TSG-RAN Meeting #15
Jeju-do, Korea, 5 - 8 March 2002

RP-020068

Title: **Agreed CRs (Release '99 and Rel-4 category A) to TS 25.322**

Source: **TSG-RAN WG2**

Agenda item: **7.2.3**

Doc-1st-	Status-	Spec	CR	Rev	Phase	Subject	Cat	Version	Versio
R2-020586	agreed	25.322	171	2	R99	Clarification on MRW SUFI and SDU discard with explicit signalling procedure	F	3.9.0	3.10.0
R2-020587	agreed	25.322	172		Rel-4	Clarification on MRW SUFI and SDU discard with explicit signalling procedure	A	4.3.0	4.4.0
R2-020584	agreed	25.322	175	1	R99	SDU discard termination	F	3.9.0	3.10.0
R2-020585	agreed	25.322	176		Rel-4	SDU discard termination	A	4.3.0	4.4.0
R2-020436	agreed	25.322	179	1	R99	Initial value of VT(US)	F	3.9.0	3.10.0
R2-020437	agreed	25.322	180		Rel-4	Initial value of VT(US)	A	4.3.0	4.4.0

CR-Form-v5

CHANGE REQUEST

⌘ **25.322** CR **171** ⌘**rev** **r2** ⌘ Current version: **3.9.0** ⌘

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

Title: ⌘	Clarification on MRW SUFI and SDU discard with explicit signalling procedure	
Source: ⌘	TSG-RAN WG2	
Work item code: ⌘	TEI	***Date:*** ⌘ 2002-2-23

Category: ⌘ **F**   ***Release:*** ⌘ R99

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

Reason for change: ⌘	For "Send MRW not configured" case, if there are more than 15 discarded SDUs, one single SDU discard procedure is enough. No separate procedures are needed.
Summary of change: ⌘	Section 11.6.2 is modified for the case where there are more than 15 discarded SDUs. The word "optionally" proposed to be added in section 11.6.1 by revision 1 of this CR is withdrawn and the current specification in this section is restored. **The CR has isolated impact:** The clarified functionality does not affect other functionalities. The CR has no backward compatibility problem.
Consequences if not approved: ⌘	Possible waste of radio resources and inefficient functionality.

Clauses affected: ⌘	11.6.2

Other specs affected: ⌘	☐ Other core specifications ⌘ 25.322 v4.3.0, CR 172
	☐ Test specifications
	☐ O&M Specifications

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.

11.6 SDU discard with explicit signalling procedure

11.6.1 General

The SDU discard with explicit signalling procedure is used for discarding SDUs and transferring the discard information between two peer entities, which are operating in acknowledged mode. The Sender shall discard an SDU that has not been successfully transmitted for a period of time or for a number of transmissions, and send a Move Receiving Window (MRW) SUFI to the Receiver. According to the MRW SUFI, the Receiver shall discard AMD PDUs carrying that SDU and update the reception window. Figure 11.6 below illustrates the elementary procedure for SDU discard with explicit signalling.
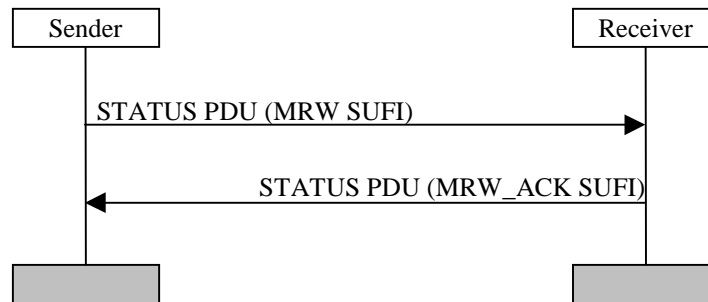

Figure 11.6: SDU discard with explicit signalling

11.6.2 Initiation

The Sender shall initiate the SDU discard with explicit signalling procedure if one of the following triggers is detected:

- "Timer based SDU discard with explicit signalling" is configured, Timer_Discard expires for an SDU, and one or more segments of the SDU have been submitted to lower layer;

- "Timer based SDU discard with explicit signalling" is configured, Timer_Discard expires for an SDU, and "Send MRW" is configured;

- "SDU discard after MaxDAT number of transmissions" is configured, and MaxDAT number of transmissions is reached (i.e. VT(DAT) ≥ MaxDAT) for an AMD PDU.

Upon initiation of the SDU discard with explicit signalling procedure, the Sender shall:

- if "Timer based SDU discard with explicit signalling" is configured:

  - discard all SDUs up to and including the SDU for which the timer Timer_Discard expired.

- if "SDU discard after MaxDAT number of retransmissions" is configured:

  - discard all SDUs that have segments in AMD PDUs with "Sequence Number" SN inside the interval VT(A) ≤ SN ≤ X, where X is the value of the "Sequence Number" of the AMD PDU with VT(DAT) ≥ MaxDAT.

- discard all AMD PDUs including segments of the discarded SDUs, unless they also carry a segment of a SDU whose timer has not expired;

- if more than 15 discarded SDUs are to be informed to the Receiver (see subclause 11.6.2.2):

  - if "Send MRW" is not configured:

    - assemble an MRW SUFI with the discard information of the SDUs;

  - otherwise ("Send MRW" is configured):

    - assemble an MRW SUFI with the discard information of the first 15 SDUs; and

- include the discard information of the rest SDUs in another MRW SUFI which shall be sent by the next SDU discard with explicit signalling procedure (after the current SDU discard with explicit signalling procedure is terminated);

- ~~assemble an MRW SUFI with the discard information of the first 15 SDUs. The discard information of the rest SDUs shall be included in another MRW SUFI which shall be sent by the next SDU discard with explicit signalling procedure (after the current SDU discard with explicit signalling procedure is terminated).~~

- otherwise (less than or equal to 15 discarded SDUs are to be informed to the Receiver):

  - assemble an MRW SUFI with the discard information of the SDUs.

- schedule and submit to lower layer a STATUS PDU/piggybacked STATUS PDU containing the MRW SUFI;

- if SN_MRW$_{LENGTH}$ in the MRW SUFI >VT(S):

  - update VT(S) to SN_MRW$_{LENGTH}$.

- start a timer Timer_MRW according to subclause 9.5.

If a new SDU discard with explicit signalling procedure is triggered when the timer Timer_MRW is active, no new MRW SUFIs shall be sent before the current SDU discard with explicit signalling procedure is terminated by one of the termination criteria specified in subclause 11.6.4.

CR-Form-v5

CHANGE REQUEST

| ⌘ | **25.322** CR **180** | ⌘**rev** | **-** | ⌘ | Current version: | **4.3.0** | ⌘ |

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

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

Title: ⌘	Initial value of VT(US)	
Source: ⌘	TSG-RAN WG2	
Work item code: ⌘	TEI	***Date:*** ⌘ 18-02-2002

Category: ⌘ **A**	***Release:*** ⌘ REL-4
Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.	*Use one of the following releases:* 2 *(GSM Phase 2)* R96 *(Release 1996)* R97 *(Release 1997)* R98 *(Release 1998)* R99 *(Release 1999)* REL-4 *(Release 4)* REL-5 *(Release 5)*

Reason for change: ⌘	In the RAN2#27 meeting, it was agreed that VT(US) for SRB#1 is delivered to the target RNC during the SRNS relocation procedure (R2-020243). Because the newly established RLC entity in the target RNC can transmit the RRC message with the SN of the delivered VT(US), the initial value of VT(US) can be set to the value other than 0.

Summary of change: ⌘	A note about the initial value of VT(US) has been added.
	
	Isolated impact analysis:
	
	   • Correction to a function where the specification was :
	
	      o ambiguous or not sufficiently explicit.
	
	Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Consequences if ⌘ ***not approved:***	The SRNS relocation can be incomplete.

Clauses affected: ⌘	9.4		
Other specs ⌘ ***affected:***	☐ Other core specifications **X** Test specifications ☐ O&M Specifications	⌘	25.322 v3.9.0, CR 179r1
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.

9.4   State variables

The state variables defined in this subclause are normative.

This sub-clause describes the state variables used in AM and UM in order to specify the peer-to-peer protocol. All state variables are non-negative integers. UMD and AMD PDUs are numbered by modulo integer sequence numbers (SN) cycling through the field: 0 to $2^{12} - 1$ for AM and 0 to $2^7 - 1$ for UM. All arithmetic operations contained in this specification on VT(S), VT(A), VT(MS), VR(R), VR(H) and VR(MR) are affected by the AM modulus. All arithmetic operations contained in this specification on VT(US) and VR(US) are affected by the UM modulus. When performing arithmetic comparisons of state variables or Sequence number values a modulus base shall be used. This modulus base is subtracted (within the appropriate field) from all the values involved and then an absolute comparison is performed. At the Sender, VT(A) and VT(US) shall be assumed to be the modulus base in AM and UM respectively. At the Receiver, VR(R) and VR(US) shall be assumed to be the modulus base in AM and UM respectively.

The RLC shall maintain the following state variables in the Sender.

a) VT(S) - Send state variable.

   This state variable contains the "Sequence Number" of the next AMD PDU to be transmitted for the first time (i.e. excluding retransmitted PDUs). It shall be updated after the aforementioned AMD PDU is transmitted or after transmission of a MRW SUFI which includes $SN\_MRW_{LENGTH} > VT(S)$ (see subclause 11.6). The initial value of this variable is 0.

b) VT(A) - Acknowledge state variable.

   This state variable contains the "Sequence Number" following the "Sequence Number" of the last in-sequence acknowledged AMD PDU. This forms the lower edge of the transmission window of acceptable acknowledgements. VT(A) shall be updated based on the receipt of a STATUS PDU including an ACK (see subclause 9.2.2.11.2) and/or an MRW_ACK SUFI (see subclause 11.6).

   The initial value of this variable is 0. For the purpose of initialising the protocol, this value shall be assumed to be the first "Sequence Number" following the last in-sequence acknowledged AMD PDU.

c) VT(DAT).

   This state variable counts the number of times a AMD PDU has been transmitted. There shall be one VT(DAT) for each PDU and each shall be incremented every time the corresponding AMD PDU is transmitted.

   The initial value of this variable is 0.

d) VT(MS) - Maximum Send state variable.

   This state variable contains the "Sequence Number" of the first AMD PDU that can be rejected by the peer Receiver, VT(MS) = VT(A) + VT(WS). This value represents the upper edge of the transmission window. The transmitter shall not transmit AMD PDUs with "Sequence Number" ≥ VT(MS) unless VT(S) ≥ VT(MS). In that case, the AMD PDU with "Sequence Number" = VT(S) - 1 can also be transmitted. VT(MS) shall be updated when VT(A) or VT(WS) is updated.

   The initial value of this variable is Configured_Tx_Window_size.

e) VT(US) – UM data state variable.

   This state variable contains the "Sequence Number" of the next UMD PDU to be transmitted. It shall be incremented by 1 each time a UMD PDU is transmitted.

   The initial value of this variable is 0.

NOTE: For the UTRAN side, the initial value of this variable ~~may not~~ can be different from 0.

f) VT(PDU).

   This state variable is used when the "poll every Poll_PDU PDU" polling trigger is configured. It shall be incremented by 1 for each AMD PDU that is transmitted including both new and retransmitted AMD PDUs.

When it becomes equal to the value Poll_PDU, a new poll shall be transmitted and the state variable shall be set to zero.

The initial value of this variable is 0.

g) VT(SDU).

This state variable is used when the "poll every Poll_SDU SDU" polling trigger is configured. It shall be incremented by 1 for a given SDU when all the AMD PDUs carrying a part of this SDU have been transmitted at least once. When it becomes equal to the value Poll_SDU a new poll shall be transmitted and the state variable shall be set to zero. The "Polling bit" shall be set to "1" in the first transmission of the AMD PDU that contains the last segment of the SDU.

The initial value of this variable is 0.

h) VT(RST) - Reset state variable.

This state variable is used to count the number of times a RESET PDU is transmitted before the reset procedure is completed. VT(RST) shall be incremented by 1 each time a RESET PDU is transmitted. VT(RST) shall only be reset upon the reception of a RESET ACK PDU, i.e. VT(RST) shall not be reset when an RLC reset initiated by the peer RLC entity occurs.

The initial value of this variable is 0.

i) VT(MRW) – MRW command send state variable.

This state variable is used to count the number of times a MRW command is transmitted. VT(MRW) is incremented by 1 each time an MRW SUFI is transmitted. VT(MRW) shall be reset when the SDU discard with explicit signalling procedure is terminated. The initial value of this variable is 0.

j) VT(WS) – Transmission window size state variable.

This state variable contains the size that shall be used for the transmission window. VT(WS) shall be set equal to the WSN field when the transmitter receives a STATUS PDU including a WINDOW SUFI.

The initial value of this variable is Configured_Tx_Window_size.

The RLC shall maintain the following state variables in the Receiver:

a) VR(R) - Receive state variable.

This state variable contains the "Sequence Number" following that of the last in-sequence AMD PDU received. It shall be updated upon the receipt of the AMD PDU with "Sequence Number" equal to VR(R).

The initial value of this variable is 0. For the purpose of initialising the protocol, this value shall be assumed to be the first "Sequence Number" following the last in-sequence received AMD PDU.

b) VR(H) - Highest expected state variable.

This state variable contains the "Sequence Number" following the highest "Sequence Number" of any received AMD PDU. When a AMD PDU is received with "Sequence Number" x such that VR(H)≤x<VR(MR), this state variable shall be set equal to x+1.

The initial value of this variable is 0.

c) VR(MR) - Maximum acceptable Receive state variable.

This state variable contains the "Sequence Number" of the first AMD PDU that shall be rejected by the Receiver, VR(MR) = VR(R) + Configured_Rx_Window_Size.

d) VR(US) - Receiver Send Sequence state variable.

This state variable contains the "Sequence Number" following that of the last UMD PDU received. When a UMD PDU with "Sequence Number" equal to x is received, the state variable shall set equal to x + 1.

The initial value of this variable is 0.

e) VR(EP) - Estimated PDU Counter state variable.

This state variable contains the number of AMD PDUs whose re-transmission is still expected as a consequence of the transmission of the latest status report. At the end of each TTI it is decremented by the total number of AMD PDUs that were received during that time.

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CHANGE REQUEST

⌘ **25.322** CR **179** ⌘**rev** **r1** ⌘ Current version: **3.9.0** ⌘

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

Title:	⌘	Initial value of VT(US)
Source:	⌘	TSG-RAN WG2
Work item code: ⌘	TEI	*Date:* ⌘ 18-02-2002
Category:	⌘ **F**	*Release:* ⌘ R99

Use <u>one</u> of the following categories:
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Reason for change:	⌘	In the RAN2#27 meeting, it was agreed that VT(US) for SRB#1 is delivered to the target RNC during the SRNS relocation procedure (R2-020243). Because the newly established RLC entity in the target RNC can transmit the RRC message with the SN of the delivered VT(US), the initial value of VT(US) can be set to the value other than 0.
Summary of change: ⌘		A note about the initial value of VT(US) has been added. <u>Isolated impact analysis:</u> • Correction to a function where the specification was : o ambiguous or not sufficiently explicit. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved:	⌘	The SRNS relocation can be incomplete.

Clauses affected:	⌘	9.4

Other specs affected:	⌘	☐ Other core specifications	⌘	25.303 v4.3.0, CR 180
		X Test specifications		
		☐ O&M Specifications		

Other comments:	⌘	

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The RLC shall maintain the following state variables in the Sender.

   a)   VT(S) - Send state variable.

      This state variable contains the "Sequence Number" of the next AMD PDU to be transmitted for the first time (i.e. excluding retransmitted PDUs). It shall be updated after the aforementioned AMD PDU is transmitted or after transmission of a MRW SUFI which includes $SN\_MRW_{LENGTH} > VT(S)$ (see subclause 11.6). The initial value of this variable is 0.

   b)   VT(A) - Acknowledge state variable.

      This state variable contains the "Sequence Number" following the "Sequence Number" of the last in-sequence acknowledged AMD PDU. This forms the lower edge of the transmission window of acceptable acknowledgements. VT(A) shall be updated based on the receipt of a STATUS PDU including an ACK (see subclause 9.2.2.11.2) and/or an MRW_ACK SUFI (see subclause 11.6).

      The initial value of this variable is 0. For the purpose of initialising the protocol, this value shall be assumed to be the first "Sequence Number" following the last in-sequence acknowledged AMD PDU.

   c)   VT(DAT).

      This state variable counts the number of times a AMD PDU has been transmitted. There shall be one VT(DAT) for each PDU and each shall be incremented every time the corresponding AMD PDU is transmitted.

      The initial value of this variable is 0.

   d)   VT(MS) - Maximum Send state variable.

      This state variable contains the "Sequence Number" of the first AMD PDU that can be rejected by the peer Receiver, VT(MS) = VT(A) + VT(WS). This value represents the upper edge of the transmission window. The transmitter shall not transmit AMD PDUs with "Sequence Number" $\geq$ VT(MS) unless VT(S) $\geq$ VT(MS). In that case, the AMD PDU with "Sequence Number" = VT(S) - 1 can also be transmitted. VT(MS) shall be updated when VT(A) or VT(WS) is updated.

      The initial value of this variable is Configured_Tx_Window_size.

   e)   VT(US) – UM data state variable.

      This state variable contains the "Sequence Number" of the next UMD PDU to be transmitted. It shall be incremented by 1 each time a UMD PDU is transmitted.

      The initial value of this variable is 0.

      NOTE: For the UTRAN side, the initial value of this variable ~~may not~~ can be different from 0.

   f)   VT(PDU).

      This state variable is used when the "poll every Poll_PDU PDU" polling trigger is configured. It shall be incremented by 1 for each AMD PDU that is transmitted including both new and retransmitted AMD PDUs.

When it becomes equal to the value Poll_PDU, a new poll shall be transmitted and the state variable shall be set to zero.

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g) VT(SDU).

This state variable is used when the "poll every Poll_SDU SDU" polling trigger is configured. It shall be incremented by 1 for a given SDU when all the AMD PDUs carrying a part of this SDU have been transmitted at least once. When it becomes equal to the value Poll_SDU a new poll shall be transmitted and the state variable shall be set to zero. The "Polling bit" shall be set to "1" in the first transmission of the AMD PDU that contains the last segment of the SDU.

The initial value of this variable is 0.

h) VT(RST) - Reset state variable.

This state variable is used to count the number of times a RESET PDU is transmitted before the reset procedure is completed. VT(RST) shall be incremented by 1 each time a RESET PDU is transmitted. VT(RST) shall only be reset upon the reception of a RESET ACK PDU, i.e. VT(RST) shall not be reset when an RLC reset initiated by the peer RLC entity occurs.

The initial value of this variable is 0.

i) VT(MRW) – MRW command send state variable.

This state variable is used to count the number of times a MRW command is transmitted. VT(MRW) is incremented by 1 each time an MRW SUFI is transmitted. VT(MRW) shall be reset when the SDU discard with explicit signalling procedure is terminated. The initial value of this variable is 0.

j) VT(WS) – Transmission window size state variable.

This state variable contains the size that shall be used for the transmission window. VT(WS) shall be set equal to the WSN field when the transmitter receives a STATUS PDU including a WINDOW SUFI.

The initial value of this variable is Configured_Tx_Window_size.

The RLC shall maintain the following state variables in the Receiver:

a) VR(R) - Receive state variable.

This state variable contains the "Sequence Number" following that of the last in-sequence AMD PDU received. It shall be updated upon the receipt of the AMD PDU with "Sequence Number" equal to VR(R).

The initial value of this variable is 0. For the purpose of initialising the protocol, this value shall be assumed to be the first "Sequence Number" following the last in-sequence received AMD PDU.

b) VR(H) - Highest expected state variable.

This state variable contains the "Sequence Number" following the highest "Sequence Number" of any received AMD PDU. When a AMD PDU is received with "Sequence Number" x such that VR(H)≤x<VR(MR), this state variable shall be set equal to x+1.

The initial value of this variable is 0.

c) VR(MR) - Maximum acceptable Receive state variable.

This state variable contains the "Sequence Number" of the first AMD PDU that shall be rejected by the Receiver, VR(MR) = VR(R) + Configured_Rx_Window_Size.

d) VR(US) - Receiver Send Sequence state variable.

This state variable contains the "Sequence Number" following that of the last UMD PDU received. When a UMD PDU with "Sequence Number" equal to x is received, the state variable shall set equal to x + 1.

The initial value of this variable is 0.

e) VR(EP) - Estimated PDU Counter state variable.

This state variable contains the number of AMD PDUs whose re-transmission is still expected as a consequence of the transmission of the latest status report. At the end of each TTI it is decremented by the total number of AMD PDUs that were received during that time.

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<tr><td colspan="3" align="right">CR-Form-v5</td></tr>
<tr><td colspan="3" align="center"><h1>CHANGE REQUEST</h1></td></tr>
</table>

⌘   **25.322 CR 176**   ⌘**rev**   **-**   ⌘   Current version: **4.3.0**   ⌘

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

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

Title: ⌘	SDU discard termination	
Source: ⌘	TSG-RAN WG2	
Work item code: ⌘	TEI	***Date:*** ⌘ 2002-02-24

Category: ⌘ **A**   ***Release:*** ⌘   REL-4

Use <u>one</u> *of the following categories:*
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R97   *(Release 1997)*
R98   *(Release 1998)*
R99   *(Release 1999)*
REL-4   *(Release 4)*
REL-5   *(Release 5)*

Reason for change: ⌘	

1. Clarifications to the poll window formula was done in WG2 #25. After discussions with T1 it is evident that the clarification was ambiguous and needs to be reworded.

2. At the editorial cleanup of 25.322 from v3.7.0 to v3.8.0, an error was made in section 11.6.4 (termination of SDU discard)

Summary of change: ⌘	

1. The poll window formula is clarified. The current description assumes that the value of VT(S) used in the formula is the updated value after the PDU has been transmitted. However, this may be read as if the poll bit can not be set until after the value of VT(S) has been updated. As the value of VT(S) is not updated until the PDU is transmitted, this is not possible. <u>The text is reworded without changing any functionality</u>.

2. The Termination criteria for the SDU discard is corrected. An error was made in the editorial cleanup between v3.7.0 and v3.8.0. The current description does not take into account that even if the LSN field in the ACK SUFI is set to a certain value X, the STATUS PDU may not acknowledge all PDUs up to and including X. E.g. if a LIST SUFI indicates a missing PDU with a value below X (say Y), the STATUS PDU only acknowledges PDUs up to and including Y-1.

Impact analysis:

<u>Impacted functionality</u>: SDU discard for AM RLC

Correction to a function where the specification was erroneous. The change only affects the SDU discard functionality.

The change in bullet 1 is editorial and has no functional impact. For bullet 2:

If the UE does not implement the change, but the UTRAN does, there is a risk for deadlock in the SDU discard procedure, i.e. the SDU discard is never terminated.

		If the UTRAN does not implement the change, but the UE does, the same applies.
		Note that the same problem exists if neither of the peer entities implements the change
Consequences if not approved:	⌘	Risk for misinterpretation of the specification. Risk for deadlock in the SDU discard functionality.

Clauses affected:	⌘	9.6, 11.6.4

Other specs Affected:	⌘ ☐	Other core specifications	⌘	25.322 v3.9.0, CR 175r1
	☐	Test specifications		
	☐	O&M Specifications		
Other comments:	⌘			

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

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

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

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

9.6 Protocol Parameters

The behaviour defined in this subclause is normative. The values of the protocol parameters defined in this subclause are signalled by upper layers.

a) MaxDAT.

   The maximum number of transmissions of an AMD PDU is equal to MaxDAT – 1. This protocol parameter represents the upper limit for state variable VT(DAT). When VT(DAT) equals the value MaxDAT, either RLC RESET procedure or SDU discard procedure shall be initiated according to the configuration by upper layers.

b) Poll_PDU.

   This protocol parameter indicates how often the transmitter shall poll the Receiver in the case where "polling every Poll_PDU PDU" is configured by upper layers. It represents the upper limit for the state variable VT(PDU). When VT(PDU) equals the value Poll_PDU a poll shall be transmitted to the peer entity.

c) Poll_SDU.

   This protocol parameter indicates how often the transmitter shall poll the Receiver in the case where "polling every Poll_SDU SDU" is configured by upper layers. It represents the upper limit for state variable VT(SDU). When VT(SDU) equals the value Poll_SDU a poll shall be transmitted to the peer entity.

d) Poll_Window.

   This protocol parameter indicates when the transmitter shall poll the Receiver in the case where "window-based polling" is configured by upper layers. ~~The range of values of this parameter shall be 0 ≤ Poll_Window ≤ 100.~~ A poll is triggered for each AMD PDU when $J \geq$ Poll_Window, where J is the transmission window percentage defined as: /* The formula below has been changed */

$$J = \frac{(4096 + VT(S) \underline{+1} - VT(A)) \bmod 4096}{VT(WS)} * 100 \ ,$$

   where the constant 4096 is the modulus for AM described in subclause 9.4 and VT(S) is the ~~updated~~ value of the variable before the ~~after the~~ AMD PDU is submitted to lower layer.

e) MaxRST.

   The maximum number of transmissions of a RESET PDU is equal to MaxRST – 1. This protocol parameter represents the upper limit for state variable VT(RST). When VT(RST) equals the value MaxRST, unrecoverable error shall be indicated to upper layers.

f) Configured_Tx_Window_Size.

   This protocol parameter indicates both the maximum allowed transmission window size and the value for the state variable VT(WS).

g) Configured_Rx_Window_Size.

   This protocol parameter indicates the reception window size.

h) MaxMRW.

   The maximum number of transmissions of an MRW command is equal to MaxMRW – 1. This protocol parameter represents the upper limit for state variable VT(MRW). When VT(MRW) equals the value MaxMRW, the RLC RESET procedure shall be initiated.

11.6.4 Termination

The Sender shall terminate the SDU discard with explicit signalling procedure if one of the following criteria is fulfilled:

- a STATUS PDU/piggybacked STATUS PDU containing an MRW_ACK SUFI is received, and the SN_ACK field in the received MRW_ACK SUFI > the SN_MRW$_{LENGTH}$ field in the transmitted MRW_SUFI, and the N field in the received MRW_ACK SUFI is set equal to "0000";

- a STATUS PDU/piggybacked STATUS PDU containing an MRW_ACK SUFI is received, and the SN_ACK field in the received MRW_ACK SUFI = the SN_MRW$_{LENGTH}$ field in the transmitted MRW_SUFI, and the N field in the received MRW_ACK SUFI is set equal to the N$_{LENGTH}$ field in the transmitted MRW SUFI;

- a STATUS PDU/piggybacked STATUS PDU containing an ACK SUFI is received, and this STATUS PDU/piggybacked STATUS PDU indicates that all AMD PDUs up to and including the AMD PDU with "Sequence Number" equal to the SN_MRW$_{LENGTH}$ field in the transmitted MRW SUFI has been received or discarded by the peer entity. the LSN field in the received ACK SUFI > the SN_MRW$_{LENGTH}$ field in the transmitted MRW SUFI.

Upon termination of the SDU discard with explicit signalling procedure, the Sender shall:

- stop the timer Timer_MRW;

- update VT(A) and VT(MS) according to the received STATUS PDU/piggybacked STATUS PDU;

The Sender shall not confirm to upper layers the SDUs that are requested to be discarded.

CR-Form-v5

CHANGE REQUEST

⌘ **25.322 CR 175** ⌘**rev** **r1** ⌘ Current version: **3.9.0** ⌘

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

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

Title: ⌘	SDU discard termination	
Source: ⌘	TSG-RAN WG2	
Work item code: ⌘	TEI	***Date:*** ⌘ 2002-02-24
Category: ⌘ **F**		***Release:*** ⌘ R99

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

Reason for change: ⌘	1. Clarifications to the poll window formula was done in WG2 #25. After discussions with T1 it is evident that the clarification was ambiguous and needs to be reworded. 2. At the editorial cleanup of 25.322 from v3.7.0 to v3.8.0, an error was made in section 11.6.4 (termination of SDU discard)
Summary of change: ⌘	1. The poll window formula is clarified. The current description assumes that the value of VT(S) used in the formula is the updated value after the PDU has been transmitted. However, this may be read as if the poll bit can not be set until after the value of VT(S) has been updated. As the value of VT(S) is not updated until the PDU is transmitted, this is not possible. <u>The text is reworded without changing any functionality</u>. 2. The Termination criteria for the SDU discard is corrected. An error was made in the editorial cleanup between v3.7.0 and v3.8.0. The current description does not take into account that even if the LSN field in the ACK SUFI is set to a certain value X, the STATUS PDU may not acknowledge all PDUs up to and including X. E.g. if a LIST SUFI indicates a missing PDU with a value below X (say Y), the STATUS PDU only acknowledges PDUs up to and including Y-1. **Impact analysis:** <u>Impacted functionality</u>: SDU discard for AM RLC Correction to a function where the specification was erroneous. The change only affects the SDU discard functionality. The change in bullet 1 is editorial and has no functional impact. For bullet 2: If the UE does not implement the change, but the UTRAN does, there is a risk for deadlock in the SDU discard procedure, i.e. the SDU discard is never terminated.

		If the UTRAN does not implement the change, but the UE does, the same applies.
		Note that the same problem exists if neither of the peer entities implements the change
Consequences if not approved:	⌘	Risk for misinterpretation of the specification. Risk for deadlock in the SDU discard functionality.

Clauses affected:	⌘	9.6, 11.6.4
Other specs Affected:	⌘ ☐	Other core specifications ⌘ 25.322 v4.3.0, CR 176
	☐	Test specifications
	☐	O&M Specifications
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.

9.6 Protocol Parameters

The behaviour defined in this subclause is normative. The values of the protocol parameters defined in this subclause are signalled by upper layers.

a) MaxDAT.

The maximum number of transmissions of an AMD PDU is equal to MaxDAT – 1. This protocol parameter represents the upper limit for state variable VT(DAT). When VT(DAT) equals the value MaxDAT, either RLC RESET procedure or SDU discard procedure shall be initiated according to the configuration by upper layers.

b) Poll_PDU.

This protocol parameter indicates how often the transmitter shall poll the Receiver in the case where "polling every Poll_PDU PDU" is configured by upper layers. It represents the upper limit for the state variable VT(PDU). When VT(PDU) equals the value Poll_PDU a poll shall be transmitted to the peer entity.

c) Poll_SDU.

This protocol parameter indicates how often the transmitter shall poll the Receiver in the case where "polling every Poll_SDU SDU" is configured by upper layers. It represents the upper limit for state variable VT(SDU). When VT(SDU) equals the value Poll_SDU a poll shall be transmitted to the peer entity.

d) Poll_Window.

This protocol parameter indicates when the transmitter shall poll the Receiver in the case where "window-based polling" is configured by upper layers. ~~The range of values of this parameter shall be 0 ≤ Poll_Window ≤ 100.~~ A poll is triggered for each AMD PDU when $J \geq$ Poll_Window, where J is the transmission window percentage defined as: /* The formula below has been changed */

$$J = \frac{(4096 + VT(S) + 1 - VT(A)) \bmod 4096}{VT(WS)} * 100 ,$$

where the constant 4096 is the modulus for AM described in subclause 9.4 and VT(S) is the ~~updated~~ value of the variable before the ~~after the~~ AMD PDU is submitted to lower layer.

e) MaxRST.

The maximum number of transmissions of a RESET PDU is equal to MaxRST – 1. This protocol parameter represents the upper limit for state variable VT(RST). When VT(RST) equals the value MaxRST, unrecoverable error shall be indicated to upper layers.

f) Configured_Tx_Window_Size.

This protocol parameter indicates both the maximum allowed transmission window size and the value for the state variable VT(WS).

g) Configured_Rx_Window_Size.

This protocol parameter indicates the reception window size.

h) MaxMRW.

The maximum number of transmissions of an MRW command is equal to MaxMRW – 1. This protocol parameter represents the upper limit for state variable VT(MRW). When VT(MRW) equals the value MaxMRW, the RLC RESET procedure shall be initiated.

11.6.4 Termination

The Sender shall terminate the SDU discard with explicit signalling procedure if one of the following criteria is fulfilled:

- a STATUS PDU/piggybacked STATUS PDU containing an MRW_ACK SUFI is received, and the SN_ACK field in the received MRW_ACK SUFI > the SN_MRW_{LENGTH} field in the transmitted MRW_SUFI, and the N field in the received MRW_ACK SUFI is set equal to "0000";

- a STATUS PDU/piggybacked STATUS PDU containing an MRW_ACK SUFI is received, and the SN_ACK field in the received MRW_ACK SUFI = the SN_MRW_{LENGTH} field in the transmitted MRW_SUFI, and the N field in the received MRW_ACK SUFI is set equal to the N_{LENGTH} field in the transmitted MRW SUFI;

- a STATUS PDU/piggybacked STATUS PDU containing an ACK SUFI is received, and this STATUS PDU/piggybacked STATUS PDU indicates that all AMD PDUs up to and including the AMD PDU with "Sequence Number" equal to the SN_MRW_{LENGTH} field in the transmitted MRW SUFI has been received or discarded by the peer entity. the LSN field in the received ACK SUFI > the SN_MRW_{LENGTH} field in the transmitted MRW SUFI.

Upon termination of the SDU discard with explicit signalling procedure, the Sender shall:

- stop the timer Timer_MRW;

- update VT(A) and VT(MS) according to the received STATUS PDU/piggybacked STATUS PDU;

The Sender shall not confirm to upper layers the SDUs that are requested to be discarded.

CR-Form-v5

CHANGE REQUEST

⌘   **25.322** CR **172**   ⌘**rev** **-** ⌘ Current version: **4.3.0** ⌘

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

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

Title: ⌘	Clarification on MRW SUFI and SDU discard with explicit signalling procedure	
Source: ⌘	TSG-RAN WG2	
Work item code: ⌘	TEI	*Date:* ⌘ 2002-2-23
Category: ⌘ **A**		*Release:* ⌘ REL-4

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

Reason for change: ⌘	For "Send MRW not configured" case, if there are more than 15 discarded SDUs, one single SDU discard procedure is enough. No separate procedures are needed.
Summary of change: ⌘	Section 11.6.2 is modified for the case where there are more than 15 discarded SDUs. **The CR has isolated impact:** The clarified functionality does not affect other functionalities. The CR has no backward compatibility problem.
Consequences if not approved: ⌘	Possible waste of radio resources and inefficient functionality.

Clauses affected: ⌘	11.6.2	
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications	25.322 v3.9.0, CR 171r2
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.

11.6   SDU discard with explicit signalling procedure

11.6.1   General

The SDU discard with explicit signalling procedure is used for discarding SDUs and transferring the discard information between two peer entities, which are operating in acknowledged mode. The Sender shall discard an SDU that has not been successfully transmitted for a period of time or for a number of transmissions, and send a Move Receiving Window (MRW) SUFI to the Receiver. According to the MRW SUFI, the Receiver shall discard AMD PDUs carrying that SDU and update the reception window. Figure 11.6 below illustrates the elementary procedure for SDU discard with explicit signalling.
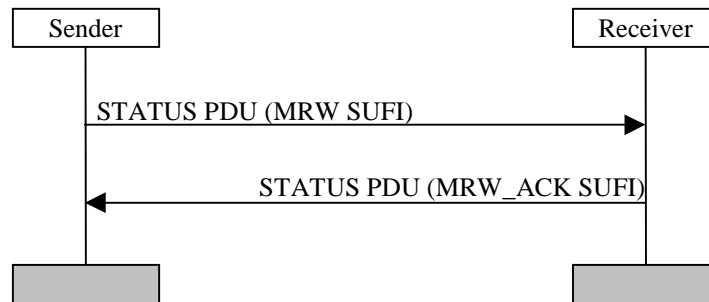

Figure 11.6: SDU discard with explicit signalling

11.6.2   Initiation

The Sender shall initiate the SDU discard with explicit signalling procedure if one of the following triggers is detected:

- "Timer based SDU discard with explicit signalling" is configured, Timer_Discard expires for an SDU, and one or more segments of the SDU have been submitted to lower layer;

- "Timer based SDU discard with explicit signalling" is configured, Timer_Discard expires for an SDU, and "Send MRW" is configured;

- "SDU discard after MaxDAT number of transmissions" is configured, and MaxDAT number of transmissions is reached (i.e. VT(DAT) ≥ MaxDAT) for an AMD PDU.

Upon initiation of the SDU discard with explicit signalling procedure, the Sender shall:

- if "Timer based SDU discard with explicit signalling" is configured:

  - discard all SDUs up to and including the SDU for which the timer Timer_Discard expired.

- if "SDU discard after MaxDAT number of retransmissions" is configured:

  - discard all SDUs that have segments in AMD PDUs with "Sequence Number" SN inside the interval VT(A) ≤ SN ≤ X, where X is the value of the "Sequence Number" of the AMD PDU with VT(DAT) ≥ MaxDAT.

  - if requested:

    - inform the upper layers of the discarded SDUs.

- discard all AMD PDUs including segments of the discarded SDUs, unless they also carry a segment of a SDU whose timer has not expired;

- if more than 15 discarded SDUs are to be informed to the Receiver (see subclause 11.6.2.2):

  - if "Send MRW" is not configured:

    - assemble an MRW SUFI with the discard information of the SDUs;

  - otherwise ("Send MRW" is configured):

-   assemble an MRW SUFI with the discard information of the first 15 SDUs; and

-   include the discard information of the rest SDUs in another MRW SUFI which shall be sent by the next SDU discard with explicit signalling procedure (after the current SDU discard with explicit signalling procedure is terminated);

-   assemble an MRW SUFI with the discard information of the first 15 SDUs. The discard information of the rest SDUs shall be included in another MRW SUFI which shall be sent by the next SDU discard with explicit signalling procedure (after the current SDU discard with explicit signalling procedure is terminated).

-   otherwise (less than or equal to 15 discarded SDUs are to be informed to the Receiver):

    -   assemble an MRW SUFI with the discard information of the SDUs.

-   schedule and submit to lower layer a STATUS PDU/piggybacked STATUS PDU containing the MRW SUFI;

-   if SN_MRW$_{LENGTH}$ in the MRW SUFI >VT(S):

    -   update VT(S) to SN_MRW$_{LENGTH}$.

-   start a timer Timer_MRW according to subclause 9.5.

If a new SDU discard with explicit signalling procedure is triggered when the timer Timer_MRW is active, no new MRW SUFIs shall be sent before the current SDU discard with explicit signalling procedure is terminated by one of the termination criteria specified in subclause 11.6.4.