following

$$\begin{array}{ll} \text{TB size} = \text{RLC size} + \text{MAC header size} & \text{if "RLC size"} \neq 0, \\ \text{TB size} = 0 & \text{if "RLC size"} = 0, \end{array}$$

where:

- MAC header size is calculated according to [15] if MAC multiplexing is used. Otherwise it is 0 bits;

- 'RLC size' reflects the RLC PDU size.

2> if the IE "Transport format Set" has the choice "Transport channel type" set to "Common transport channel":

3> in FDD:

4> for transport channels other than DSCH calculate the transport block size for all transport formats in the TFS using the following:

$$\text{TB size} = \text{RLC size}.$$

4> for DSCH transport channels calculate the transport block size for all transport formats in the TFS using the following:

$$\begin{array}{ll} \text{TB size} = \text{RLC size} + \text{MAC header size} & \text{if "RLC size"} \neq 0, \\ \text{TB size} = 0 & \text{if "RLC size"} = 0, \end{array}$$

where:

- MAC header size is calculated according to [15];

- 'RLC size' reflects the RLC PDU size.

3> for TDD calculate the transport block size for all transport formats in the TFS using the following:

$$\text{TB size} = \text{RLC size}.$$

2> if the IE "Number of Transport blocks" $\neq 0$ and IE "RLC size" = 0, no RLC PDU data exists but only parity bits exist for that transport format;

- 2> if the IE "Number of Transport blocks" = 0, neither RLC PDU neither data nor parity bits exist for that transport format;
- 2> perform the actions as specified in subclause 8.5.21.

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

10.3.4.23 RLC info

Information Element/Group name	Need	Multi	Type and reference	Semantics description	
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	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	
>AM RLC				RLC shall be used	
>>DL RLC PDU size	MP		Integer(0..4992)	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
>TM RLC					
>>Segmentation indication	MP		Boolean	TRUE indicates that segmentation is performed.	

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

[...]

```
DL-AM-RLC-Mode ::= SEQUENCE {
    inSequenceDelivery      BOOLEAN,
    receivingWindowSize     ReceivingWindowSize,
    dl-RLC-StatusInfo      DL-RLC-StatusInfo
}
```

```
DL-AM-RLC-Mode-r5 ::= SEQUENCE {
    dl-RLC-PDU-size         DataModeRLC-SizeInfoType1DL-RLC-PDU-size
    inSequenceDelivery      BOOLEAN,
    receivingWindowSize     ReceivingWindowSize,
    dl-RLC-StatusInfo      DL-RLC-StatusInfo
}
```

[...]

```
DL-RLC-PDU-size ::= INTEGER(0..4992)
```

[...]

```
DL-RLC-Mode ::= CHOICE {
    dl-AM-RLC-Mode      DL-AM-RLC-Mode,
    dl-UM-RLC-Mode      NULL,
}
```

```

    dl-TM-RLC-Mode                DL-TM-RLC-Mode
  }
  DL-RLC-Mode-r5 ::=                CHOICE {
    dl-AM-RLC-Mode-r5             DL-AM-RLC-Mode-r5,
    dl-UM-RLC-Mode-r5             DL-UM-RLC-Mode-r5,
    dl-TM-RLC-Mode                 DL-TM-RLC-Mode
  }
  [...]

  DL-UM-RLC-LI-size ::=            ENUMERATED {
    size7, size15 }
  DL-UM-RLC-Mode-r5 ::=           SEQUENCE {
    dl-UM-RLC-LI-size             DL-UM-RLC-LI-size
  }
  [...]

  RB-InformationReconfig-r5 ::=    SEQUENCE {
    rb-Identity                    RB-Identity,
    pdcp-Info                      PDCP-InfoReconfig-r4           OPTIONAL,
    pdcp-SN-Info                   PDCP-SN-Info           OPTIONAL,
    rlc-Info                       RLC-Info-r5             OPTIONAL,
    rb-MappingInfo                 RB-MappingInfo-r5       OPTIONAL,
    rb-StopContinue                RB-StopContinue      OPTIONAL
  }
  [...]

  RB-InformationSetup-r5 ::=       SEQUENCE {
    rb-Identity                    RB-Identity,
    pdcp-Info                      PDCP-Info-r4           OPTIONAL,
    rlc-InfoChoice                 RLC-InfoChoice-r5,
    rb-MappingInfo                 RB-MappingInfo-r5
  }
  [...]

  RLC-Info ::=                    SEQUENCE {
    ul-RLC-Mode                   UL-RLC-Mode           OPTIONAL,
    dl-RLC-Mode                   DL-RLC-Mode           OPTIONAL
  }
  RLC-Info-r5 ::=                 SEQUENCE {
    ul-RLC-Mode                   UL-RLC-Mode           OPTIONAL,
    dl-RLC-Mode-r5               DL-RLC-Mode-r5       OPTIONAL
  }

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

  SRB-InformationSetup-r5 ::=      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-r5
  }
  [...]

```