TSG-RAN Meeting #21 ***RP-030483***
Frankfurt, Germany, 16-19 September 2003

Title: **CRs (R'99 and linked Rel-4/Rel-5) to TS 25.322**

Source: **TSG-RAN WG2**

Agenda item: **7.3.3**

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Workitem
25.322	228	-	R99	SDU Concatenation Exceptions and SDU Concatenation in AM Mode	F	3.15.0	3.16.0	R2-031874	TEI
25.322	229	-	Rel-4	SDU Concatenation Exceptions and SDU Concatenation in AM Mode	A	4.9.0	4.10.0	R2-031875	TEI
25.322	230	-	Rel-5	SDU Concatenation Exceptions and SDU Concatenation in AM Mode	A	5.5.0	5.6.0	R2-031876	TEI
25.322	231	1	R99	Decision of Discarded SDUs from Discarded PDUs	F	3.15.0	3.16.0	R2-032011	TEI
25.322	232	1	Rel-4	Decision of Discarded SDUs from Discarded PDUs	A	4.9.0	4.10.0	R2-032012	TEI
25.322	233	1	Rel-5	Decision of Discarded SDUs from Discarded PDUs	F	5.5.0	5.6.0	R2-032013	TEI
25.322	234	1	R99	RLC Reset Triggering and Update of VT(RST)	F	3.15.0	3.16.0	R2-032014	TEI
25.322	235	1	Rel-4	RLC Reset Triggering and Update of VT(RST)	A	4.9.0	4.10.0	R2-032015	TEI
25.322	236	1	Rel-5	RLC Reset Triggering and Update of VT(RST)	A	5.5.0	5.6.0	R2-032016	TEI
25.322	237	-	R99	Correction to the ‘SDU discard with explicit signalling’ procedure	F	3.15.0	3.16.0	R2-031998	TEI
25.322	238	-	Rel-4	Correction to the ‘SDU discard with explicit signalling’ procedure	A	4.9.0	4.10.0	R2-031999	TEI
25.322	239	-	Rel-5	Correction to the ‘SDU discard with explicit signalling’ procedure	A	5.5.0	5.6.0	R2-032000	TEI
25.322	243	-	R99	Correction of MRW and RESET timers in RLC	F	3.15.0	3.16.0	R2-032017	TEI
25.322	244	-	Rel-4	Correction of MRW and RESET timers in RLC	A	4.9.0	4.10.0	R2-032018	TEI
25.322	245	-	Rel-5	Correction of MRW and RESET timers in RLC	A	5.5.0	5.6.0	R2-032019	TEI

3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th-29th August 2003

Tdoc R2-031874

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **228** ⌘ **rev** **-** ⌘ Current version: **3.f.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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	SDU Concatenation Exceptions and SDU Concatenation in AM Mode
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	28 August 2003
Category:	⌘	**F**
Release:	⌘	R99

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

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change: ⌘

1. When 15-bit Length Indicators are used and an SDU ends with either one octet left or one octet short of exactly filling the PDU, the last octet of the PDU shall be padded. This is specified in subclause 9.2.2.8. However, it is mandated in subclauses 9.2.2.9 and 11.2.2.2 that an RLC SDU shall be concatenated with the next RLC SDU to avoid unnecessary padding. This may lead to inconsistent behaviours.
2. The concatenation behaviour is missing in AM data transfer procedure.

Summary of change: ⌘

1. SDU concatenation behaviours in subclauses 9.2.2.9 and 11.2.2.2 are clarified to align with the behaviour specified in subclause 9.2.2.8.
2. The SDU concatenation behaviour is added in AM data transfer procedure.

Consequences if not approved: ⌘

If the first change of the CR is not implemented, the reassembled SDU data may either miss the first octet or contain one excess octet at the beginning.
If the second change of the CR is not implemented, RLC SDUs would not be concatenated in AM mode, although it is unlikely that UE or UTRAN was implemented that way, and the efficiency of AM data transmission would be degraded.

Impact analysis:

Impacted functionality: RLC SDU concatenation.

Correction type: Clarification of a function where the specification is inconsistent. Does not affect implementation behaving like indicated in the CR, would affect implementations behaving otherwise.

Interoperability:
- Isolated impact: the impact is isolated; only the corrected functionality is affected.
- The first change of the CR implemented only by UTRAN or only by UE: In the

unlikely event that the peer implementation does not behave as specified by this CR, the reassembled SDU data may be corrupted.

- The second change of the CR implemented only by UTRAN or only by UE: Efficiency of AM data transmission would be degraded. No interoperability problems are foreseen.

Clauses affected:	⌘	9.2.2.9, 11.2.2.2, 11.3.2			
		Y	**N**		
Other specs affected:	⌘		**X**	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:

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

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

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

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

9.2.2.9 Data field

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

Transparent mode data:

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

Unacknowledged mode data and Acknowledged mode data:

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

11.2.2.2 Submission of UMD PDUs to the lower layer

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

- inform the lower layer of the number and size of SDUs scheduled for transmission;
- segment, and if possible concatenate the SDUs according to the PDU sizes indicated by the lower layer (see subclause 9.2.2.9);
- submit to the lower layer, the requested number of UMD PDUs;
- update VT(US) for each UMD PDU submitted to the lower layer (see subclause 9.4);
- buffer the SDUs that are not submitted to the lower layer according to the discard configuration (see subclause 9.7.3).

11.3.2 Transmission of AMD PDU

Upon a request of acknowledged mode data transfer from upper layers or upon retransmission of AMD PDUs, the Sender shall:

- when RLC SDUs are received from upper layers:
  - segment, and if possible concatenate the RLC SDUs into AMD PDUs where the fixed PDU size is configured by upper layer (see subclause 9.2.2.9);
  - set a "Length Indicator" field for each SDU that ends in the AMD PDU according to subclause 9.2.2.8;
  - if "Timer based SDU Discard with explicit signalling" is configured:
    - start a timer Timer_Discard for each SDU received from upper layer (see subclause 9.7.3);
  - schedule the AMD PDUs for transmission;
- if one or several AMD PDUs have been negatively acknowledged (see subclause 11.5.3):
  - schedule the AMD PDUs that were negatively acknowledged for retransmission;
- if a poll has been triggered by either the poll triggers "Poll timer" or "Timer based" (see subclause 9.7.1); and
- if polling is not prohibited (see subclause 9.5); and
- if no AMD PDU is scheduled for transmission or retransmission:
  - if the value of "Configured_Tx_Window_Size" is larger than or equal to "2048":
    - select the AMD PDU with "Sequence Number" equal to VT(S)-1.
  - otherwise if the "Configured_Tx_Window_Size" is less than "2048";
    - select the AMD PDU with "Sequence Number" equal to VT(S)-1; or
    - select an AMD PDU that has not yet been acknowledged by the peer entity;
  - schedule the selected AMD PDU for retransmission (in order to transmit a poll).

Each time an AMD PDU is scheduled for transmission or retransmission, the Sender shall:

- increment the value of the corresponding VT(DAT);
- if VT(DAT) = MaxDAT:
  - perform the actions specified in subclause 11.3.3a;
- e1se:
  - notify the lower layer that data is available for transmission;
  - perform the actions specified in subclause 11.3.2.2.

In AM, a PDU shall be considered to be a padding PDU if it is:

- an AMD PDU consisting only of an RLC Header with one "Length Indicator" (indicating that the rest of the PDU is padding) and padding; or
- a STATUS PDU consisting only of a NO_MORE SUFI.

3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th-29th August 2003

Tdoc R2-031875

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CHANGE REQUEST

⌘ **25.322** **CR** **229** ⌘ **rev** **-** ⌘ Current version: **4.9.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	SDU Concatenation Exceptions and SDU Concatenation in AM Mode
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	28 August 2003
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)*
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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)*
Rel-6	*(Release 6)*

Reason for change: ⌘

1. When 15-bit Length Indicators are used and an SDU ends with either one octet left or one octet short of exactly filling the PDU, the last octet of the PDU shall be padded. This is specified in subclause 9.2.2.8. However, it is mandated in subclauses 9.2.2.9 and 11.2.2.2 that an RLC SDU shall be concatenated with the next RLC SDU to avoid unnecessary padding. This may lead to inconsistent behaviours.
2. The concatenation behaviour is missing in AM data transfer procedure.

Summary of change: ⌘

1. SDU concatenation behaviours in subclauses 9.2.2.9 and 11.2.2.2 are clarified to align with the behaviour specified in subclause 9.2.2.8.
2. The SDU concatenation behaviour is added in AM data transfer procedure.

Consequences if not approved: ⌘

If the first change of the CR is not implemented, the reassembled SDU data may either miss the first octet or contain one excess octet at the beginning.
If the second change of the CR is not implemented, RLC SDUs would not be concatenated in AM mode, although it is unlikely that UE or UTRAN was implemented that way, and the efficiency of AM data transmission would be degraded.

Impact analysis:

Impacted functionality: RLC SDU concatenation.

Correction type: Clarification of a function where the specification is inconsistent. Does not affect implementation behaving like indicated in the CR, would affect implementations behaving otherwise.

Interoperability:
- Isolated impact: the impact is isolated; only the corrected functionality is affected.
- The first change of the CR implemented only by UTRAN or only by UE: In the

unlikely event that the peer implementation does not behave as specified by this CR, the reassembled SDU data may be corrupted.

- The second change of the CR implemented only by UTRAN or only by UE: Efficiency of AM data transmission would be degraded. No interoperability problems are foreseen.

Clauses affected:	⌘	9.2.2.9, 11.2.2.2, 11.3.2			
		Y	**N**		
Other specs affected:	⌘		**X**	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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  - only RLC PDUs carrying segments from a single RLC SDU shall be sent in one TTI;
- otherwise (Segmentation is not configured):
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Unacknowledged mode data and Acknowledged mode data:

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

11.2.2.2 Submission of UMD PDUs to the lower layer

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

- inform the lower layer of the number and size of SDUs scheduled for transmission;
- segment, and if possible concatenate the SDUs according to the PDU sizes indicated by the lower layer (see subclause 9.2.2.9);
- submit to the lower layer, the requested number of UMD PDUs;
- update VT(US) for each UMD PDU submitted to the lower layer (see subclause 9.4);
- buffer the SDUs that are not submitted to the lower layer according to the discard configuration (see subclause 9.7.3).

11.3.2 Transmission of AMD PDU

Upon a request of acknowledged mode data transfer from upper layers or upon retransmission of AMD PDUs, the Sender shall:

- when RLC SDUs are received from upper layers:
  - segment, and if possible concatenate the RLC SDUs into AMD PDUs where the fixed PDU size is configured by upper layer (see subclause 9.2.2.9);
  - set a "Length Indicator" field for each SDU that ends in the AMD PDU according to subclause 9.2.2.8;
  - if "Timer based SDU Discard with explicit signalling" is configured:
    - start a timer Timer_Discard for each SDU received from upper layer (see subclause 9.7.3);
  - schedule the AMD PDUs for transmission;
- if one or several AMD PDUs have been negatively acknowledged (see subclause 11.5.3):
  - schedule the AMD PDUs that were negatively acknowledged for retransmission;
- if a poll has been triggered by either the poll triggers "Poll timer" or "Timer based" (see subclause 9.7.1); and
- if polling is not prohibited (see subclause 9.5); and
- if no AMD PDU is scheduled for transmission or retransmission:
  - if the value of "Configured_Tx_Window_Size" is larger than or equal to "2048":
    - select the AMD PDU with "Sequence Number" equal to VT(S)-1.
  - otherwise if the "Configured_Tx_Window_Size" is less than "2048";
    - select the AMD PDU with "Sequence Number" equal to VT(S)-1; or
    - select an AMD PDU that has not yet been acknowledged by the peer entity;
  - schedule the selected AMD PDU for retransmission (in order to transmit a poll).

Each time an AMD PDU is scheduled for transmission or retransmission, the Sender shall:

- increment the value of the corresponding VT(DAT);
- if VT(DAT) = MaxDAT:
  - perform the actions specified in subclause 11.3.3a;
- e1se:
  - notify the lower layer that data is available for transmission;
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In AM, a PDU shall be considered to be a padding PDU if it is:

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3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th-29th August 2003

Tdoc R2-031876

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CHANGE REQUEST

⌘ **25.322** **CR** **230** ⌘ **rev** **-** ⌘ Current version: **5.5.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	SDU Concatenation Exceptions and SDU Concatenation in AM Mode
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	28 August 2003
Category:	⌘	**A**
Release:	⌘	Rel-5

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)*
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R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change: ⌘

1. When 15-bit Length Indicators are used and an SDU ends with either one octet left or one octet short of exactly filling the PDU, the last octet of the PDU shall be padded. This is specified in subclause 9.2.2.8. However, it is mandated in subclauses 9.2.2.9 and 11.2.2.2 that an RLC SDU shall be concatenated with the next RLC SDU to avoid unnecessary padding. This may lead to inconsistent behaviours.
2. The concatenation behaviour is missing in AM data transfer procedure.

Summary of change: ⌘

1. SDU concatenation behaviours in subclauses 9.2.2.9 and 11.2.2.2 are clarified to align with the behaviour specified in subclause 9.2.2.8.
2. The SDU concatenation behaviour is added in AM data transfer procedure.

Consequences if not approved: ⌘

If the first change of the CR is not implemented, the reassembled SDU data may either miss the first octet or contain one excess octet at the beginning.
If the second change of the CR is not implemented, RLC SDUs would not be concatenated in AM mode, although it is unlikely that UE or UTRAN was implemented that way, and the efficiency of AM data transmission would be degraded.

Impact analysis:

Impacted functionality: RLC SDU concatenation.

Correction type: Clarification of a function where the specification is inconsistent. Does not affect implementation behaving like indicated in the CR, would affect implementations behaving otherwise.

Interoperability:
- Isolated impact: the impact is isolated; only the corrected functionality is affected.
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unlikely event that the peer implementation does not behave as specified by this CR, the reassembled SDU data may be corrupted.

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Clauses affected:	⌘	9.2.2.9, 11.2.2.2, 11.3.2			
		Y	**N**		
Other specs affected:	⌘		**X**	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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9.2.2.9 Data field

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

Transparent mode data:

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

Unacknowledged mode data and Acknowledged mode data:

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

11.2.2.2 Submission of UMD PDUs to the lower layer

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

- inform the lower layer of the number and size of SDUs scheduled for transmission;
- segment, and if possible concatenate the SDUs according to the PDU sizes indicated by the lower layer (see subclause 9.2.2.9);
- submit to the lower layer, the requested number of UMD PDUs;
- update VT(US) for each UMD PDU submitted to the lower layer (see subclause 9.4);
- buffer the SDUs that are not submitted to the lower layer according to the discard configuration (see subclause 9.7.3).

11.3.2 Transmission of AMD PDU

Upon a request of acknowledged mode data transfer from upper layers or upon retransmission of AMD PDUs, the Sender shall:

- when RLC SDUs are received from upper layers:
  - segment, and if possible concatenate the RLC SDUs into AMD PDUs where the fixed PDU size is configured by upper layer (see subclause 9.2.2.9);
  - set a "Length Indicator" field for each SDU that ends in the AMD PDU according to subclause 9.2.2.8;
  - if "Timer based SDU Discard with explicit signalling" is configured:
    - start a timer Timer_Discard for each SDU received from upper layer (see subclause 9.7.3);
  - schedule the AMD PDUs for transmission;
- if one or several AMD PDUs have been negatively acknowledged (see subclause 11.5.3):
  - schedule the AMD PDUs that were negatively acknowledged for retransmission;
- if a poll has been triggered by either the poll triggers "Poll timer" or "Timer based" (see subclause 9.7.1); and
- if polling is not prohibited (see subclause 9.5); and
- if no AMD PDU is scheduled for transmission or retransmission:
  - if the value of "Configured_Tx_Window_Size" is larger than or equal to "2048":
    - select the AMD PDU with "Sequence Number" equal to VT(S)-1.
  - otherwise if the "Configured_Tx_Window_Size" is less than "2048";
    - select the AMD PDU with "Sequence Number" equal to VT(S)-1; or
    - select an AMD PDU that has not yet been acknowledged by the peer entity;
  - schedule the selected AMD PDU for retransmission (in order to transmit a poll).

Each time an AMD PDU is scheduled for transmission or retransmission, the Sender shall:

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- if VT(DAT) = MaxDAT:
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- e1se:
  - notify the lower layer that data is available for transmission;
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In AM, a PDU shall be considered to be a padding PDU if it is:

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3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th-29th August 2003

Tdoc R2-032011

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **231** ⌘ **rev** **1** ⌘ Current version: **3.f.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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Decision of Discarded SDUs from Discarded PDUs
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	29 August 2003
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
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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)*
Rel-6 *(Release 6)*

Reason for change: ⌘ There are cases that a PDU contains a Length Indicator indicating the end of a SDU but does not contain any segment of the SDU. These cases are not considered when deciding the set of discarded SDUs from a missing UMD PDU or from a discarded AMD PDU after MaxDAT number of transmissions.

Summary of change: ⌘ When deciding the set of discarded SDUs, the corresponding Length Indicator is considered together with SDU segments.

Consequences if not approved: ⌘ If the CR is not implemented, the SDU discard function may not work properly.

Impact analysis:

Impacted functionality: SDU discard.

Correction type: Clarification of a function where the specification is incomplete, ambiguous and/or inconsistent. Does not affect implementation behaving like indicated in the CR, would affect implementations behaving otherwise.

Interoperability:
- Isolated impact: the impact is isolated; only the corrected functionality is affected.
- The CR implemented only by UTRAN: In the event that the UE implementation does not behave as specified by this CR, the SDU discard function may not work properly in UE. No interoperability problems are foreseen.
- The CR implemented only by UE: In the event that the UTRAN implementation does not behave as specified by this CR, the SDU discard function may not work properly in UTRAN. No interoperability problems are foreseen.

Clauses affected: ⌘ 9.7.3.3, 11.2.3, 11.6.2

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

How to create CRs using this form:

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

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

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

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

9.7.3.3 SDU discard after MaxDAT number of transmissions

This alternative uses the number of transmissions as a trigger for SDU discard, and is therefore only applicable for acknowledged mode RLC. This makes the SDU discard function dependent on the channel rate. Also, this variant of the SDU discard function strives to keep the SDU loss rate constant for the connection, on the cost of a variable delay.

If the number of times an AMD PDU is scheduled for transmission reaches MaxDAT, the Sender shall:

- discard all SDUs that have segments or "Length Indicators" indicating the end of the SDUs ~~of which are contained~~ in the AMD PDU; and

- utilise explicit signalling to inform the Receiver according to clause 11.6.

11.2.3 Reception of UMD PDU

Upon delivery of a set of UMD PDUs from the lower layer, the Receiver shall:

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

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 transmissions" is configured:
  - discard all SDUs that have segments or "Length Indicators" indicating the end of the SDUs 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 or "Length Indicators" indicating the end 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).
- 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.

3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th-29th August 2003

Tdoc R2-032012

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **232** ⌘ **rev** **1** ⌘ Current version: **4.9.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Decision of Discarded SDUs from Discarded PDUs
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	29 August 2003
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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	There are cases that a PDU contains a Length Indicator indicating the end of a SDU but does not contain any segment of the SDU. These cases are not considered when deciding the set of discarded SDUs from a missing UMD PDU or from a discarded AMD PDU after MaxDAT number of transmissions.
Summary of change:	⌘	When deciding the set of discarded SDUs, the corresponding Length Indicator is considered together with SDU segments.
Consequences if not approved:	⌘	If the CR is not implemented, the SDU discard function may not work properly. **Impact analysis:** Impacted functionality: SDU discard. Correction type: Clarification of a function where the specification is incomplete, ambiguous and/or inconsistent. Does not affect implementation behaving like indicated in the CR, would affect implementations behaving otherwise. Interoperability: ◆ Isolated impact: the impact is isolated; only the corrected functionality is affected. ◆ The CR implemented only by UTRAN: In the event that the UE implementation does not behave as specified by this CR, the SDU discard function may not work properly in UE. No interoperability problems are foreseen. ◆ The CR implemented only by UE: In the event that the UTRAN implementation does not behave as specified by this CR, the SDU discard function may not work properly in UTRAN. No interoperability problems are foreseen.

Clauses affected:	⌘	9.7.3.3, 11.2.3, 11.6.2

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

How to create CRs using this form:

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

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

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

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

9.7.3.3 SDU discard after MaxDAT number of transmissions

This alternative uses the number of transmissions as a trigger for SDU discard, and is therefore only applicable for acknowledged mode RLC. This makes the SDU discard function dependent on the channel rate. Also, this variant of the SDU discard function strives to keep the SDU loss rate constant for the connection, on the cost of a variable delay.

If the number of times an AMD PDU is scheduled for transmission reaches MaxDAT, the Sender shall:

- discard all SDUs that have segments or "Length Indicators" indicating the end of the SDUs ~~of which are contained~~ in the AMD PDU; and

- utilise explicit signalling to inform the Receiver according to clause 11.6.

11.2.3 Reception of UMD PDU

Upon delivery of a set of UMD PDUs from the lower layer, the Receiver shall:

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

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 transmissions" is configured:
  - discard all SDUs that have segments or "Length Indicators" indicating the end of the SDUs 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 or "Length Indicators" indicating the end of the 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).
- 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.

3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th-29th August 2003

Tdoc R2-032013

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **233** ⌘ **rev** **1** ⌘ Current version: **5.5.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Decision of Discarded SDUs from Discarded PDUs
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	29 August 2003
Category:	⌘	**F**
Release:	⌘	Rel-5

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)*
Rel-6 *(Release 6)*

Reason for change: ⌘ There are cases that a PDU contains a Length Indicator indicating the end of a SDU but does not contain any segment of the SDU. These cases are not considered when deciding the set of discarded SDUs from a missing UMD PDU or from a discarded AMD PDU after MaxDAT number of transmissions.

Summary of change: ⌘ When deciding the set of discarded SDUs, the corresponding Length Indicator is considered together with SDU segments.

Note for Rel-5 shadow: There are extra changes in subclauses 9.2.2.11.8 and 11.6.3.

Consequences if not approved: ⌘ If the CR is not implemented, the SDU discard function may not work properly.

Impact analysis:

Impacted functionality: SDU discard.

Correction type: Clarification of a function where the specification is incomplete, ambiguous and/or inconsistent. Does not affect implementation behaving like indicated in the CR, would affect implementations behaving otherwise.

Interoperability:
- Isolated impact: the impact is isolated; only the corrected functionality is affected.
- The CR implemented only by UTRAN: In the event that the UE implementation does not behave as specified by this CR, the SDU discard function may not work properly in UE. No interoperability problems are foreseen.
- The CR implemented only by UE: In the event that the UTRAN implementation does not behave as specified by this CR, the SDU discard function may not work properly in UTRAN. No interoperability problems are foreseen.

Clauses affected:	⌘	9.7.3.3, 11.2.3, 11.6.2, **9.2.2.11.8, 11.6.3**			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:

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

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

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

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

9.2.2.11.8 The Move Receiving Window (MRW) super-field

The 'Move Receiving Window' super-field is used to request the Receiver to move its reception window and optionally to indicate the set of discarded RLC SDUs, as a result of an RLC SDU discard in the Sender. The format is given in figure 9.15 below.

Type = **MRW**
LENGTH
SN_MRW_1
SN_MRW_2
...
SN_MRW_{LENGTH}
N_{LENGTH}

Figure 9.15: The MRW fields in a STATUS PDU

LENGTH

Length: 4 bits

The number of SN_MRW_i fields in the super-field of type MRW.

The values "0001" through "1111" indicate 1 through 15 SN_MRW_i respectively. The value "0000" indicates that one SN_MRW_i field is present and that the RLC SDU to be discarded in the Receiver extends above the configured transmission window in the Sender.

SN_MRW_i

Length: 12 bits

When "Send MRW" is configured, an SN_MRW_i shall be used to indicate the end of each discarded RLC SDU, i.e. the number of SN_MRW_i fields shall equal the number of RLC SDUs discarded by that MRW SUFI. When "Send MRW" is not configured, an SN_MRW_i field shall be used to indicate the end of the last RLC SDU to be discarded in the Receiver and additional ones may optionally be used to indicate the end of other discarded RLC SDUs. SN_MRW_i is the "Sequence Number" of the AMD PDU that contains the "Length Indicator" of the i:th RLC SDU to be discarded in the Receiver (except for SN_MRW_{LENGTH} when $N_{LENGTH} = 0$, see definition of N_{LENGTH}). The order of the SN_MRW_i shall be in the same sequential order as the RLC SDUs that they refer to.

Additionally SN_MRW_{LENGTH} requests the Receiver to discard all not yet successfully received SDUs that have segments or "Length Indicators" indicating the end of the SDUs in the AMD PDUs with "Sequence Number" < SN_MRW_{LENGTH}, and to move the reception window accordingly. In addition, when $N_{LENGTH} > 0$, the Receiver has to discard the not yet successfully received SDUs that have segments or "Length Indicators" indicating the end of the SDUs in the AMD PDU with sequence number SN_MRW_{LENGTH} up to and including the octet indicated by the N_{LENGTH}:th "Length Indicator" field of the PDU with sequence number SN_MRW_{LENGTH}.

N_{LENGTH}

Length: 4 bits

N_{LENGTH} is used together with SN_MRW_{LENGTH} to indicate the end of the last RLC SDU to be discarded in the Receiver.

N_{LENGTH} indicates which "Length Indicator" in the AMD PDU with "Sequence Number" SN_MRW_{LENGTH} corresponds to the last RLC SDU to be discarded in the Receiver. $N_{LENGTH} = 0$ indicates that the last RLC SDU ended in the AMD PDU with "Sequence Number" $SN\_MRW_{LENGTH} - 1$ and that the first data octet in the AMD PDU with "Sequence Number" SN_MRW_{LENGTH} is the first data octet to be reassembled next.

9.7.3.3 SDU discard after MaxDAT number of transmissions

This alternative uses the number of transmissions as a trigger for SDU discard, and is therefore only applicable for acknowledged mode RLC. This makes the SDU discard function dependent on the channel rate. Also, this variant of the SDU discard function strives to keep the SDU loss rate constant for the connection, on the cost of a variable delay.

If the number of times an AMD PDU is scheduled for transmission reaches MaxDAT, the Sender shall:

- discard all SDUs that have segments or "Length Indicators" indicating the end of the SDUs ~~of which are contained~~ in the AMD PDU; and

- utilise explicit signalling to inform the Receiver according to clause 11.6.

11.2.3 Reception of UMD PDU

Upon delivery of a set of UMD PDUs from the lower layer, the Receiver shall:

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

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 transmissions" is configured:
  - discard all SDUs that have segments or "Length Indicators" indicating the end of the SDUs 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 or "Length Indicators" indicating the end of the 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).
- 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.

11.6.3 Reception of the STATUS PDU by the Receiver

Upon reception of the STATUS PDU/piggybacked STATUS PDU containing an MRW SUFI, the Receiver shall:

- if the LENGTH field in the received MRW SUFI is "0000":
  - consider SN_MRW_1 to be above or equal to VR(R).
- otherwise:
  - consider SN_MRW_1 to be less than VR(MR);
- consider all the SN_MRW_is other than SN_MRW_1 to be in sequential order within the list and sequentially above or equal to SN_MRW_{i-1};
- deliver all the successfully received SDUs from the SDU that have segments or "Length Indicators" indicating the end of the SDUs in AMD PDU with "Sequence Number" of VR(R) up to and including the last SDU that is indicated by the MRW SUFI;
- discard AMD PDUs up to and including the PDU with sequence number SN_MRW_{LENGTH}–1;
- if the N_{LENGTH} field in the received MRW SUFI is "0000":
  - reassemble from the first data octet of the AMD PDU with sequence number SN_MRW_{LENGTH} after the discard.
- otherwise:
  - discard further the data octets in the AMD PDU with sequence number SN_MRW_{LENGTH} up to and including the octet indicated by the N_{LENGTH}:th "Length Indicator" field of the PDU with sequence number SN_MRW_{LENGTH};
  - reassemble from the succeeding data octet in the AMD PDU with sequence number SN_MRW_{LENGTH} after the discard;
- if "Send MRW" is configured:
  - inform upper layers about all of the discarded SDUs that were not previously delivered to upper layer or discarded by other MRW SUFIs;
- update the state variables VR(R), VR(H) and VR(MR) according to the received STATUS PDU/piggybacked STATUS PDU;
- assemble a MRW_ACK SUFI according to subclause 11.6.3.1;
- schedule and submit to lower layer a STATUS PDU/piggybacked STATUS PDU containing the MRW_ACK SUFI.

3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th-29th August 2003

Tdoc R2-032014

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **234** ⌘ **rev** **1** ⌘ Current version: **3.f.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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	RLC Reset Triggering and Update of VT(RST)
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	29 August 2003
Category:	⌘	**F**
Release:	⌘	R99

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

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change: ⌘

1. Erroneous Sequence Number in a piggybacked STATUS PDU is missing in the current RLC Reset triggering condition.
2. It is possible that STATUS PDU with erroneous Sequence Number could be retransmitted due to Timer Based Status Report Transfer. The retransmitted STATUS PDU should not trigger a RLC Reset Procedure again. This is missing in the current specification.
3. VT(RST) is specified to be incremented by one when a RLC Reset is triggered (subclause 11.4.2) and when Timer_RST expires (subclause 11.4.5.1). However, it is mandated to be incremented by one each time a RESET PDU is scheduled to be transmitted in subclause 9.4. The update of VT(RST) is inconsistent.
4. In subclause 11.4.5.1, a retransmitted RESET PDU has nothing to do with additional discarded SDUs. This comment was copied from subclause 11.6.5 (about MRW procedure) by editorial error.

Summary of change: ⌘

1. The RLC Reset triggering conditions are modified to cover piggyback STATUS PDU.
2. It is clarified that the Sender stops receiving any AMD PDU or STATUS PDU so that any retransmitted STATUS PDU will be ignored and no RLC Reset Procedure will be re-triggered.
3. The VT(RST) update behaviour in subclause 9.4 is corrected to be aligned with subclauses 11.4.2 and 11.4.5.1.
4. The inadequate comment is removed from subcaluse 11.4.5.1.

Consequences if not approved: ⌘

If the first change of the CR is not implemented, RLC reset procedure will not be triggered when a piggybacked STATUS PDU contains erroneous Sequence Number so that protocol error will not be recovered.
If the second change of the CR is not implemented, retransmitted STATUS PDU may

arrived before RESET ACK PDU so that the RLC Reset Procedure may be terminated prematurely.
If the third change of the CR is not implemented, the VT(RST) update behaviours are inconsistently specified. An implementation stick to the specification may terminate the RLC Reset Procedure prematurely.
If the fourth change of the CR is not implemented, the retransmitted RESET PDU may be misunderstood as to be related to discarded SDUs.

Impact analysis:

Impacted functionality: RLC Reset Procedure.

Correction type: Clarification of a function where the specification is incomplete, ambiguous and/or inconsistent. Does not affect implementation behaving like indicated in the CR, would affect implementations behaving otherwise.

Interoperability:

- Isolated impact: the impact is isolated; only the corrected functionality is affected.
- The CR implemented only by UTRAN: The corrected functionality may not work properly in UE. No interoperability problems are foreseen.
- The CR implemented only by UE: The corrected functionality may not work properly in UTRAN. No interoperability problems are foreseen.

Clauses affected:	⌘	9.4, 11.4.2, 11.4.5.1			
Other specs affected:	⌘	**Y**	**N**	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
			X		
Other comments:	⌘				

How to create CRs using this form:
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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.

9.4 State variables

The state variables defined in this subclause are normative.

…….

h) VT(RST) - Reset state variable.

This state variable is used to count the number of times a RESET PDU is scheduled to be transmitted before the reset procedure is completed. VT(RST) shall be incremented by 1 ~~each time a RESET PDU is scheduled to be transmitted~~according to subclauses 11.4.2 and 11.4.5.1. 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.

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:

1) "No_Discard after MaxDAT number of transmissions" is configured and VT(DAT) equals the value MaxDAT (see subclause 9.7.3.4);

2) VT(MRW) equals the value MaxMRW;

3) A STATUS PDU or a piggybacked STATUS PDU including "erroneous Sequence Number" is received (see clause 10);

   - stop transmitting any AMD PDU or STATUS PDU;

   - ignore any incoming AMD PDU, piggybacked STATUS PDU or STATUS PDU;

   - increment VT(RST) by 1;

   - if VT(RST) = MaxRST:

     - the Sender may submit to the lower layer a RESET PDU;

     - perform the actions specified in subclause 11.4.4a.

   - else (if VT(RST) < MaxRST):

     - submit a RESET PDU to the lower layer;

     - start the timer Timer_RST.

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

When a reset procedure has been initiated it can only be ended upon reception of a RESET ACK PDU with the same RSN value as in the corresponding RESET PDU, or upon request of re-establishment or release from upper layer, a reset procedure is not interrupted by the reception of a RESET PDU from the peer entity.

11.4.5.1 Timer_RST timeout

If Timer_RST expires before the reset procedure is terminated, the Sender shall:

- increment VT(RST) by one;
- if VT(RST)<MaxRST:
  - set the RESET PDU as previously transmitted ~~(even if additional SDUs were discarded in the mean time)~~;
  - transmit the RESET PDU;
  - restart Timer_RST.
- else (if VT(RST) = MaxRST):
  - perform the actions specified in subclause 11.4.4a.

3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th-29th August 2003

Tdoc R2-032015

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **235** ⌘ **rev** **1** ⌘ Current version: **4.9.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	RLC Reset Triggering and Update of VT(RST)
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	29 August 2003
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)*
Rel-6 *(Release 6)*

Reason for change: ⌘

1. Erroneous Sequence Number in a piggybacked STATUS PDU is missing in the current RLC Reset triggering conditions.
2. It is possible that STATUS PDU with erroneous Sequence Number could be retransmitted due to Timer Based Status Report Transfer. The retransmitted STATUS PDU should not trigger a RLC Reset Procedure again. This is missing in the current specification.
3. VT(RST) is specified to be incremented by one when a RLC Reset is triggered (subclause 11.4.2) and when Timer_RST expires (subclause 11.4.5.1). However, it is mandated to be incremented by one each time a RESET PDU is scheduled to be transmitted in subclause 9.4. The update behaviour of VT(RST) is inconsistent.
4. The content of a retransmitted RESET PDU has nothing to do with additional discarded SDUs. In subclause 11.4.5.1, a comment about additional discarded SDUs was copied from subclause 11.6.5 (for MRW procedure) by editorial error.

Summary of change: ⌘

1. The RLC Reset triggering conditions are modified to cover piggyback STATUS PDU.
2. It is clarified that the Sender stops receiving any AMD PDU or STATUS PDU so that any retransmitted STATUS PDU will be ignored and no RLC Reset Procedure will be re-triggered.
3. The VT(RST) update behaviour in subclause 9.4 is corrected to be aligned with subclauses 11.4.2 and 11.4.5.1.
4. The inadequate comment is removed from subcaluse 11.4.5.1.

Consequences if not approved: ⌘

If the first change of the CR is not implemented, RLC reset procedure will not be triggered when a piggybacked STATUS PDU contains erroneous Sequence Number so that protocol error will not be recovered.
If the second change of the CR is not implemented, retransmitted STATUS PDU may

arrived before RESET ACK PDU so that the RLC Reset Procedure may be terminated prematurely.
If the third change of the CR is not implemented, the VT(RST) update behaviours are inconsistently specified. An implementation stick to the specification may terminate the RLC Reset Procedure prematurely.
If the fourth change of the CR is not implemented, the retransmitted RESET PDU may be misunderstood as to be related to discarded SDUs.

Impact analysis:

Impacted functionality: RLC Reset Procedure.

Correction type: Clarification of a function where the specification is incomplete, ambiguous and/or inconsistent. Does not affect implementation behaving like indicated in the CR, would affect implementations behaving otherwise.

Interoperability:

- Isolated impact: the impact is isolated; only the corrected functionality is affected.
- The CR implemented only by UTRAN: The corrected functionality may not work properly in UE. No interoperability problems are foreseen.
- The CR implemented only by UE: The corrected functionality may not work properly in UTRAN. No interoperability problems are foreseen.

Clauses affected:	⌘	9.4, 11.4.2, 11.4.5.1			
Other specs affected:	⌘	**Y**	**N**	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
			X		
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.

…….

h) VT(RST) - Reset state variable.

This state variable is used to count the number of times a RESET PDU is scheduled to be transmitted before the reset procedure is completed. VT(RST) shall be incremented by 1 ~~each time a RESET PDU is scheduled to be transmitted~~according to subclauses 11.4.2 and 11.4.5.1. 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.

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:

1) "No_Discard after MaxDAT number of transmissions" is configured and VT(DAT) equals the value MaxDAT (see subclause 9.7.3.4);

2) VT(MRW) equals the value MaxMRW;

3) A STATUS PDU or a piggybacked STATUS PDU including "erroneous Sequence Number" is received (see clause 10);

   - stop transmitting any AMD PDU or STATUS PDU;

   - ignore any incoming AMD PDU, piggybacked STATUS PDU or STATUS PDU;

   - increment VT(RST) by 1;

   - if VT(RST) = MaxRST:

     - perform the actions specified in subclause 11.4.4a.

   - else (if VT(RST) < MaxRST):

     - submit a RESET PDU to the lower layer;

     - start the timer Timer_RST.

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

When a reset procedure has been initiated it can only be ended upon reception of a RESET ACK PDU with the same RSN value as in the corresponding RESET PDU, or upon request of re-establishment or release from upper layer, a reset procedure is not interrupted by the reception of a RESET PDU from the peer entity.

11.4.5.1 Timer_RST timeout

If Timer_RST expires before the reset procedure is terminated, the Sender shall:

- increment VT(RST) by one;
- if VT(RST)<MaxRST:
  - set the RESET PDU as previously transmitted ~~(even if additional SDUs were discarded in the mean time)~~;
  - transmit the RESET PDU;
  - restart Timer_RST.
- else (if VT(RST) = MaxRST):
  - perform the actions specified in subclause 11.4.4a.

3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th-29th August 2003

Tdoc R2-032016

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **236** ⌘ **rev** **1** ⌘ Current version: **5.5.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	RLC Reset Triggering and Update of VT(RST)
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	29 August 2003
Category:	⌘	**A**
Release:	⌘	Rel-5

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)*
Rel-6 *(Release 6)*

Reason for change: ⌘

1. Erroneous Sequence Number in a piggybacked STATUS PDU is missing in the current RLC Reset triggering conditions.
2. It is possible that STATUS PDU with erroneous Sequence Number could be retransmitted due to Timer Based Status Report Transfer. The retransmitted STATUS PDU should not trigger a RLC Reset Procedure again. This is missing in the current specification.
3. VT(RST) is specified to be incremented by one when a RLC Reset is triggered (subclause 11.4.2) and when Timer_RST expires (subclause 11.4.5.1). However, it is mandated to be incremented by one each time a RESET PDU is scheduled to be transmitted in subclause 9.4. The update behaviour of VT(RST) is inconsistent.
4. The content of a retransmitted RESET PDU has nothing to do with additional discarded SDUs. In subclause 11.4.5.1, a comment about additional discarded SDUs was copied from subclause 11.6.5 (for MRW procedure) by editorial error.

Summary of change: ⌘

1. The RLC Reset triggering conditions are modified to cover piggyback STATUS PDU.
2. It is clarified that the Sender stops receiving any AMD PDU or STATUS PDU so that any retransmitted STATUS PDU will be ignored and no RLC Reset Procedure will be re-triggered.
3. The VT(RST) update behaviour in subclause 9.4 is corrected to be aligned with subclauses 11.4.2 and 11.4.5.1.
4. The inadequate comment is removed from subcaluse 11.4.5.1.

Consequences if not approved: ⌘

If the first change of the CR is not implemented, RLC reset procedure will not be triggered when a piggybacked STATUS PDU contains erroneous Sequence Number so that protocol error will not be recovered.
If the second change of the CR is not implemented, retransmitted STATUS PDU may

arrived before RESET ACK PDU so that the RLC Reset Procedure may be terminated prematurely.
If the third change of the CR is not implemented, the VT(RST) update behaviours are inconsistently specified. An implementation stick to the specification may terminate the RLC Reset Procedure prematurely.
If the fourth change of the CR is not implemented, the retransmitted RESET PDU may be misunderstood as to be related to discarded SDUs.

Impact analysis:

Impacted functionality: RLC Reset Procedure.

Correction type: Clarification of a function where the specification is incomplete, ambiguous and/or inconsistent. Does not affect implementation behaving like indicated in the CR, would affect implementations behaving otherwise.

Interoperability:

- Isolated impact: the impact is isolated; only the corrected functionality is affected.
- The CR implemented only by UTRAN: The corrected functionality may not work properly in UE. No interoperability problems are foreseen.
- The CR implemented only by UE: The corrected functionality may not work properly in UTRAN. No interoperability problems are foreseen.

Clauses affected:	⌘	9.4, 11.4.2, 11.4.5.1			
Other specs affected:	⌘	**Y**	**N**	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
			X		
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.

…….

h) VT(RST) - Reset state variable.

This state variable is used to count the number of times a RESET PDU is scheduled to be transmitted before the reset procedure is completed. VT(RST) shall be incremented by 1 ~~each time a RESET PDU is scheduled to be transmitted~~according to subclauses 11.4.2 and 11.4.5.1. 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.

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:

1) "No_Discard after MaxDAT number of transmissions" is configured and VT(DAT) equals the value MaxDAT (see subclause 9.7.3.4);

2) VT(MRW) equals the value MaxMRW;

3) A STATUS PDU or a piggybacked STATUS PDU including "erroneous Sequence Number" is received (see clause 10);

   - stop transmitting any AMD PDU or STATUS PDU;

   - ignore any incoming AMD PDU, piggybacked STATUS PDU or STATUS PDU;

   - increment VT(RST) by 1;

   - if VT(RST) = MaxRST:

     - perform the actions specified in subclause 11.4.4a.

   - else (if VT(RST) < MaxRST):

     - submit a RESET PDU to the lower layer;

     - start the timer Timer_RST.

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

When a reset procedure has been initiated it can only be ended upon reception of a RESET ACK PDU with the same RSN value as in the corresponding RESET PDU, or upon request of re-establishment or release from upper layer, a reset procedure is not interrupted by the reception of a RESET PDU from the peer entity.

11.4.5.1 Timer_RST timeout

If Timer_RST expires before the reset procedure is terminated, the Sender shall:

- increment VT(RST) by one;
- if VT(RST)<MaxRST:
  - set the RESET PDU as previously transmitted ~~(even if additional SDUs were discarded in the mean time)~~;
  - transmit the RESET PDU;
  - restart Timer_RST.
- else (if VT(RST) = MaxRST):
  - perform the actions specified in subclause 11.4.4a.

3GPP TSG RAN WG2 #37
25-29th August 2003
Budapest, Hungary

Tdoc ⌘R2-031998

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **237** ⌘ **rev** **-** ⌘ Current version: **3.15.0** ⌘

*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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Correction to the 'SDU discard with explicit signalling' procedure
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	19/08/2003
Category:	⌘	**F**
Release:	⌘	R99

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Incorrect functioning of AM RLC entities in 'SDU discard with explicit signalling' procedure.
Summary of change:	⌘	1. A new 'SDU discard with explicit signalling' procedure is not triggered if another one is still going on. Currently a "new" 'SDU discard with explicit signalling' procedure can be initiated if the Timer_MRW is not active (even if a 'SDU discard with explicit signalling' procedure is going on). 2. An MRW_ACK SUFI is discarded if no 'SDU discard with explicit signalling' procedure is active. Currently it is being discarded if the Timer_MRW is not active (even if a 'SDU discard with explicit signalling' procedure is going on). **Isolated Impact change analysis:** The CR has an isolated impact, since it corrects the RLC behaviour which has a local meaning in UE and UTRAN side, respectively. Only UE implements the CR: No IOT problem. SDU discard with explicit signalling procedure may be delayed. Only UTRAN implements the CR: No IOT problem. SDU discard with explicit signalling procedure may be delayed.
Consequences if not approved:	⌘	1. Two (or more) simultaneouly active 'SDU discard with explicit signalling' procedures may happen against the intended behaviour. 2. Possibility of discarding a valid MRW_ACK SUFI causing delay in the 'SDU discard with explicit signalling' procedure resulting into degraded performance. 2a. In the worst case, unnecessary RESET (or an unrecoverable error, if MaxRST is 1) can happen resulting into data loss (or a link failure).

Clauses affected:	⌘	11.6.2, 11.6.6.3

		Y	N		
Other specs Affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	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.

11.6.2 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 transmissions" 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).
- 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~~ current SDU discard with explicit signalling procedure is still going on, 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.

11.6.6 Abnormal cases

11.6.6.1 Reception of obsolete/corrupted MRW SUFI by the Receiver

If the received MRW SUFI contains outdated information about the reception window (reception window already moved further than MRW SUFI is indicating), the Receiver shall:

- discard the MRW SUFI;
- set the SN_ACK field in the MRW_ACK SUFI to the current value of VR(R);
- set the N field in the MRW_ACK SUFI to "0000";
- include the MRW_ACK SUFI in the next STATUS PDU/piggybacked STATUS PDU to be transmitted, according to subclause 11.5.2.

11.6.6.2 Void

11.6.6.3 Reception of obsolete/corrupted MRW_ACK SUFI by the Sender

The Sender shall discard the received MRW_ACK SUFI if one of the following cases occurs:

- no ongoing SDU discard with explicit signaling procedure; ~~the timer Timer_MRW is not active;~~ or
- the SN_ACK field in the received MRW_ACK SUFI < the SN_MRW_{LENGTH} field in the transmitted MRW SUFI; or
- 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 not equal to the N_{LENGTH} field in the transmitted MRW SUFI; or
- 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 not equal to "0000".

3GPP TSG RAN WG2 #37
25-29th August 2003
Budapest, Hungary

Tdoc ⌘R2-031999

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **238** ⌘ **rev** **-** ⌘ Current version: **4.9.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	Correction to the 'SDU discard with explicit signalling' procedure
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	19/08/2003
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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Incorrect functioning of AM RLC entities in 'SDU discard with explicit signalling' procedure.
Summary of change:	⌘	1. A new 'SDU discard with explicit signalling' procedure is not triggered if another one is still going on. Currently a "new" 'SDU discard with explicit signalling' procedure can be initiated if the Timer_MRW is not active (even if a 'SDU discard with explicit signalling' procedure is going on). 2. An MRW_ACK SUFI is discarded if no 'SDU discard with explicit signalling' procedure is active. Currently it is being discarded if the Timer_MRW is not active (even if a 'SDU discard with explicit signalling' procedure is going on). **Isolated Impact change analysis:** The CR has an isolated impact, since it corrects the RLC behaviour which has a local meaning in UE and UTRAN side, respectively. Only UE implements the CR: No IOT problem. SDU discard with explicit signalling procedure may be delayed. Only UTRAN implements the CR: No IOT problem. SDU discard with explicit signalling procedure may be delayed.
Consequences if not approved:	⌘	1. Two (or more) simultaneouly active 'SDU discard with explicit signalling' procedures may happen against the intended behaviour. 2. Possibility of discarding a valid MRW_ACK SUFI causing delay in the 'SDU discard with explicit signalling' procedure resulting into degraded performance. 2a. In the worst case, unnecessary RESET (or an unrecoverable error, if MaxRST is 1) can happen resulting into data loss (or a link failure).

Clauses affected:	⌘	11.6.2, 11.6.6.3

		Y	N		
Other specs Affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:

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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.

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 transmissions" 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).
- 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~~ current SDU discard with explicit signalling procedure is still going on, 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.

11.6.6 Abnormal cases

11.6.6.1 Reception of obsolete/corrupted MRW SUFI by the Receiver

If the received MRW SUFI contains outdated information about the reception window (reception window already moved further than MRW SUFI is indicating), the Receiver shall:

- discard the MRW SUFI;
- set the SN_ACK field in the MRW_ACK SUFI to the current value of VR(R);
- set the N field in the MRW_ACK SUFI to "0000";
- include the MRW_ACK SUFI in the next STATUS PDU/piggybacked STATUS PDU to be transmitted, according to subclause 11.5.2.

11.6.6.2 Void

11.6.6.3 Reception of obsolete/corrupted MRW_ACK SUFI by the Sender

The Sender shall discard the received MRW_ACK SUFI if one of the following cases occurs:

- no ongoing SDU discard with explicit signaling procedure; ~~the timer Timer_MRW is not active;~~ or
- the SN_ACK field in the received MRW_ACK SUFI < the SN_MRW_{LENGTH} field in the transmitted MRW SUFI; or
- 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 not equal to the N_{LENGTH} field in the transmitted MRW SUFI; or
- 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 not equal to "0000".

3GPP TSG RAN WG2 #37
25-29th August 2003
Budapest, Hungary

Tdoc ⌘R2-032000

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **239** ⌘ **rev** **-** ⌘ Current version: **5.5.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	Correction to the 'SDU discard with explicit signalling' procedure
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	19/08/2003
Category:	⌘	**A**
Release:	⌘	Rel-5

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Incorrect functioning of AM RLC entities in 'SDU discard with explicit signalling' procedure.
Summary of change:	⌘	1. A new 'SDU discard with explicit signalling' procedure is not triggered if another one is still going on. Currently a "new" 'SDU discard with explicit signalling' procedure can be initiated if the Timer_MRW is not active (even if a 'SDU discard with explicit signalling' procedure is going on). 2. An MRW_ACK SUFI is discarded if no 'SDU discard with explicit signalling' procedure is active. Currently it is being discarded if the Timer_MRW is not active (even if a 'SDU discard with explicit signalling' procedure is going on). **Isolated Impact change analysis:** The CR has an isolated impact, since it corrects the RLC behaviour which has a local meaning in UE and UTRAN side, respectively. Only UE implements the CR: No IOT problem. SDU discard with explicit signalling procedure may be delayed. Only UTRAN implements the CR: No IOT problem. SDU discard with explicit signalling procedure may be delayed.
Consequences if not approved:	⌘	1. Two (or more) simultaneouly active 'SDU discard with explicit signalling' procedures may happen against the intended behaviour. 2. Possibility of discarding a valid MRW_ACK SUFI causing delay in the 'SDU discard with explicit signalling' procedure resulting into degraded performance. 2a. In the worst case, unnecessary RESET (or an unrecoverable error, if MaxRST is 1) can happen resulting into data loss (or a link failure).

Clauses affected:	⌘	11.6.2, 11.6.6.3

		Y	N		
Other specs Affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:

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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.

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 transmissions" 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).
- 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~~ current SDU discard with explicit signalling procedure is still going on, 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.

11.6.6 Abnormal cases

11.6.6.1 Reception of obsolete/corrupted MRW SUFI by the Receiver

If the received MRW SUFI contains outdated information about the reception window (reception window already moved further than MRW SUFI is indicating), the Receiver shall:

- discard the MRW SUFI;
- set the SN_ACK field in the MRW_ACK SUFI to the current value of VR(R);
- set the N field in the MRW_ACK SUFI to "0000";
- include the MRW_ACK SUFI in the next STATUS PDU/piggybacked STATUS PDU to be transmitted, according to subclause 11.5.2.

11.6.6.2 Void

11.6.6.3 Reception of obsolete/corrupted MRW_ACK SUFI by the Sender

The Sender shall discard the received MRW_ACK SUFI if one of the following cases occurs:

- no ongoing SDU discard with explicit signaling procedure; ~~the timer Timer_MRW is not active;~~ or
- the SN_ACK field in the received MRW_ACK SUFI < the SN_MRW_{LENGTH} field in the transmitted MRW SUFI; or
- 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 not equal to the N_{LENGTH} field in the transmitted MRW SUFI; or
- 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 not equal to "0000".

3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th August 2003

Tdoc ⌘R2-032017

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **243** ⌘ **rev** **-** ⌘ Current version: **3.f.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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Correction of MRW and RESET timers in RLC
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	15/08/2003
Category:	⌘	**F**
Release:	⌘	R99

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	There are currently discrepancies in the RLC specification of the way the MRW and RESET timers are started in the UE.
Summary of change:	⌘	Add restarted to the section specifying when each timer is started. In chapter 11, subclause9.5 is referenced whenever a timer needs to be re-configured.
Consequences if not approved:	⌘	Timer starting timing would be unpredictable at the network. Networks would need to select the values very conservatively, resulting in significantly reduced performance. Backward compatibilty analysis: - The change affects the MRW and RESET procedure - Wrong UE implementation with correct network implementation would results in having more MRW and RESET re-transmissions - Correct UE implementation with wrong network implementation would result in further delay in triggering MRW and RESET re-transmissions and therefore further reduced performance.

Clauses affected:	⌘	8.6.3.1

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	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.

9.5 Timers

The timers defined in this subclause are normative. The timers shall be considered active from the time they are started until the time they either expire or are stopped.

a) Timer_Poll.

This timer shall only be used when so configured by upper layers. The value of the timer is signalled by upper layers. In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of an AMD PDU containing a poll is indicated by lower layer. In UTRAN it should be started when an AMD PDU containing a poll is submitted to lower layer. If x is the value of the state variable VT(S) after the poll was submitted to lower layer, the timer shall be stopped upon receiving:

- positive acknowledgements for all the AMD PDUs with "Sequence Number" up to and including x - 1; or
- a negative acknowledgement for the AMD PDU with "Sequence Number" = x - 1.

If the timer expires and no STATUS PDU fulfilling the criteria above has been received:

- the Receiver shall be polled once more;
- the timer shall be restarted; and
- the new value of VT(S) shall be saved.

If a new poll is sent when the timer is active, the timer shall be restarted at the time specified above, and the value of VT(S) shall be saved.

b) Timer_Poll_Prohibit.

This timer shall only be used when so configured by upper layers. It is used to prohibit transmission of polls within a certain period. The value of the timer is signalled by upper layers.

In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of an AMD PDU containing a poll is indicated by lower layer. In UTRAN it should be started when an AMD PDU containing a poll is submitted to lower layer.

From the time a poll is triggered until the timer expires, polling is prohibited. If another poll is triggered while polling is prohibited, its transmission shall be delayed until the timer expires (see subclause 9.7.1). Only one poll shall be transmitted when Timer_Poll_Prohibit expires even if several polls were triggered in the meantime. This timer shall not be affected by the reception of STATUS PDUs.

When Timer_Poll_Prohibit is not configured by upper layers, polling is never prohibited.

c) Timer_EPC.

This timer shall only be used when the EPC function is configured by upper layers. It is meant to account for the roundtrip delay, i.e. the time between the transmission of a status report and the reception of the first retransmitted AMD PDU. The initial value of the timer is signalled by upper layers.

In the UE, this timer shall be started (or restarted) when the successful or unsuccessful transmission of the first STATUS PDU of a status report is indicated by lower layer. In UTRAN it should be started when the first STATUS PDU of a status report is submitted to lower layer. Only after Timer_EPC expires shall VR(EP) be decremented as described in subclause 9.7.4.

d) Timer_Discard.

This timer shall be used when timer-based SDU discard is configured by upper layers. The value of the timer is signalled by upper layers. In the transmitter, a new timer is started upon reception of an SDU from upper layer.

In UM/TM, if a timer expires before the corresponding SDU is submitted to lower layer, "SDU discard without explicit signalling" specified in subclauses 11.2.4.3 and 11.1.4.2 shall be initiated. In AM, if a timer expires before the corresponding SDU is acknowledged, "SDU discard with explicit signalling" specified in subclause 11.6 shall be initiated.

e) Timer_Poll_Periodic.

This timer shall only be used when "timer based polling" is configured by upper layers. The value of the timer is signalled by upper layers. The timer shall be started when the RLC entity is created. When the timer expires, the RLC entity shall:

- restart the timer;
- if AMD PDUs are available for transmission or retransmission (not yet acknowledged):
  - trigger a poll.

f) Timer_Status_Prohibit.

This timer shall only be used when so configured by upper layers. It is meant to prohibit the Receiver from sending consecutive acknowledgement status reports. A status report is an acknowledgement status report if it contains any of the SUFIs LIST, BITMAP, RLIST or ACK. The value of the timer is signalled by upper layers.

In the UE, this timer shall be started (or restarted) when the successful or unsuccessful transmission of the last STATUS PDU of an acknowledgement status report is indicated by lower layer. In UTRAN it should be started when the last STATUS PDU of an acknowledgement status report is submitted to lower layer.

From the time an acknowledgement status report is triggered until the Timer_Status_Prohibit timer expires, acknowledgement is prohibited. If another such status report is triggered while acknowledgement is prohibited, its transmission shall be delayed until the timer expires (see subclause 9.7.2). The status report may be updated during this time. The transmission of SUFIs MRW, MRW_ACK, WINDOW or NO_MORE is not restricted.

When Timer_Status_Prohibit is not configured by upper layers, acknowledgment is not prohibited.

g) Timer_Status_Periodic.

This timer shall only be used when timer based status reporting is configured by upper layers.

This timer shall be started when the RLC entity is created. When the timer expires the transmission of a status report shall be triggered and the timer shall be restarted. This timer can be blocked by upper layers. The timer shall be restarted when upper layers indicate that it is no longer blocked.

h) Timer_RST.

This timer is meant to handle the loss of a RESET PDU by the peer entity, or the loss of a RESET ACK PDU from the peer entity. The value of the timer is signalled by upper layers.

In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of a RESET PDU is indicated by lower layer. In UTRAN it should be started when a RESET PDU is submitted to lower layer.

Timer_RST shall only be stopped upon reception of a RESET ACK PDU (with same RSN as RESET PDU), i.e. this timer shall not be stopped when an RLC reset initiated by the peer RLC entity occurs. If this timer expires, the RESET PDU shall be retransmitted.

i) Timer_MRW.

This timer is used to trigger the retransmission of a status report containing an MRW SUFI field. The value of the timer is signalled by upper layers.

In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of a STATUS PDU containing the MRW SUFI is indicated by lower layer. In UTRAN, it should be started when a STATUS PDU containing the MRW SUFI is submitted to lower layer.

Each time the timer expires the MRW SUFI is retransmitted ~~and the timer is restarted~~. It shall be stopped when one of the termination criteria for the SDU discard with explicit signalling procedure is fulfilled (see subclause 11.6.4).

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:

1) "No_Discard after MaxDAT number of transmissions" is configured and VT(DAT) equals the value MaxDAT (see subclause 9.7.3.4);

2) VT(MRW) equals the value MaxMRW;

3) A STATUS PDU including "erroneous Sequence Number" is received (see clause 10);

   - stop transmitting any AMD PDU or STATUS PDU;
   - increment VT(RST) by 1;
   - if VT(RST) = MaxRST:
     - the Sender may submit to the lower layer a RESET PDU;
     - perform the actions specified in subclause 11.4.4a.
   - else (if VT(RST) < MaxRST):
     - submit a RESET PDU to the lower layer;
     - start the timer Timer_RST according to the description in ~~section~~subclause 9.5.

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

When a reset procedure has been initiated it can only be ended upon reception of a RESET ACK PDU with the same RSN value as in the corresponding RESET PDU, or upon request of re-establishment or release from upper layer, a reset procedure is not interrupted by the reception of a RESET PDU from the peer entity.

11.4.5 Abnormal cases

11.4.5.1 Timer_RST timeout

If Timer_RST expires before the reset procedure is terminated, the Sender shall:

- increment VT(RST) by one;
- if VT(RST)<MaxRST:
  - set the RESET PDU as previously transmitted (even if additional SDUs were discarded in the mean-time);
  - transmit the RESET PDU;
  - restart Timer_RST according to the description in subclause~~section~~ 9.5.
- else (if VT(RST) = MaxRST):
  - perform the actions specified in subclause 11.4.4a.

11.6.5 Expiration of timer Timer_MRW

If Timer_MRW expires before the discard procedure is terminated, the Sender shall:

- increment VT(MRW) by one;
- if VT(MRW)<MaxMRW:
  - set the MRW SUFI as previously transmitted (even if additional SDUs were discarded in the mean-time);

- include the MRW SUFI in a new status report (if other SUFIs are included, their contents shall be updated);
- transmit the status report by either including it in a STATUS PDU or piggybacked in an AMD PDU;
- restart Timer_MRW for this discard procedure according to the description in subclause~~section~~ 9.5.

- else (if VT(MRW) = MaxMRW):
  - perform the actions specified in subclause 11.6.4a.

3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th August 2003

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CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **244** ⌘ **rev** **-** ⌘ Current version: **4.9.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Correction of MRW and RESET timers in RLC
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	15/08/2003
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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	There are currently discrepancies in the RLC specification of the way the MRW and RESET timers are started in the UE.
Summary of change:	⌘	Add restarted to the section specifying when each timer is started. In chapter 11, subclause 9.5 is referenced whenever a timer needs to be re-configured.
Consequences if not approved:	⌘	Timer starting timing would be unpredictable at the network. Networks would need to select the values very conservatively, resulting in significantly reduced performance.

Clauses affected:	⌘	8.6.3.1			
Other specs affected:	⌘	**Y**	**N**		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:
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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.

9.5 Timers

The timers defined in this subclause are normative. The timers shall be considered active from the time they are started until the time they either expire or are stopped.

a) Timer_Poll.

This timer shall only be used when so configured by upper layers. The value of the timer is signalled by upper layers. In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of an AMD PDU containing a poll is indicated by lower layer. In UTRAN it should be started when an AMD PDU containing a poll is submitted to lower layer. If x is the value of the state variable VT(S) after the poll was submitted to lower layer, the timer shall be stopped upon receiving:

- positive acknowledgements for all the AMD PDUs with "Sequence Number" up to and including x - 1; or
- a negative acknowledgement for the AMD PDU with "Sequence Number" = x - 1.

If the timer expires and no STATUS PDU fulfilling the criteria above has been received:

- the Receiver shall be polled once more;
- the timer shall be restarted; and
- the new value of VT(S) shall be saved.

If a new poll is sent when the timer is active, the timer shall be restarted at the time specified above, and the value of VT(S) shall be saved.

b) Timer_Poll_Prohibit.

This timer shall only be used when so configured by upper layers. It is used to prohibit transmission of polls within a certain period. The value of the timer is signalled by upper layers.

In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of an AMD PDU containing a poll is indicated by lower layer. In UTRAN it should be started when an AMD PDU containing a poll is submitted to lower layer.

From the time a poll is triggered until the timer expires, polling is prohibited. If another poll is triggered while polling is prohibited, its transmission shall be delayed until the timer expires (see subclause 9.7.1). Only one poll shall be transmitted when Timer_Poll_Prohibit expires even if several polls were triggered in the meantime. This timer shall not be affected by the reception of STATUS PDUs.

When Timer_Poll_Prohibit is not configured by upper layers, polling is never prohibited.

c) Timer_EPC.

This timer shall only be used when the EPC function is configured by upper layers. It is meant to account for the roundtrip delay, i.e. the time between the transmission of a status report and the reception of the first retransmitted AMD PDU. The initial value of the timer is signalled by upper layers.

In the UE, this timer shall be started (or restarted) when the successful or unsuccessful transmission of the first STATUS PDU of a status report is indicated by lower layer. In UTRAN it should be started when the first STATUS PDU of a status report is submitted to lower layer. Only after Timer_EPC expires shall VR(EP) be decremented as described in subclause 9.7.4.

d) Timer_Discard.

This timer shall be used when timer-based SDU discard is configured by upper layers. The value of the timer is signalled by upper layers. In the transmitter, a new timer is started upon reception of an SDU from upper layer.

In UM/TM, if a timer expires before the corresponding SDU is submitted to lower layer, "SDU discard without explicit signalling" specified in subclauses 11.2.4.3 and 11.1.4.2 shall be initiated. In AM, if a timer expires before the corresponding SDU is acknowledged, "SDU discard with explicit signalling" specified in subclause 11.6 shall be initiated.

e) Timer_Poll_Periodic.

This timer shall only be used when "timer based polling" is configured by upper layers. The value of the timer is signalled by upper layers. The timer shall be started when the RLC entity is created. When the timer expires, the RLC entity shall:

- restart the timer;
- if AMD PDUs are available for transmission or retransmission (not yet acknowledged):
  - trigger a poll.

f) Timer_Status_Prohibit.

This timer shall only be used when so configured by upper layers. It is meant to prohibit the Receiver from sending consecutive acknowledgement status reports. A status report is an acknowledgement status report if it contains any of the SUFIs LIST, BITMAP, RLIST or ACK. The value of the timer is signalled by upper layers.

In the UE, this timer shall be started (or restarted) when the successful or unsuccessful transmission of the last STATUS PDU of an acknowledgement status report is indicated by lower layer. In UTRAN it should be started when the last STATUS PDU of an acknowledgement status report is submitted to lower layer.

From the time an acknowledgement status report is triggered until the Timer_Status_Prohibit timer expires, acknowledgement is prohibited. If another such status report is triggered while acknowledgement is prohibited, its transmission shall be delayed until the timer expires (see subclause 9.7.2). The status report may be updated during this time. The transmission of SUFIs MRW, MRW_ACK, WINDOW or NO_MORE is not restricted.

When Timer_Status_Prohibit is not configured by upper layers, acknowledgment is not prohibited.

g) Timer_Status_Periodic.

This timer shall only be used when timer based status reporting is configured by upper layers.

This timer shall be started when the RLC entity is created. When the timer expires the transmission of a status report shall be triggered and the timer shall be restarted. This timer can be blocked by upper layers. The timer shall be restarted when upper layers indicate that it is no longer blocked.

h) Timer_RST.

This timer is meant to handle the loss of a RESET PDU by the peer entity, or the loss of a RESET ACK PDU from the peer entity. The value of the timer is signalled by upper layers.

In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of a RESET PDU is indicated by lower layer. In UTRAN it should be started when a RESET PDU is submitted to lower layer.

Timer_RST shall only be stopped upon reception of a RESET ACK PDU (with same RSN as RESET PDU), i.e. this timer shall not be stopped when an RLC reset initiated by the peer RLC entity occurs. If this timer expires, the RESET PDU shall be retransmitted.

i) Timer_MRW.

This timer is used to trigger the retransmission of a status report containing an MRW SUFI field. The value of the timer is signalled by upper layers.

In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of a STATUS PDU containing the MRW SUFI is indicated by lower layer. In UTRAN, it should be started when a STATUS PDU containing the MRW SUFI is submitted to lower layer.

Each time the timer expires the MRW SUFI is retransmitted ~~and the timer is restarted~~. It shall be stopped when one of the termination criteria for the SDU discard with explicit signalling procedure is fulfilled (see subclause 11.6.4).

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:

1) "No_Discard after MaxDAT number of transmissions" is configured and VT(DAT) equals the value MaxDAT (see subclause 9.7.3.4);

2) VT(MRW) equals the value MaxMRW;

3) A STATUS PDU including "erroneous Sequence Number" is received (see clause 10);

   - stop transmitting any AMD PDU or STATUS PDU;
   - increment VT(RST) by 1;
   - if VT(RST) = MaxRST:
     - the Sender may submit to the lower layer a RESET PDU;
     - perform the actions specified in subclause 11.4.4a.
   - else (if VT(RST) < MaxRST):
     - submit a RESET PDU to the lower layer;
     - start the timer Timer_RST according to the description in subclause~~section~~ 9.5.

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

When a reset procedure has been initiated it can only be ended upon reception of a RESET ACK PDU with the same RSN value as in the corresponding RESET PDU, or upon request of re-establishment or release from upper layer, a reset procedure is not interrupted by the reception of a RESET PDU from the peer entity.

11.4.5 Abnormal cases

11.4.5.1 Timer_RST timeout

If Timer_RST expires before the reset procedure is terminated, the Sender shall:

- increment VT(RST) by one;
- if VT(RST)<MaxRST:
  - set the RESET PDU as previously transmitted (even if additional SDUs were discarded in the mean-time);
  - transmit the RESET PDU;
  - restart Timer_RST according to the description in subclause~~section~~ 9.5.
- else (if VT(RST) = MaxRST):
  - perform the actions specified in subclause 11.4.4a.

11.6.5 Expiration of timer Timer_MRW

If Timer_MRW expires before the discard procedure is terminated, the Sender shall:

- increment VT(MRW) by one;
- if VT(MRW)<MaxMRW:
  - set the MRW SUFI as previously transmitted (even if additional SDUs were discarded in the mean-time);

- include the MRW SUFI in a new status report (if other SUFIs are included, their contents shall be updated);
- transmit the status report by either including it in a STATUS PDU or piggybacked in an AMD PDU;
- restart Timer_MRW for this discard procedure according to the description in subclause~~section~~ 9.5~~.~~.

- else (if VT(MRW) = MaxMRW):
  - perform the actions specified in subclause 11.6.4a.

3GPP TSG-RAN2 Meeting #37
Budapest, Hungary, 25th August 2003

Tdoc ⌘R2-032019

CR-Form-v7

CHANGE REQUEST

⌘ **25.322** **CR** **245** ⌘ **rev** **-** ⌘ Current version: **5.5.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Correction of MRW and RESET timers in RLC
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	15/08/2003
Category:	⌘	**A**
Release:	⌘	Rel-5

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:

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Reason for change:	⌘	There are currently discrepancies in the RLC specification of the way the MRW and RESET timers are started in the UE.
Summary of change:	⌘	Add restarted to the section specifying when each timer is started. In chapter 11, subclause 9.5 is referenced whenever a timer needs to be re-configured.
Consequences if not approved:	⌘	Timer starting timing would be unpredictable at the network. Networks would need to select the values very conservatively, resulting in significantly reduced performance.

Clauses affected:	⌘	8.6.3.1

Other specs affected: ⌘	Y	N	
		X	Other core specifications
		X	Test specifications
		X	O&M Specifications

⌘

Other comments: ⌘

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- positive acknowledgements for all the AMD PDUs with "Sequence Number" up to and including x - 1; or
- a negative acknowledgement for the AMD PDU with "Sequence Number" = x - 1.

If the timer expires and no STATUS PDU fulfilling the criteria above has been received:

- the Receiver shall be polled once more;
- the timer shall be restarted; and
- the new value of VT(S) shall be saved.

If a new poll is sent when the timer is active, the timer shall be restarted at the time specified above, and the value of VT(S) shall be saved.

b) Timer_Poll_Prohibit.

This timer shall only be used when so configured by upper layers. It is used to prohibit transmission of polls within a certain period. The value of the timer is signalled by upper layers.

In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of an AMD PDU containing a poll is indicated by lower layer. In UTRAN it should be started when an AMD PDU containing a poll is submitted to lower layer.

From the time a poll is triggered until the timer expires, polling is prohibited. If another poll is triggered while polling is prohibited, its transmission shall be delayed until the timer expires (see subclause 9.7.1). Only one poll shall be transmitted when Timer_Poll_Prohibit expires even if several polls were triggered in the meantime. This timer shall not be affected by the reception of STATUS PDUs.

When Timer_Poll_Prohibit is not configured by upper layers, polling is never prohibited.

c) Timer_EPC.

This timer shall only be used when the EPC function is configured by upper layers. It is meant to account for the roundtrip delay, i.e. the time between the transmission of a status report and the reception of the first retransmitted AMD PDU. The initial value of the timer is signalled by upper layers.

In the UE, this timer shall be started (or restarted) when the successful or unsuccessful transmission of the first STATUS PDU of a status report is indicated by lower layer. In UTRAN it should be started when the first STATUS PDU of a status report is submitted to lower layer. Only after Timer_EPC expires shall VR(EP) be decremented as described in subclause 9.7.4.

d) Timer_Discard.

This timer shall be used when timer-based SDU discard is configured by upper layers. The value of the timer is signalled by upper layers. In the transmitter, a new timer is started upon reception of an SDU from upper layer.

In UM/TM, if a timer expires before the corresponding SDU is submitted to lower layer, "SDU discard without explicit signalling" specified in subclauses 11.2.4.3 and 11.1.4.2 shall be initiated. In AM, if a timer expires before the corresponding SDU is acknowledged, "SDU discard with explicit signalling" specified in subclause 11.6 shall be initiated.

e) Timer_Poll_Periodic.

This timer shall only be used when "timer based polling" is configured by upper layers. The value of the timer is signalled by upper layers. The timer shall be started when the RLC entity is created. When the timer expires, the RLC entity shall:

- restart the timer;
- if AMD PDUs are available for transmission or retransmission (not yet acknowledged):
  - trigger a poll.

f) Timer_Status_Prohibit.

This timer shall only be used when so configured by upper layers. It is meant to prohibit the Receiver from sending consecutive acknowledgement status reports. A status report is an acknowledgement status report if it contains any of the SUFIs LIST, BITMAP, RLIST or ACK. The value of the timer is signalled by upper layers.

In the UE, this timer shall be started (or restarted) when the successful or unsuccessful transmission of the last STATUS PDU of an acknowledgement status report is indicated by lower layer. In UTRAN it should be started when the last STATUS PDU of an acknowledgement status report is submitted to lower layer.

From the time an acknowledgement status report is triggered until the Timer_Status_Prohibit timer expires, acknowledgement is prohibited. If another such status report is triggered while acknowledgement is prohibited, its transmission shall be delayed until the timer expires (see subclause 9.7.2). The status report may be updated during this time. The transmission of SUFIs MRW, MRW_ACK, WINDOW or NO_MORE is not restricted.

When Timer_Status_Prohibit is not configured by upper layers, acknowledgment is not prohibited.

g) Timer_Status_Periodic.

This timer shall only be used when timer based status reporting is configured by upper layers.

This timer shall be started when the RLC entity is created. When the timer expires the transmission of a status report shall be triggered and the timer shall be restarted. This timer can be blocked by upper layers. The timer shall be restarted when upper layers indicate that it is no longer blocked.

h) Timer_RST.

This timer is meant to handle the loss of a RESET PDU by the peer entity, or the loss of a RESET ACK PDU from the peer entity. The value of the timer is signalled by upper layers.

In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of a RESET PDU is indicated by lower layer. In UTRAN it should be started when a RESET PDU is submitted to lower layer.

Timer_RST shall only be stopped upon reception of a RESET ACK PDU (with same RSN as RESET PDU), i.e. this timer shall not be stopped when an RLC reset initiated by the peer RLC entity occurs. If this timer expires, the RESET PDU shall be retransmitted.

i) Timer_MRW.

This timer is used to trigger the retransmission of a status report containing an MRW SUFI field. The value of the timer is signalled by upper layers.

In the UE this timer shall be started (or restarted) when the successful or unsuccessful transmission of a STATUS PDU containing the MRW SUFI is indicated by lower layer. In UTRAN, it should be started when a STATUS PDU containing the MRW SUFI is submitted to lower layer.

Each time the timer expires the MRW SUFI is retransmitted ~~and the timer is restarted~~. It shall be stopped when one of the termination criteria for the SDU discard with explicit signalling procedure is fulfilled (see subclause 11.6.4).

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:

1) "No_Discard after MaxDAT number of transmissions" is configured and VT(DAT) equals the value MaxDAT (see subclause 9.7.3.4);

2) VT(MRW) equals the value MaxMRW;

3) A STATUS PDU including "erroneous Sequence Number" is received (see clause 10);

   - stop transmitting any AMD PDU or STATUS PDU;
   - increment VT(RST) by 1;
   - if VT(RST) = MaxRST:
     - the Sender may submit to the lower layer a RESET PDU;
     - perform the actions specified in subclause 11.4.4a.
   - else (if VT(RST) < MaxRST):
     - submit a RESET PDU to the lower layer;
     - start the timer Timer_RST according to the description in subclause~~section~~ 9.5.

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

When a reset procedure has been initiated it can only be ended upon reception of a RESET ACK PDU with the same RSN value as in the corresponding RESET PDU, or upon request of re-establishment or release from upper layer, a reset procedure is not interrupted by the reception of a RESET PDU from the peer entity.

11.4.5 Abnormal cases

11.4.5.1 Timer_RST timeout

If Timer_RST expires before the reset procedure is terminated, the Sender shall:

- increment VT(RST) by one;
- if VT(RST)<MaxRST:
  - set the RESET PDU as previously transmitted (even if additional SDUs were discarded in the mean-time);
  - transmit the RESET PDU;
  - restart Timer_RST according to the description in subclause~~section~~ 9.5.
- else (if VT(RST) = MaxRST):
  - perform the actions specified in subclause 11.4.4a.

11.6.5 Expiration of timer Timer_MRW

If Timer_MRW expires before the discard procedure is terminated, the Sender shall:

- increment VT(MRW) by one;
- if VT(MRW)<MaxMRW:
  - set the MRW SUFI as previously transmitted (even if additional SDUs were discarded in the mean-time);

- include the MRW SUFI in a new status report (if other SUFIs are included, their contents shall be updated);
- transmit the status report by either including it in a STATUS PDU or piggybacked in an AMD PDU;
- restart Timer_MRW for this discard procedure according to the description in subclause~~section~~ 9.5~~.~~.

- else (if VT(MRW) = MaxMRW):
  - perform the actions specified in subclause 11.6.4a.