

Source: TSG-RAN WG2.

Title: CRs (Rel-6) on MBMS corrections (25.322 and 25.323)

The following CRs are in RP-050315:

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Workitem
25.322	0273	-	Rel-6	Clarification on a Transmitter Constraint	F	6.3.0	6.4.0	R2-051132	MBMS-RAN
25.322	0279	1	Rel-6	Clarification of the "Out of sequence SDU delivery"	F	6.3.0	6.4.0	R2-051571	MBMS-RAN
25.322	0281	-	Rel-6	Correction to Out Of Sequence Delivery	F	6.3.0	6.4.0	R2-051565	MBMS-RAN
25.322	0282	-	Rel-6	Clarification on operations when UE MCCH RLC entity is re-established and OSD_Window_Size is reconfigured	F	6.3.0	6.4.0	R2-051564	MBMS-RAN
25.323	0060	1	Rel-6	Introduction of MBMS	B	6.1.0	6.2.0	R2- 051566	MBMS-RAN

CHANGE REQUEST

⌘ **25.322 CR 0273** ⌘ rev ⌘ Current version: **6.3.0** ⌘

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

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

Title:	⌘ Clarification on a Transmitter Constraint		
Source:	⌘ RAN WG2		
Work item code:	⌘ MBMS-RAN	Date:	⌘ 04/04/2005
Category:	⌘ F	Release:	⌘ Rel-6
	<i>Use <u>one</u> of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		<i>Use <u>one</u> of the following releases:</i> Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	⌘ When UM out of sequence SDU delivery is configured there is a constraint on transmitter operation if duplicate transfer of MBMS Access Information is to be avoided. There is currently no record of this constraint in the TS.
Summary of change:	⌘ A note is added to section 11.2.3.2 indicating that, when configured for UM out of sequence SDU delivery, the transmitting RLC should not: transmit within a single PDU, SDUs or fractions of SDUs that contain MBMS Access Information messages with the special length indicator "0000 000", "0000 0000 0000 000", and "1111 1111 1111 011"
Consequences if not approved:	⌘ There is a risk that the transmitting RLC may cause duplicate transfer of MBMS Access Information.

Clauses affected:	⌘ 11.2.3.2										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications ⌘ Test specifications ⌘ O&M Specifications ⌘	
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Other comments:	⌘										

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- 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.

11.2.3.2 Out of sequence SDU delivery

To enable the recovery of SDUs from UMD PDUs that are received in different transmissions the receiving function shall store PDUs until all SDUs that are associated with the PDU can be reconstructed or until they are discarded in accordance with the procedures described below. SDUs are transferred to the upper layers as soon as all PDUs that contain the SDU (and any associated PDU containing the special "Length Indicator" "0000 000" or "0000 0000 0000 000") have been received.

Upon delivery of a set of UMD PDUs from the lower layer, the Receiver shall for each PDU (in the following SN denotes the sequence number of each PDU):

- If the PDU is the first PDU received:
 - VR(UOH) shall be assigned the value SN-1.
 - if $VR(UOH) \geq SN > VR(UOH) - OSD_Window_Size$ then:
 - if a PDU with sequence number SN is already stored:
 - discard the PDU;
 - else:
 - store the PDU in sequence number order.
 - else:
 - $VR(UOH) = SN$ thereby advancing the storage window;
 - store the PDU in sequence number order;
 - remove from storage any PDUs whose sequence numbers, SN, are outside of the storage window $VR(UOH) \geq SN > VR(UOH) - OSD_Window_Size$;
 - if Timer_OSD is active then Timer_OSD shall be stopped;
 - Timer_OSD shall be started.
 - if PDU with sequence number SN was stored:
 - taking account of any consecutively numbered stored PDUs (with lower or higher indexes) and using the values of the "Length Indicators", if any, in each PDU:
 - re-assemble the PDUs into SDUs;
 - submit the RLC SDUs to upper layers through the UM-SAP;
 - remove from storage any PDUs for which all associated SDUs have been re-assembled. PDUs containing the special length indicators "0000 000", "0000 0000 0000 000" or "1111 1111 1111 011" should not be deleted unless SDUs associated with this length indicator have been recovered or will be capable of recovery.
- NOTE: If PDUs are removed from storage after SDU recovery then retransmitted PDUs may result in the duplicate transfer of SDUs to the higher layers.
- if Timer_OSD expires:
 - remove from storage all stored PDUs.

NOTE1: When configured for out of sequence SDU delivery the transmitter shall not, following transmission of a PDU with sequence number SN, including retransmissions, permit VT(US) to advance beyond $128 + SN - OSD_Window_Size$ within a time equal to the duration of Timer_OSD.

NOTE2: The transmitter should not concatenate within a single PDU, SDUs or fractions of SDUs that contain MBMS Access Information messages with SDUs or fractions of SDUs that contain other MCCH message types.

NOTE3: The transmitter should not transmit within a single PDU, SDUs or fractions of SDUs that contain MBMS Access Information messages with the special length indicator “0000 000”, “0000 0000 0000 000”, and “1111 1111 1111 011”

CHANGE REQUEST

25.322 CR 0279 # rev 1 # Current version: 6.3.0

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

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

Title:	# Clarification of the "Out of sequence SDU delivery"		
Source:	# RAN WG2		
Work item code:	# MBMS-RAN	Date:	# 12/05/2005
Category:	# F	Release:	# Rel-6
	<p>Use <u>one</u> of the following categories:</p> <p>F (correction)</p> <p>A (corresponds to a correction in an earlier release)</p> <p>B (addition of feature),</p> <p>C (functional modification of feature)</p> <p>D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>		<p>Use <u>one</u> of the following releases:</p> <p>Ph2 (GSM Phase 2)</p> <p>R96 (Release 1996)</p> <p>R97 (Release 1997)</p> <p>R98 (Release 1998)</p> <p>R99 (Release 1999)</p> <p>Rel-4 (Release 4)</p> <p>Rel-5 (Release 5)</p> <p>Rel-6 (Release 6)</p> <p>Rel-7 (Release 7)</p>

Reason for change:	# The assignment of the value SN to VR(UOH) advancing the OSD storage window is not clearly specified.
	The NOTE 1 does not clearly reflect that the retransmissions of a certain PDU need to be taken into account when determining the rate of SN advancements on the transmitting side. The NOTE 1 also contains a small error in the numerical expression restricting the advancement of VT(US).
	The new NOTE is needed to reflect how the transmitter could be implemented to handle the transmission of ACCESS INFORMATION messages.
Summary of change:	# The assignment of the value SN to VR(UOH) is clarified.
	The NOTE 1 is redrafted to reflect that the transmitter may need to take the possibility of undetected protocol errors on the receiver side into account. The numerical expression is corrected.
	A NOTE 3 is added to clarify a possible transmitter behaviour at the transmission of ACCESS INFORMATION messages.
	Certain editorial corrections.
Consequences if not approved:	# If not approved, the assignment of the value SN to VR(UOH) is not clear. The NOTE 1 can be misinterpreted. It is unclear how the transmitter could handle the transmission of ACCESS INFORMATION messages.

Clauses affected:	# 11.2.3.2
	<input type="checkbox"/> Y <input type="checkbox"/> N

Other specs affected:	⌘	<input checked="" type="checkbox"/>	Other core specifications	⌘	
		<input checked="" type="checkbox"/>	Test specifications		
		<input checked="" type="checkbox"/>	O&M Specifications		
Other comments:	⌘				

11.2.3.2 Out of sequence SDU delivery

To enable the recovery of SDUs from UMD PDUs that are received in different transmissions the receiving function shall store PDUs until all SDUs that are associated with the PDU can be reconstructed or until they are discarded in accordance with the procedures described below. SDUs are transferred to the upper layers as soon as all PDUs that contain the SDU (and any associated PDU containing the special "Length Indicator" "0000 000 or "0000 0000 0000 000") have been received.

Upon delivery of a set of UMD PDUs from the lower layer, the Receiver shall for each PDU (in the following SN denotes the sequence number of each PDU):

- If the PDU is the first PDU received:
 - VR(UOH) shall be assigned the value SN-1.
- if $VR(UOH) \geq SN > VR(UOH) - OSD_Window_Size$ then:
 - if a PDU with sequence number SN is already stored:
 - discard the PDU;
 - else:
 - store the PDU in sequence number order.
- else:
 - VR(UOH) ~~shall be assigned the value~~ SN, thereby advancing the storage window;
 - store the PDU in sequence number order;
 - remove from storage any PDUs whose sequence numbers, SN, are outside of the storage window $VR(UOH) \geq SN > VR(UOH) - OSD_Window_Size$;
 - if Timer_OSD is active then Timer_OSD shall be stopped;
 - Timer_OSD shall be started.
- if PDU with sequence number SN was stored:
 - taking account of any consecutively numbered stored PDUs (with lower or higher indexes) and using the values of the "Length Indicators", if any, in each PDU:
 - re-assemble the PDUs into SDUs;
 - submit the RLC SDUs to upper layers through the UM-SAP;
 - remove from storage any PDUs for which all associated SDUs have been re-assembled. PDUs containing the special length indicators "0000 000", "0000 0000 0000 000" or "1111 1111 1111 011" should not be deleted unless SDUs associated with this length indicator have been recovered or will be capable of recovery.

NOTE 0: If PDUs are removed from storage after SDU recovery then retransmitted PDUs may result in the duplicate transfer of SDUs to the higher layers. [\[Note to the editor: the paragraph style is changed.\]](#)

- if Timer_OSD expires:
 - remove from storage all stored PDUs.

NOTE 1: [When configured for out of sequence SDU delivery, the transmitter should consider the possibility that a loss of a number of \$128 - OSD_Window_Size\$ consecutive^y numbered PDUs may result in an undetected protocol error in the receiver, if the transmit state variable VT\(US\), at the end of a time interval equal to the duration of Timer_OSD, is greater than \$128 + SN - OSD_Window_Size + 1\$, where SN is the lowest sequence number of any PDU transmitted or retransmitted within that time interval.](#)

~~NOTE1: When configured for out of sequence SDU delivery the transmitter shall not, following transmission of a PDU with sequence number SN, including retransmissions, permit VT(US) to advance beyond $128+SN-OSD_Window_Size$ within a time equal to the duration of Timer_OSD.~~

NOTE_2: The transmitter should not concatenate within a single PDU, SDUs or fractions of SDUs that contain MBMS Access Information messages with SDUs or fractions of SDUs that contain other MCCH message types. [\[Note to the editor: the paragraph style is changed.\]](#)

NOTE 3: SDUs are contained within consecutively numbered PDUs. To enable SDUs containing MBMS Access Information messages to be transmitted at their designated times, the transmitter may transmit PDUs out of sequence order.

CHANGE REQUEST

25.322 CR 0281 # rev - # Current version: 6.3.0

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

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

Title:	# Correction to Out Of Sequence Delivery		
Source:	# RAN WG2		
Work item code:	# MBMS-RAN	Date:	# 04/04/2005
Category:	# F	Release:	# Rel-6
	<i>Use one of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		<i>Use one of the following releases:</i> Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	# -For RLC SDUs to be recovered from RLC PDUs, not only all the segments of the SDUs but also length indicators that indicate the boundaries of SDUs are needed. But current text in TS 25.322 seems to suggest that RLC SDU can be reassembled from the RLC PDUs without the help of length indicator associated with the SDU. -The special length indicator that needs to be considered are "0000 000", "0000 0000 0000 000" and "1111 1111 1111 011". Current text in the specification omits "1111 1111 1111 011". -The terms used in other part of TS25.322 are "segments of SDU" and "Length Indicator indicating the end of the SDU". Alignment of terms is needed.
Summary of change:	# The sentence is modified that RLC SDU can be transferred to upper layers when all the segments of the SDU and the length indicator associated with the SDU are available.
Consequences if not approved:	# RLC SDU can not be properly disassembled and transferred to upper layer.

Clauses affected:	# 11.2.3.2										
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;">#</td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">#</td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">#</td> <td style="text-align: center;">X</td> </tr> </table>	Y	N	#	X	#	X	#	X	Other core specifications # Test specifications # O&M Specifications #	
Y	N										
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Other comments:	#										

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- 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.

11.2.3.2 Out of sequence SDU delivery

To enable the recovery of SDUs from UMD PDUs that are received in different transmissions the receiving function shall store PDUs until all SDUs that are associated with the PDU can be reconstructed or until they are discarded in accordance with the procedures described below. SDUs are transferred to the upper layers as soon as all PDUs that contain the [segments of the SDU and the "Length Indicator" indicating the end of the SDU](#)~~(and any associated PDU containing the special "Length Indicator" "0000 000" or "0000 0000 0000 000")~~ have been received.

Upon delivery of a set of UMD PDUs from the lower layer, the Receiver shall for each PDU (in the following SN denotes the sequence number of each PDU):

- If the PDU is the first PDU received:
 - VR(UOH) shall be assigned the value SN-1.
- if $VR(UOH) \geq SN > VR(UOH) - OSD_Window_Size$ then:
 - if a PDU with sequence number SN is already stored:
 - discard the PDU;
 - else:
 - store the PDU in sequence number order.
- else:
 - VR(UOH) = SN thereby advancing the storage window;
 - store the PDU in sequence number order;
 - remove from storage any PDUs whose sequence numbers, SN, are outside of the storage window $VR(UOH) \geq SN > VR(UOH) - OSD_Window_Size$;
 - if Timer_OSD is active then Timer_OSD shall be stopped;
 - Timer_OSD shall be started.
- if PDU with sequence number SN was stored:
 - taking account of any consecutively numbered stored PDUs (with lower or higher indexes) and using the values of the "Length Indicators", if any, in each PDU:
 - re-assemble the PDUs into SDUs;
 - submit the RLC SDUs to upper layers through the UM-SAP;
 - remove from storage any PDUs for which all associated SDUs have been re-assembled. PDUs containing the special length indicators "0000 000", "0000 0000 0000 000" or "1111 1111 1111 011" should not be deleted unless SDUs associated with this length indicator have been recovered or will be capable of recovery.

NOTE: If PDUs are removed from storage after SDU recovery then retransmitted PDUs may result in the duplicate transfer of SDUs to the higher layers.

- if Timer_OSD expires:
 - remove from storage all stored PDUs.

NOTE1: When configured for out of sequence SDU delivery the transmitter shall not, following transmission of a PDU with sequence number SN, including retransmissions, permit VT(US) to advance beyond $128+SN-OSD_Window_Size$ within a time equal to the duration of Timer_OSD.

NOTE2: The transmitter should not concatenate within a single PDU, SDUs or fractions of SDUs that contain MBMS Access Information messages with SDUs or fractions of SDUs that contain other MCCH message types.

CHANGE REQUEST

25.322 CR 0282 # rev - # Current version: 6.3.0

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

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

Title:	# Clarification on operations when UE MCCH RLC entity is re-established and OSD_Window_Size is reconfigured		
Source:	# RAN WG2		
Work item code:	# MBMS-RAN	Date:	# 13/05/2005
Category:	# F	Release:	# Rel-6
	<i>Use one of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		<i>Use one of the following releases:</i> Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	# When MCCH RLC UM entity re-establishment is performed, it is not clear that how the receiving entity should operate on the MCCH specific State Variable and timers. When the parameter OSD_Window_Size is reconfigured, the new value of OSD_Window_Size may be less than the former value and some PDUs may become out of the receiving window. In current specification, the UE behaviors in such cases are not clarified.
Summary of change:	# The changes are listed as follows: 1. It is clarified that the RLC entity shall stop all timers when UM RLC entity is re-established by upper layers. 2. It is clarified that VR(UOH) shall also be reset to its initial value when RLC UM entity is re-established. 3. When OSD_Window_Size is reconfigured, The UE behaviour is added into Section 9.7.9.
Consequences if not approved:	# An unnecessary timers may still be active when the UM RLC entity is re-established by upper layers. It will cause the UE to consume more power resource and the remaining PDUs will not be discarded. The former value of VR(UOH) may be kept when the MCCH receiving entity has been re-established. The PDUs out of the receiving window will still be stored in buffer, which will cause error SDU combination.

Clauses affected:	⌘	9.7.7, 11.2.3.2, 9.7.9										
Other specs affected:	⌘	<table border="1"><tr><td>Y</td><td>N</td></tr><tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr></table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘
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	Test specifications											
	O&M Specifications											
Other comments:	⌘											

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9.7.7 RLC re-establishment function for acknowledged and unacknowledged mode

RLC re-establishment is performed upon request by upper layers.

The RLC re-establishment function is applicable for AM or UM RLC. For UM, the whole RLC entity is re-established. For AM, upper layers may request re-establishment of the whole RLC entity or only the transmitting or receiving side of the RLC entity.

When an UM RLC entity is re-established by upper layers, the RLC entity shall:

- reset the state variables to their initial value;
- set the configurable parameters to their configured value;
- set the hyper frame number (HFN) to the value configured by upper layers;
- if it is a receiving UM RLC entity:
 - discard all UMD PDUs.
 - [stop all timers](#);
- if it is a transmitting UM RLC entity:
 - discard the RLC SDUs for which one or more segments have been submitted to a lower layer;
 - if requested:
 - inform the upper layers of the discarded SDUs.
 - not stop Timer_Discard if the RLC SDU is not discarded.

When the transmitting and/or receiving side of an AM RLC entity is re-established by upper layers, the RLC entity shall:

- if the receiving side of the RLC entity is re-established:
 - reset the state variables specified for the receiver in subclause 9.4 to their initial values;
 - set the configurable parameters applicable for the receiving side in subclause 9.6 to their configured values;
 - set the hyper frame number (HFN) in the receiving side (DL in the UE) to the value configured by upper layers;
 - discard the control PDUs in both transmitting and receiving side and the AMD PDUs in the receiving side.
- if the transmitting side of the RLC entity is re-established:
 - reset the state variables specified for the sender in subclause 9.4 to their initial values;
 - set the configurable parameters applicable for the transmitting side in subclause 9.6 to their configured values;
 - set the hyper frame number (HFN) in the transmitting side (UL in the UE) to the value configured by upper layers.
- if only the transmitter side of the RLC entity is re-established:
 - discard the control PDUs in both the transmitting and receiving side and all SDUs in the transmitting side that have been completely transmitted (the AMD PDUs containing segments of the SDU and the "Length Indicator" indicating the end of the SDU have been transmitted);
 - re-segment the SDUs that were not discarded into AMD PDUs with the configured RLC PDU size (that may be different from the size before the re-establishment).
- if both the transmitter and receiver side of the RLC entity is re-established:

- discard the control PDUs in both transmitting and receiving side and the AMD PDUs in the transmitting side.
- stop all timers described in subclause 9.5 except Timer_Poll_Periodic and Timer_Status_Periodic;
- discard all AMD PDUs and control PDUs in both the receiving side and the transmitting side of the RLC entity;
- if requested:
 - inform the upper layers of the discarded SDUs.

NOTE: If the TFC selection exchange has been initiated by sending the RLC Entity Info parameter to MAC, the RLC entity may delay the re-establishment function until the end of the next TTI.

/ Cut until the next modification **/**

9.7.9 Reconfiguration of RLC parameters by upper layers

The RLC parameters for an RLC entity may be reconfigured (modified) by upper layers.

When an RLC parameter is reconfigured by the upper layer, the UE shall:

- start using the reconfigured value of the RLC parameter.

If the parameter Configured_Rx_Window_Size is reconfigured:

- the UE shall update the state variable VR(MR), (see clause 9.4);
- for AMD PDUs with "Sequence Number" x such that $VR(MR) \leq x < VR(H)$:
 - the UE may discard these AMD PDUs:
 - consider the discarded AMD PDUs as not having been received.

If the parameter Configured_Tx_Window_Size is reconfigured:

- the UE shall set the state variable VT(WS) equal to the Configured_Tx_Window_Size;
- the UE shall update the state variable VT(MS), (see subclause 9.4);
- for AMD PDUs with "Sequence Number" x such that $VT(MS) \leq x < VT(S)$:
 - the UE shall not discard any AMD PDUs that are not positively acknowledged;
 - the UE may discard AMD PDUs that are positively acknowledged.

When the transmission window size or the reception window size is reconfigured the required buffer memory may temporarily exceed the size of the configured window and thus exceed the available buffer memory (see subclause 11.3.4.9).

If the parameter OSD_Window_Size is reconfigured:

- UE shall remove from storage any PDUs whose sequence numbers, SN, are outside of the storage window $VR(UOH) \geq SN > VR(UOH) - OSD_Window_Size$;

/ Cut until the next modification **/**

11.2.3.2 Out of sequence SDU delivery

To enable the recovery of SDUs from UMD PDUs that are received in different transmissions the receiving function shall store PDUs until all SDUs that are associated with the PDU can be reconstructed or until they are discarded in accordance with the procedures described below. SDUs are transferred to the upper layers as soon as all PDUs that contain the SDU

(and any associated PDU containing the special "Length Indicator" "0000 000 or "0000 0000 0000 000") have been received.

Upon delivery of a set of UMD PDUs from the lower layer, the Receiver shall for each PDU (in the following SN denotes the sequence number of each PDU):

- If the PDU is the first PDU received (after the receiving entity is established or re-established):
 - VR(UOH) shall be assigned the value SN-1.
 - if $VR(UOH) \geq SN > VR(UOH) - OSD_Window_Size$ then:
 - if a PDU with sequence number SN is already stored:
 - discard the PDU;
 - else:
 - store the PDU in sequence number order.
 - else:
 - $VR(UOH) = SN$ thereby advancing the storage window;
 - store the PDU in sequence number order;
 - remove from storage any PDUs whose sequence numbers, SN, are outside of the storage window $VR(UOH) \geq SN > VR(UOH) - OSD_Window_Size$;
 - if Timer_OSD is active then Timer_OSD shall be stopped;
 - Timer_OSD shall be started.
 - if PDU with sequence number SN was stored:
 - taking account of any consecutively numbered stored PDUs (with lower or higher indexes) and using the values of the "Length Indicators", if any, in each PDU:
 - re-assemble the PDUs into SDUs;
 - submit the RLC SDUs to upper layers through the UM-SAP;
 - remove from storage any PDUs for which all associated SDUs have been re-assembled. PDUs containing the special length indicators "0000 000", "0000 0000 0000 000" or "1111 1111 1111 011" should not be deleted unless SDUs associated with this length indicator have been recovered or will be capable of recovery.
- NOTE: If PDUs are removed from storage after SDU recovery then retransmitted PDUs may result in the duplicate transfer of SDUs to the higher layers.
- if Timer_OSD expires:
 - remove from storage all stored PDUs.

CHANGE REQUEST

⌘ **25.323 CR 0060** ⌘ rev **1** ⌘ 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:	⌘ Introduction of MBMS		
Source:	⌘ RAN WG2		
Work item code:	⌘ MBMS-RAN	Date:	⌘ 13/05/2005
Category:	⌘ B	Release:	⌘ Rel-6
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	⌘ Introduction of MBMS in specification
Summary of change:	⌘ - Abbreviations related to MBMS are added - The requirement to keep the static part of the PDCP header in the case of change of cell group - The requirement to wait for Ir-dyn / Dyn packet at cell change in the same cell group where no combining is done in order to avoid header corruption due to de-synchronization - adding the requirement for optional ROHC configuration per MBMS session.
Consequences if not approved:	⌘ - The frequency of transmission of IR packets needs to be higher, which will result in a higher overhead.

Clauses affected:	⌘ 3.2, 5.x, 5.x.1, 5.x.2, 7.1										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table> Other core specifications ⌘ Test specifications ⌘ O&M Specifications ⌘	Y	N	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Y	N										
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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.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AS	Access Stratum
CID	Context Identifier
C-SAP	Control Service Access Point
HC	Header Compression
IETF	Internet Engineering Task Force
IP	Internet Protocol
L2	Layer 2 (data link layer)
L3	Layer 3 (network layer)
<u>MBMS</u>	<u>Multimedia Broadcast Multicast Service</u>
M-HC	Mobile Header Compressor
M-HCD	Mobile Header Compressor/Decompressor
M-HD	Mobile Header Decompressor
NAS	Non Access Stratum
N-HC	Network Header Compressor
N-HCD	Network Header Compressor/Decompressor
N-HD	Network Header Decompressor
PDCP	Packet Data Convergence Protocol
PDU	Protocol Data Unit
PID	Packet Identifier
PPP	Point-to-Point Protocol
<u>p-t-p</u>	<u>Point-to-Point</u>
<u>p-t-m</u>	<u>Point-to-Multipoint</u>
RB	Radio Bearer
RFC	Request For Comments
RLC	Radio Link Control
RNC	Radio Network Controller
ROHC	RObust Header Compression
RTP	Real Time Protocol
SDU	Service Data Unit
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UE	User Equipment
UMTS	Universal Mobile Telecommunications System
UTRA	UMTS Terrestrial Radio Access
UTRAN	UMTS Terrestrial Radio Access Network

5.x Header Compression and Decompression for MBMS

Header compression and decompression for a p-t-m MBMS service is performed in ROHC U-mode.

Applying ROHC for p-t-m RB configuration is optional and should be configured per MBMS session.

5.x.1 Cell change inside the same cell group

When a UE moves to a cell that is the same cell group with that of the previous cell while receiving a p-t-m MBMS service which is provided in both cells, the UE shall

- if no combining is applied for the service between two cells
- stop header decompression in the new cell [FFS].
- re-initialise header decompression after receiving IR-DYN or IR packet.
- Else

- continue header decompression during and after cell change.

5.x.2 Cell change between cell groups

When a UE moves to a cell that is the different cell group with that of the previous cell while receiving a p-t-m MBMS service which is provided in both cells, the UE shall

- reconfigure and re-initialise the PDCP entity.
- reuse the static part of the header decompressor context used in the previous cell [FFS].
- re-initialise header decompression after receiving IR-DYN [FFS] or IR packet and correcting the CID of the context with the CID being used in the new cell.

7 Elements for layer-to-layer communication

The interaction between the PDCP layer and other layers are described in terms of primitives where the primitives represent the logical exchange of information and control between the PDCP layer and other layers. The primitives shall not specify or constrain implementations.

7.1 Primitives between PDCP and upper layers

The primitives between PDCP and upper layers are shown in Table 5.

Table 5: Primitives between PDCP and upper layers

Generic Name	Parameter			
	Req.	Ind.	Resp.	Conf.
PDCP-DATA	Data	Data	Not Defined	Not Defined
CPDCP-CONFIG	PDCP-Info, RLC-SAP SN_Sync, R/I/C/RS, Context-Info	Not Defined	Not Defined	Not Defined
CPDCP-CONTEXT	None	Not Defined	Not Defined	Context-Info
CPDCP-RELEASE	RLC-SAP	Not Defined	Not Defined	Not Defined
CPDCP-SN	PDCP SN	Not Defined	Not Defined	Not Defined
CPDCP-RELOC	Next_Receive_SN	Not Defined	Not Defined	Next_Receive_SN, Next_Send_SN

Each Primitive is defined as follows:

- PDCP-DATA-Req./Ind.
 - PDCP-DATA-Req is used by upper user-plane protocol layers to request a transmission of upper layer PDU. PDCP-DATA-Ind is used to deliver PDCP SDU that has been received to upper user plane protocol layers.
- CPDCP-CONFIG-Req.
 - CPDCP-CONFIG-Req is used to configure and – in case of already existing PDCP entity – to reconfigure a PDCP entity and to assign it to the radio bearer associated with that entity.
- CPDCP-RELEASE-Req.
 - CPDCP-RELEASE-Req is used by upper layers to release a PDCP entity.
- CPDCP-SN-Req.
 - This primitive is used at the UTRAN. CPDCP-SN-Req is used to transfer the PDCP SN to PDCP.
- CPDCP-RELOC-Req/Conf.

- CPDCP-RELOC-Req initiates the SRNS Relocation procedure in PDCP for those radio bearers that are configured to support lossless SRNS Relocation. The Next_Receive_SN is only included at the UE side.
 - CPDCP-RELOC-Conf is used to transfer the Next_Receive_SN and/or Next_Send_SN to upper layers for lossless SRNS Relocation. The Next_Send_SN is only included at the source RNC.
- f) CPDCP-CONTEXT-Req./Conf.
- CPDCP-CONTEXT-Req initiates specific actions in the source RNC in order to perform context relocation as a part of the SRNS relocation. The primitive is applicable only in the source RNC.
 - CPDCP-CONTEXT-Conf is used to transfer the header compression context information from PDCP to upper layer in order to perform context relocation as a part of the SRNS relocation. The primitive is applicable only in the source RNC.

The following parameters are used in the primitives:

1) PDCP-Info:

- Contains the parameters for each of the header compression protocols configured to be used by one PDCP entity.

2) RLC-SAP:

- The RLC-SAP (TM/UM/AM) used by PDCP entity when communicating with RLC sublayer.

3) SN_Sync:

- Indicates that PDCP should start PDCP SN synchronisation procedure.

4) Next_Send_SN:

- The Send PDCP SN of the next PDCP SDU to be sent. There is one in the uplink (UL_Send PDCP SN) and one in the downlink (DL_Send PDCP SN). Refer to subclause 5.4.1.

5) Next_Receive_SN:

- The Receive PDCP SN of the next PDCP SDU expected to be received. There is one in the uplink (UL_Receive PDCP SN) and one in the downlink (DL_Receive PDCP SN). Refer to subclause 5.4.1.

6) PDCP SN:

- This includes a PDCP sequence number.

7) R/I/C/RS

- Indicates that PDCP should Re-initialise (R)/Initialise (I) the header compression protocols. Alternatively (Context-relocation, C) it indicates that UE PDCP shall perform specific actions related to context relocation during SRNS relocation. (RS) indicates to Re-initialise while keeping the static part of the header compression (only for RFC 3095). R/I/C/RS indication is given separately for each of the configured header compression protocol, if several exist for a given radio bearer.

8) Context-Info:

- Contains the header compression context information of each of the header compression protocols that are subject to the context relocation during SRNS relocation.