

TSG-RAN Meeting #17
Biarritz, France, 3 - 6 September 2002

RP-020539

Title: Agreed CRs (Release '99 and Rel-4/Rel-5 category A) to TS 25.322
Source: TSG-RAN WG2
Agenda item: 7.2.3

Doc-1st-	Status-	Spec	CR	Rev	Phase	Subject	Cat	Versio	Versio
R2-022354	agreed	25.322	196		R99	Correction to the behaviour after expiration of Timer_MRW during the SDU discard with explicit signalling procedure	F	3.11.0	3.12.0
R2-022355	agreed	25.322	197		Rel-4	Correction to the behaviour after expiration of Timer_MRW during the SDU discard with explicit signalling procedure	A	4.5.0	4.6.0
R2-022356	agreed	25.322	198		Rel-5	Correction to the behaviour after expiration of Timer_MRW during the SDU discard with explicit signalling procedure	A	5.1.0	5.2.0
R2-022357	agreed	25.322	199		R99	Corrections of RLC re-transmissions	F	3.11.0	3.12.0
R2-022358	agreed	25.322	200		Rel-4	Corrections of RLC re-transmissions	A	4.5.0	4.6.0
R2-022359	agreed	25.322	201		Rel-5	Corrections of RLC re-transmissions	A	5.1.0	5.2.0
R2-022360	agreed	25.322	202		R99	Corrections to RLC RESET procedure	F	3.11.0	3.12.0
R2-022361	agreed	25.322	203		Rel-4	Corrections to RLC RESET procedure	A	4.5.0	4.6.0
R2-022362	agreed	25.322	204		Rel-5	Corrections to RLC RESET procedure	A	5.1.0	5.2.0
R2-022363	agreed	25.322	205		R99	Corrections on handling of timers during a RLC reset or re-establishment	F	3.11.0	3.12.0
R2-022364	agreed	25.322	206		Rel-4	Corrections on handling of timers during a RLC reset or re-establishment	A	4.5.0	4.6.0
R2-022365	agreed	25.322	207		Rel-5	Corrections on handling of timers during a RLC reset or re-establishment	A	5.1.0	5.2.0

CHANGE REQUEST

25.322 CR 196 # rev - # Current version: 3.11.0

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 behaviour after expiration of Timer_MRW during the SDU discard with explicit signalling procedure.	
Source:	#	TSG-RAN WG2	
Work item code:	#	TEI	Date: # 19/08/2002
Category:	#	F	Release: # R99
		Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900.	Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	#	The state variable VT(MRW) should incremented by 1 each time an MRW SUFI is scheduled to be transmitted. In 25.322 v3.11.0, a error was introduced in section 11.6.5 (CR 190r1) where is is wrongly said that VT(RST) shall be incremented by 1 and not VT(MRW).
Summary of change:	#	The state variable VT(RST) is corrected to be VT(MRW) in section 11.6.5.
		Impact analysis: Impacted functionality: AM SDU Discard with explicit signalling. Correction to a function where the specification was containing some contradictions. It is assumes that the clarifications are inline with RAN2 assumptions: - If the CR is not implemented in UE or UTRAN: Erroneous interpretation of the current specification may lead to udesirable unecovrable error of the RLC entities and possibly RLC failure in case SDU discard with explicit signalling is configured (no RESET would be triggered before). - If UE and UTRAN is implemented according to current RAN2 assumptions, the CR has no impact.
Consequences if not approved:	#	Contradictions in specification. Risk for udesirable RLC failure that would prohibit the UE and UTRAN to exchange information in case SDU discard with explicit signalling is configured.

Clauses affected:	#	11.6.5		
		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">Y</td> <td style="padding: 2px 5px;">N</td> </tr> </table>	Y	N
Y	N			

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

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.

11.6.5 Expiration of timer Timer_MRW

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

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

CHANGE REQUEST

⌘ **25.322 CR 197** ⌘ rev **-** ⌘ Current version: **4.5.0** ⌘

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 behaviour after expiration of Timer_MRW during the SDU discard with explicit signalling procedure.																				
Source:	⌘ TSG-RAN WG2																				
Work item code:	⌘ TEI Date: ⌘ 19/08/2002																				
Category:	<table border="0"> <tr> <td>⌘ A</td> <td>Release: ⌘ Rel-4</td> </tr> <tr> <td>Use <u>one</u> of the following categories:</td> <td>Use <u>one</u> of the following releases:</td> </tr> <tr> <td>F (correction)</td> <td>2 (GSM Phase 2)</td> </tr> <tr> <td>A (corresponds to a correction in an earlier release)</td> <td>R96 (Release 1996)</td> </tr> <tr> <td>B (addition of feature),</td> <td>R97 (Release 1997)</td> </tr> <tr> <td>C (functional modification of feature)</td> <td>R98 (Release 1998)</td> </tr> <tr> <td>D (editorial modification)</td> <td>R99 (Release 1999)</td> </tr> <tr> <td>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</td> <td>Rel-4 (Release 4)</td> </tr> <tr> <td></td> <td>Rel-5 (Release 5)</td> </tr> <tr> <td></td> <td>Rel-6 (Release 6)</td> </tr> </table>	⌘ A	Release: ⌘ Rel-4	Use <u>one</u> of the following categories:	Use <u>one</u> of the following releases:	F (correction)	2 (GSM Phase 2)	A (corresponds to a correction in an earlier release)	R96 (Release 1996)	B (addition of feature),	R97 (Release 1997)	C (functional modification of feature)	R98 (Release 1998)	D (editorial modification)	R99 (Release 1999)	Detailed explanations of the above categories can be found in 3GPP TR 21.900.	Rel-4 (Release 4)		Rel-5 (Release 5)		Rel-6 (Release 6)
⌘ A	Release: ⌘ Rel-4																				
Use <u>one</u> of the following categories:	Use <u>one</u> of the following releases:																				
F (correction)	2 (GSM Phase 2)																				
A (corresponds to a correction in an earlier release)	R96 (Release 1996)																				
B (addition of feature),	R97 (Release 1997)																				
C (functional modification of feature)	R98 (Release 1998)																				
D (editorial modification)	R99 (Release 1999)																				
Detailed explanations of the above categories can be found in 3GPP TR 21.900.	Rel-4 (Release 4)																				
	Rel-5 (Release 5)																				
	Rel-6 (Release 6)																				

Reason for change:	⌘ Shadow CR The state variable VT(MRW) should incremented by 1 each time an MRW SUFI is scheduled to be transmitted. In 25.322 v3.11.0, a error was introduced in section 11.6.5 (CR 190r1) where is is wrongly said that VT(RST) shall be incremented by 1 and not VT(MRW).
Summary of change:	⌘ The state variable VT(RST) is corrected to be VT(MRW) in section 11.6.5. Impact analysis: Impacted functionality: AM SDU Discard with explicit signalling. Correction to a function where the specification was containing some contradictions. It is assumes that the clarifications are inline with RAN2 assumptions: - If the CR is not implemented in UE or UTRAN: Erroneous interpretation of the current specification may lead to udesirable unecovrable error of the RLC entities and possibly RLC failure in case SDU discard with explicit signalling is configured (no RESET would be triggered before). - If UE and UTRAN is implemented according to current RAN2 assumptions, the CR has no impact.
Consequences if not approved:	⌘ Contradictions in specification. Risk for udesirable RLC failure that would prohibit the UE and UTRAN to exchange information in case SDU discard with explicit signalling is configured.

Clauses affected:	⌘ 11.6.5
--------------------------	----------

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.

11.6.5 Expiration of timer Timer_MRW

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

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

CHANGE REQUEST

25.322 CR 198 # rev **-** # Current version: **5.1.0**

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

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

Title:	#	Correction to the behaviour after expiration of Timer_MRW during the SDU discard with explicit signalling procedure.	
Source:	#	TSG-RAN WG2	
Work item code:	#	TEI	Date: # 19/08/2002
Category:	#	A	Release: # Rel-5
		Use <u>one</u> of the following categories: <i>F</i> (correction) <i>A</i> (corresponds to a correction in an earlier release) <i>B</i> (addition of feature), <i>C</i> (functional modification of feature) <i>D</i> (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900.	Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	#	Shadow CR The state variable VT(MRW) should incremented by 1 each time an MRW SUFI is scheduled to be transmitted. In 25.322 v3.11.0, a error was introduced in section 11.6.5 (CR 190r1) where is is wrongly said that VT(RST) shall be incremented by 1 and not VT(MRW).
Summary of change:	#	The state variable VT(RST) is corrected to be VT(MRW) in section 11.6.5. Impact analysis: Impacted functionality: AM SDU Discard with explicit signalling. Correction to a function where the specification was containing some contradictions. It is assumes that the clarifications are inline with RAN2 assumptions: - If the CR is not implemented in UE or UTRAN: Erroneous interpretation of the current specification may lead to udesirable unecovrable error of the RLC entities and possibly RLC failure in case SDU discard with explicit signalling is configured (no RESET would be triggered before). - If UE and UTRAN is implemented according to current RAN2 assumptions, the CR has no impact.
Consequences if not approved:	#	Contradictions in specification. Risk for udesirable RLC failure that would prohibit the UE and UTRAN to exchange information in case SDU discard with explicit signalling is configured.

Clauses affected:	#	11.6.5
--------------------------	---	--------

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.

11.6.5 Expiration of timer Timer_MRW

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

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

3GPP TSG-RAN2 Meeting #31
Arlanda, Sweden, 19th-23rd August 2002

Tdoc # R2-022357

CR-Form-v7	CHANGE REQUEST
# 25.322 CR 199 # rev - # Current version: 3.b.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:	# Corrections to RLC retransmissions		
Source:	# TSG-RAN WG2		
Work item code:	# TEI	Date:	# 2002-08-22
Category:	# F	Release:	# R99
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
	B (addition of feature),		R97 (Release 1997)
	C (functional modification of feature)		R98 (Release 1998)
	D (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	# In the RLC specification retransmissions of AMD PDUs are mandated in two cases: <ol style="list-style-type: none"> 1) one ore more PDUs are negatively acknowledged by a STATUS PDU 2) one of the polling mechanisms "timer based" or "timer poll" triggers a poll to be transmitted and the only way to transmit the poll is to perform a retransmission (i.e. no new PDUs available to carry te poll). <p>However, according to the specification the UE is also allowed to spontaneously perform retransmissions even of the retransmission is not caused by any of the mechanisms mentioned above. This flexibility causes some problems:</p> <p>A UE implementation may perform retransmissions of each PDU a large number of times causing excessive interference in the system and degrade the system performance.</p> <p>Since the described freedom also does not bring any clear benefit it is proposed to remove it.</p>
Summary of change:	# The possibility to perform retransmissions of AMD PDUs is limited to the cases where the retransmissions are caused by negative acknowledgements or the expiry of poll timers. <p>If the CR is implemented only in the UE, the system works and the excessive interference is avoided in uplink.</p> <p>If the CR is implemented only in UTRAN, the system works and the excessive interference is avoided in downlink.</p>

		If the CR is implemented both in the UE and in UTRAN , the system works and the excessive interference is avoided in downlink	
Consequences if not approved:	⌘	Potential excessive interference caused by unwanted spontaneous retransmissions.	
		Impacts on T1 test specifications: If the CR is not agreed, RLC test cases in T1 needs to be redesigned.	

Clauses affected:	⌘	11.3.2											
Other specs affected:	⌘	<table border="1"> <tr> <td>Y</td> <td>N</td> </tr> <tr> <td></td> <td>X</td> </tr> <tr> <td>X</td> <td></td> </tr> <tr> <td></td> <td>X</td> </tr> </table>	Y	N		X	X			X	Other core specifications Test specifications O&M Specifications	⌘	T1 affected if the CR is <i>not</i> approved
Y	N												
	X												
X													
	X												
Other comments:	⌘	T1 specifications are affected in the sense that RLC tests needs to be redesigned if the CR is not agreed.											

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.

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 the RLC SDUs into AMD PDUs where the fixed PDU size is configured by upper layer;
 - 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).

~~The Sender may also schedule an AMD PDU for retransmission even if none of the criteria above is fulfilled. In this case, the Sender may:~~

- ~~—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.~~

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;
- else:
 - 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 #31
Arlanda, Sweden, 19th-23rd August 2002

Tdoc # R2-022358

CR-Form-v7
CHANGE REQUEST
25.322 CR 200 # rev - # Current version: 4.5.0

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:	# Corrections to RLC retransmissions		
Source:	# TSG-RAN WG2		
Work item code:	# TEI	Date:	# 2002-08-22
Category:	# A	Release:	# Rel-4
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
	B (addition of feature),		R97 (Release 1997)
	C (functional modification of feature)		R98 (Release 1998)
	D (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	# In the RLC specification retransmissions of AMD PDUs are mandated in two cases: <ol style="list-style-type: none"> 1) one ore more PDUs are negatively acknowledged by a STATUS PDU 2) one of the polling mechanisms "timer based" or "timer poll" triggers a poll to be transmitted and the only way to transmit the poll is to perform a retransmission (i.e. no new PDUs available to carry te poll). <p>However, according to the specification the UE is also allowed to spontaneously perform retransmissions even of the retransmission is not caused by any of the mechanisms mentioned above. This flexibility causes some problems:</p> <p>A UE implementation may perform retransmissions of each PDU a large number of times causing excessive interference in the system and degrade the system performance.</p> <p>Since the described freedom also does not bring any clear benefit it is proposed to remove it.</p>
Summary of change:	# The possibility to perform retransmissions of AMD PDUs is limited to the cases where the retransmissions are caused by negative acknowledgements or the expiry of poll timers. <p>If the CR is implemented only in the UE, the system works and the excessive interference is avoided in uplink.</p> <p>If the CR is implemented only in UTRAN, the system works and the excessive interference is avoided in downlink.</p>

		If the CR is implemented both in the UE and in UTRAN , the system works and the excessive interference is avoided in downlink	
Consequences if not approved:	⌘	Potential excessive interference caused by unwanted spontaneous retransmissions.	
		Impacts on T1 test specifications: If the CR is not agreed, RLC test cases in T1 needs to be redesigned.	

Clauses affected:	⌘	11.3.2											
Other specs affected:	⌘	<table border="1"> <tr> <td>Y</td> <td>N</td> </tr> <tr> <td></td> <td>X</td> </tr> <tr> <td>X</td> <td></td> </tr> <tr> <td></td> <td>X</td> </tr> </table>	Y	N		X	X			X	Other core specifications Test specifications O&M Specifications	⌘	T1 affected if the CR is <i>not</i> approved
Y	N												
	X												
X													
	X												
Other comments:	⌘	T1 specifications are affected in the sense that RLC tests needs to be redesigned if the CR is not agreed.											

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.

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 the RLC SDUs into AMD PDUs where the fixed PDU size is configured by upper layer;
 - 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).

~~The Sender may also schedule an AMD PDU for retransmission even if none of the criteria above is fulfilled. In this case, the Sender may:~~

- ~~—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.~~

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;
- else:
 - 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 #31
Arlanda, Sweden, 19th-23rd August 2002

Tdoc # R2-022359

<small>CR-Form-v7</small>
<h2 style="margin: 0;">CHANGE REQUEST</h2>
25.322 CR 201 # rev - # Current version: 5.1.0

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

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

Title:	# Corrections to RLC retransmissions		
Source:	# TSG-RAN WG2		
Work item code:	# TEI	Date:	# 2002-08-22
Category:	# A	Release:	# Rel-5
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	# In the RLC specification retransmissions of AMD PDUs are mandated in two cases: 1) one ore more PDUs are negatively acknowledged by a STATUS PDU 2) one of the polling mechanisms "timer based" or "timer poll" triggers a poll to be transmitted and the only way to transmit the poll is to perform a retransmission (i.e. no new PDUs available to carry te poll). However, according to the specification the UE is also allowed to spontaneously perform retransmissions even of the retransmission is not caused by any of the mechanisms mentioned above. This flexibility causes some problems: A UE implementation may perform retransmissions of each PDU a large number of times causing excessive interference in the system and degrade the system performance. Since the described freedom also does not bring any clear benefit it is proposed to remove it.
Summary of change:	# The possibility to perform retransmissions of AMD PDUs is limited to the cases where the retransmissions are caused by negative acknowledgements or the expiry of poll timers. If the CR is implemented only in the UE , the system works and the excessive interference is avoided in uplink. If the CR is implemented only in UTRAN , the system works and the excessive interference is avoided in downlink.

		If the CR is implemented both in the UE and in UTRAN , the system works and the excessive interference is avoided in downlink	
Consequences if not approved:	⌘	Potential excessive interference caused by unwanted spontaneous retransmissions.	
		Impacts on T1 test specifications: If the CR is not agreed, RLC test cases in T1 needs to be redesigned.	

Clauses affected:	⌘	11.3.2											
Other specs affected:	⌘	<table border="1"> <tr> <td>Y</td> <td>N</td> </tr> <tr> <td></td> <td>X</td> </tr> <tr> <td>X</td> <td></td> </tr> <tr> <td></td> <td>X</td> </tr> </table>	Y	N		X	X			X	Other core specifications Test specifications O&M Specifications	⌘	T1 affected if the CR is <i>not</i> approved
Y	N												
	X												
X													
	X												
Other comments:	⌘	T1 specifications are affected in the sense that RLC tests needs to be redesigned if the CR is not agreed.											

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.

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 the RLC SDUs into AMD PDUs where the fixed PDU size is configured by upper layer;
 - 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).

~~The Sender may also schedule an AMD PDU for retransmission even if none of the criteria above is fulfilled. In this case, the Sender may:~~

- ~~—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.~~

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;
- else:
 - 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.

CR-Form-v7

CHANGE REQUEST

⌘ **25.322 CR 202** ⌘ rev **-** ⌘ Current version: **3.b.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:	⌘ Corrections to RLC RESET procedure		
Source:	⌘ TSG-RAN WG2.		
Work item code:	⌘ TEI	Date:	⌘ 21/08/2002
Category:	⌘ F	Release:	⌘ R99
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ The current RLC RESET procedure causes HFN out-of-sync problem when simultaneous RESET procedure occurs.
Summary of change:	⌘ When the Sender of the RESET PDU receives another RESET PDU sent by its peer before receiving its corresponding RESET ACK PDU, the Sender, after setting the HFN equal to the HFNI field in the received RESET PDU, shall not increase the HFN values.
	Impact analysis: Impact is isolated to the simultaneous RLC RESET procedure. The change is essential, but can be seen as a correction to an earlier CR producing error. If UE or UTRAN does not follow this change, the HFNs will be out-of-sync after the simultaneous RLC RESET procedure
Consequences if not approved:	⌘ HFN values will still be out-of-sync after the simultaneous RESET procedure.

Clauses affected:	⌘ 11.4.5.3						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	⌘	
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Test specifications	<input type="checkbox"/>	<input checked="" type="checkbox"/>	⌘			
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> O&M Specifications	<input type="checkbox"/>	<input checked="" type="checkbox"/>	⌘			
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
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.

11.4 RLC reset procedure

11.4.1 General

The RLC reset procedure is used to reset two RLC peer entities, which are operating in acknowledged mode. Figure 11.4 below illustrates the elementary procedure for an RLC reset. During the reset procedure the hyper frame numbers (HFN) in UTRAN and UE are synchronised. Two HFNs used for ciphering needs to be synchronised, DL HFN in downlink and UL HFN in uplink. In the reset procedure, the highest UL HFN and DL HFN used by the RLC entity in the transmitting sides, i.e. the HFNs associated with AMD PDUs of "Sequence Number"= $VT(S)-1$ if at least one AMD PDU had been transmitted or of "Sequence Number"=0 if no AMD PDU had been transmitted, are exchanged between UE and UTRAN.

The RESET PDUs and the RESET ACK PDUs have higher priority than AMD PDUs.

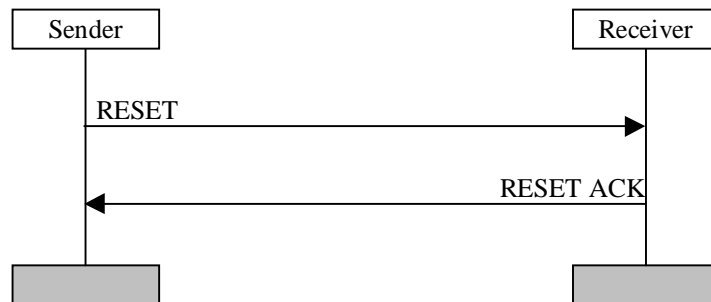


Figure 11.4: RLC reset procedure

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:
 - 1) "No_Discard after MaxDAT number of retransmissions" 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 $VT(RST) = MaxRST$:
 - 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.

11.4.2.1 RESET PDU contents to set

The Sender shall:

- set the HFNI field to the currently highest used HFN (DL HFN when the RESET PDU is sent by UTRAN or UL HFN when the RESET PDU is sent by the UE);
- set the RSN field to the sequence number of the RESET PDU. The sequence number of the first RESET PDU after the AM entity is established or re-established shall be "0". This sequence number is incremented every time a new RESET PDU is transmitted, but not when a RESET PDU is retransmitted.

11.4.3 Reception of the RESET PDU by the Receiver

Upon reception of a RESET PDU the Receiver shall:

- if the RSN value in the RESET PDU is the same as the RSN value in the last received RESET PDU:
 - only submit a RESET ACK PDU to the lower layer with the contents set exactly as in the last transmitted RESET ACK PDU (i.e., in this case the RLC entity is not reset).
- if the RESET PDU is the first RESET PDU received since the entity was (re-)established or the RSN value is different from the RSN value in the last received RESET PDU:
 - submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
 - reset the state variables described in subclause 9.4 except VT(RST) to their initial values;
 - stop all the timers described in subclause 9.5 except Timer_RST;
 - reset configurable parameters to their configured values;
 - discard all RLC PDUs in the receiving side of the AM RLC entity;
 - discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
 - set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;
 - increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.

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 SDUs discard in the transmitting side of the AM RLC entity until the end of the next TTI.

11.4.3.1 RESET ACK PDU contents to set

The Receiver shall:

- set the hyper frame number indicator field (HFNI) to the currently highest used HFN (DL HFN when the RESET ACK PDU is sent by UTRAN or UL HFN when the RESET ACK PDU is sent by the UE);
- set the RSN field to the same value as in the corresponding received RESET PDU.

11.4.4 Reception of the RESET ACK PDU by the Sender

Upon reception of a RESET ACK PDU, the Sender shall:

- if the Sender has already transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU:
 - if the received RSN value is the same as the one in the corresponding RESET PDU:
 - set the HFN value (DL HFN when the RESET ACK PDU is received in UE or UL HFN when the RESET ACK PDU is received in UTRAN) to the HFNI field of the received RESET ACK PDU;

- reset the state variables described in subclause 9.4 to their initial values;
- stop all the timers described in subclause 9.5;
- reset configurable parameters to their configured values;
- discard all RLC PDUs in the receiving side of the AM RLC entity;
- discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
- increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure;
- otherwise (if the received RSN value is not the same as the one in the corresponding RESET PDU):
 - discard the RESET ACK PDU;
- otherwise (if the Sender has not transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU):
 - discard the RESET ACK PDU.

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 SDUs discard in the transmitting side until the end of the next TTI.

11.4.4a Reached maximum number of attempts

If $VT(RST) = MaxRST$, the Sender shall:

- terminate the ongoing RLC RESET procedure;
- stop the timer `Timer_RST` if it was started;
- indicate unrecoverable error to upper layer.

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`.
- else (if $VT(RST) = MaxRST$):
 - perform the actions specified in subclause 11.4.4a.

11.4.5.2 Void

11.4.5.3 Reception of the RESET PDU by the Sender

Upon reception of a RESET PDU, the Sender shall:

- submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
 - reset the state variables described in subclause 9.4 except VT(RST) to their initial values;
 - stop all the timers described in subclause 9.5 except Timer_RST;
 - reset configurable parameters to their configured values;
 - discard all RLC PDUs in the receiving side of the AM RLC entity;
 - discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
 - set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;
- ~~increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.~~

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 SDUs discard in the transmitting side until the end of the next TTI.

CR-Form-v7

CHANGE REQUEST

⌘ **25.322 CR 203** ⌘ rev **-** ⌘ Current version: **4.5.0** ⌘

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:	⌘ Corrections to RLC RESET procedure		
Source:	⌘ TSG-RAN WG2.		
Work item code:	⌘ TEI	Date:	⌘ 21/08/2002
Category:	⌘ A	Release:	⌘ Rel-4
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ The current RLC RESET procedure causes HFN out-of-sync problem when simultaneous RESET procedure occurs.
Summary of change:	⌘ When the Sender of the RESET PDU receives another RESET PDU sent by its peer before receiving its corresponding RESET ACK PDU, the Sender, after setting the HFN equal to the HFNI field in the received RESET PDU, shall not increase the HFN values.
	Impact analysis: Impact is isolated to the simultaneous RLC RESET procedure. The change is essential, but can be seen as a correction to an earlier CR producing error. If UE or UTRAN does not follow this change, the HFNs will be out-of-sync after the simultaneous RLC RESET procedure
Consequences if not approved:	⌘ HFN values will still be out-of-sync after the simultaneous RESET procedure.

Clauses affected:	⌘ 11.4.5.3						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	⌘	
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Test specifications	<input checked="" type="checkbox"/>	⌘				
<input checked="" type="checkbox"/>							
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> O&M Specifications	<input checked="" type="checkbox"/>	⌘				
<input checked="" type="checkbox"/>							
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.

11.4 RLC reset procedure

11.4.1 General

The RLC reset procedure is used to reset two RLC peer entities, which are operating in acknowledged mode. Figure 11.4 below illustrates the elementary procedure for an RLC reset. During the reset procedure the hyper frame numbers (HFN) in UTRAN and UE are synchronised. Two HFNs used for ciphering needs to be synchronised, DL HFN in downlink and UL HFN in uplink. In the reset procedure, the highest UL HFN and DL HFN used by the RLC entity in the transmitting sides, i.e. the HFNs associated with AMD PDUs of "Sequence Number"= $VT(S)-1$ if at least one AMD PDU had been transmitted or of "Sequence Number"=0 if no AMD PDU had been transmitted, are exchanged between UE and UTRAN.

The RESET PDUs and the RESET ACK PDUs have higher priority than AMD PDUs.

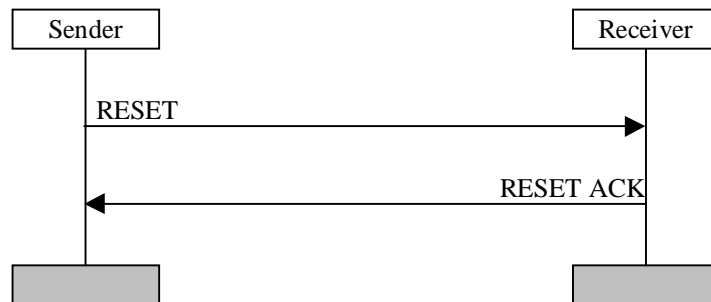


Figure 11.4: RLC reset procedure

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:
 - 1) "No_Discard after MaxDAT number of retransmissions" 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 $VT(RST) = MaxRST$:
 - 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.

11.4.2.1 RESET PDU contents to set

The Sender shall:

- set the HFNI field to the currently highest used HFN (DL HFN when the RESET PDU is sent by UTRAN or UL HFN when the RESET PDU is sent by the UE);
- set the RSN field to the sequence number of the RESET PDU. The sequence number of the first RESET PDU after the AM entity is established or re-established shall be "0". This sequence number is incremented every time a new RESET PDU is transmitted, but not when a RESET PDU is retransmitted.

11.4.3 Reception of the RESET PDU by the Receiver

Upon reception of a RESET PDU the Receiver shall:

- if the RSN value in the RESET PDU is the same as the RSN value in the last received RESET PDU:
 - only submit a RESET ACK PDU to the lower layer with the contents set exactly as in the last transmitted RESET ACK PDU (i.e., in this case the RLC entity is not reset).
- if the RESET PDU is the first RESET PDU received since the entity was (re-)established or the RSN value is different from the RSN value in the last received RESET PDU:
 - submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
 - reset the state variables described in subclause 9.4 except VT(RST) to their initial values;
 - stop all the timers described in subclause 9.5 except Timer_RST;
 - reset configurable parameters to their configured values;
 - discard all RLC PDUs in the receiving side of the AM RLC entity;
 - discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
 - set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;
 - increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.

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 SDUs discard in the transmitting side of the AM RLC entity until the end of the next TTI.

11.4.3.1 RESET ACK PDU contents to set

The Receiver shall:

- set the hyper frame number indicator field (HFNI) to the currently highest used HFN (DL HFN when the RESET ACK PDU is sent by UTRAN or UL HFN when the RESET ACK PDU is sent by the UE);
- set the RSN field to the same value as in the corresponding received RESET PDU.

11.4.4 Reception of the RESET ACK PDU by the Sender

Upon reception of a RESET ACK PDU, the Sender shall:

- if the Sender has already transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU:
 - if the received RSN value is the same as the one in the corresponding RESET PDU:
 - set the HFN value (DL HFN when the RESET ACK PDU is received in UE or UL HFN when the RESET ACK PDU is received in UTRAN) to the HFNI field of the received RESET ACK PDU;

- reset the state variables described in subclause 9.4 to their initial values;
- stop all the timers described in subclause 9.5;
- reset configurable parameters to their configured values;
- discard all RLC PDUs in the receiving side of the AM RLC entity;
- discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
- increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure;
- otherwise (if the received RSN value is not the same as the one in the corresponding RESET PDU):
 - discard the RESET ACK PDU;
- otherwise (if the Sender has not transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU):
 - discard the RESET ACK PDU.

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 SDUs discard in the transmitting side until the end of the next TTI.

11.4.4a Reached maximum number of attempts

If $VT(RST) = MaxRST$, the Sender shall:

- terminate the ongoing RLC RESET procedure;
- stop the timer `Timer_RST` if it was started;
- indicate unrecoverable error to upper layer.

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`.
- else (if $VT(RST) = MaxRST$):
 - perform the actions specified in subclause 11.4.4a.

11.4.5.2 Void

11.4.5.3 Reception of the RESET PDU by the Sender

Upon reception of a RESET PDU, the Sender shall:

- submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
- reset the state variables described in subclause 9.4 except VT(RST) to their initial values;
- stop all the timers described in subclause 9.5 except Timer_RST;
- reset configurable parameters to their configured values;
- discard all RLC PDUs in the receiving side of the AM RLC entity;
- discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
- set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;
- ~~— increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.~~

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 SDUs discard in the transmitting side until the end of the next TTI.

CHANGE REQUEST

⌘ **25.322 CR 204** ⌘ rev **-** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘ Corrections to RLC RESET procedure		
Source:	⌘ TSG-RAN WG2.		
Work item code:	⌘ TEI	Date:	⌘ 21/08/2002
Category:	⌘ A	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(GSM Phase 2)
	A (corresponds to a correction in an earlier release)	R96	(Release 1996)
	B (addition of feature),	R97	(Release 1997)
	C (functional modification of feature)	R98	(Release 1998)
	D (editorial modification)	R99	(Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Rel-4	(Release 4)
		Rel-5	(Release 5)
		Rel-6	(Release 6)

Reason for change:	⌘ The current RLC RESET procedure causes HFN out-of-sync problem when simultaneous RESET procedure occurs.
Summary of change:	⌘ When the Sender of the RESET PDU receives another RESET PDU sent by its peer before receiving its corresponding RESET ACK PDU, the Sender, after setting the HFN equal to the HFNI field in the received RESET PDU, shall not increase the HFN values.
	Impact analysis: Impact is isolated to the simultaneous RLC RESET procedure. The change is essential, but can be seen as a correction to an earlier CR producing error. If UE or UTRAN does not follow this change, the HFNs will be out-of-sync after the simultaneous RLC RESET procedure
Consequences if not approved:	⌘ HFN values will still be out-of-sync after the simultaneous RESET procedure.

Clauses affected:	⌘ 11.4.5.3						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<input checked="" type="checkbox"/>	Test specifications					
	<input checked="" type="checkbox"/>	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.

11.4 RLC reset procedure

11.4.1 General

The RLC reset procedure is used to reset two RLC peer entities, which are operating in acknowledged mode. Figure 11.4 below illustrates the elementary procedure for an RLC reset. During the reset procedure the hyper frame numbers (HFN) in UTRAN and UE are synchronised. Two HFNs used for ciphering needs to be synchronised, DL HFN in downlink and UL HFN in uplink. In the reset procedure, the highest UL HFN and DL HFN used by the RLC entity in the transmitting sides, i.e. the HFNs associated with AMD PDUs of "Sequence Number"= $VT(S)-1$ if at least one AMD PDU had been transmitted or of "Sequence Number"=0 if no AMD PDU had been transmitted, are exchanged between UE and UTRAN.

The RESET PDUs and the RESET ACK PDUs have higher priority than AMD PDUs.

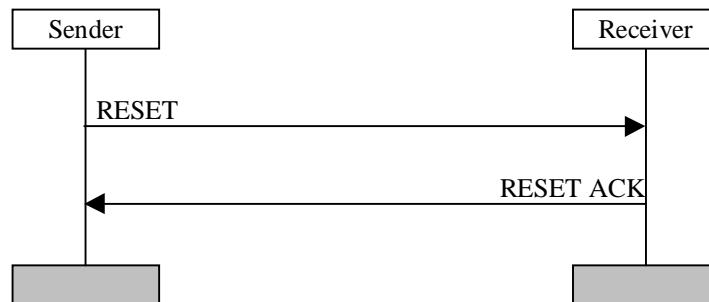


Figure 11.4: RLC reset procedure

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:
 - 1) "No_Discard after MaxDAT number of retransmissions" 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 $VT(RST) = MaxRST$:
 - 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.

11.4.2.1 RESET PDU contents to set

The Sender shall:

- set the HFNI field to the currently highest used HFN (DL HFN when the RESET PDU is sent by UTRAN or UL HFN when the RESET PDU is sent by the UE);
- set the RSN field to the sequence number of the RESET PDU. The sequence number of the first RESET PDU after the AM entity is established or re-established shall be "0". This sequence number is incremented every time a new RESET PDU is transmitted, but not when a RESET PDU is retransmitted.

11.4.3 Reception of the RESET PDU by the Receiver

Upon reception of a RESET PDU the Receiver shall:

- if the RSN value in the RESET PDU is the same as the RSN value in the last received RESET PDU:
 - only submit a RESET ACK PDU to the lower layer with the contents set exactly as in the last transmitted RESET ACK PDU (i.e., in this case the RLC entity is not reset).
- if the RESET PDU is the first RESET PDU received since the entity was (re-)established or the RSN value is different from the RSN value in the last received RESET PDU:
 - submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
 - reset the state variables described in subclause 9.4 except VT(RST) to their initial values;
 - stop all the timers described in subclause 9.5 except Timer_RST;
 - reset configurable parameters to their configured values;
 - discard all RLC PDUs in the receiving side of the AM RLC entity;
 - discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
 - set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;
 - increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.

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 SDUs discard in the transmitting side of the AM RLC entity until the end of the next TTI.

11.4.3.1 RESET ACK PDU contents to set

The Receiver shall:

- set the hyper frame number indicator field (HFNI) to the currently highest used HFN (DL HFN when the RESET ACK PDU is sent by UTRAN or UL HFN when the RESET ACK PDU is sent by the UE);
- set the RSN field to the same value as in the corresponding received RESET PDU.

11.4.4 Reception of the RESET ACK PDU by the Sender

Upon reception of a RESET ACK PDU, the Sender shall:

- if the Sender has already transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU:
 - if the received RSN value is the same as the one in the corresponding RESET PDU:
 - set the HFN value (DL HFN when the RESET ACK PDU is received in UE or UL HFN when the RESET ACK PDU is received in UTRAN) to the HFNI field of the received RESET ACK PDU;

- reset the state variables described in subclause 9.4 to their initial values;
- stop all the timers described in subclause 9.5;
- reset configurable parameters to their configured values;
- discard all RLC PDUs in the receiving side of the AM RLC entity;
- discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
- increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure;
- otherwise (if the received RSN value is not the same as the one in the corresponding RESET PDU):
 - discard the RESET ACK PDU;
- otherwise (if the Sender has not transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU):
 - discard the RESET ACK PDU.

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 SDUs discard in the transmitting side until the end of the next TTI.

11.4.4a Reached maximum number of attempts

If $VT(RST) = MaxRST$, the Sender shall:

- terminate the ongoing RLC RESET procedure;
- stop the timer `Timer_RST` if it was started;
- indicate unrecoverable error to upper layer.

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`.
- else (if $VT(RST) = MaxRST$):
 - perform the actions specified in subclause 11.4.4a.

11.4.5.2 Void

11.4.5.3 Reception of the RESET PDU by the Sender

Upon reception of a RESET PDU, the Sender shall:

- submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
- reset the state variables described in subclause 9.4 except VT(RST) to their initial values;
- stop all the timers described in subclause 9.5 except Timer_RST;
- reset configurable parameters to their configured values;
- discard all RLC PDUs in the receiving side of the AM RLC entity;
- discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
- set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;
- ~~— increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.~~

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 SDUs discard in the transmitting side until the end of the next TTI.

CHANGE REQUEST

⌘ **25.322 CR 205** ⌘ rev **-** ⌘ Current version: **3.11.0** ⌘

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:	⌘ Corrections on handling of timers during a RLC reset or re-establishment		
Source:	⌘ TSG-RAN WG2		
Work item code:	⌘ TEI	Date:	⌘ 22/08/2002
Category:	⌘ F	Release:	⌘ R99
	<p>Use <u>one</u> of the following categories:</p> <p>F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>		<p>Use <u>one</u> of the following releases:</p> <p>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)</p>

Reason for change:	⌘	<ol style="list-style-type: none"> 1. Handling of timers during a RLC re-establishment is not specified in subclause 9.7.7. 2. By the current specification, all the timers except Timer_RST shall be stoped during a RLC reset. This behaviour might lead to deadlock for cases that not all the polling functions and STATUS transmission triggers are configured. 3. For SDUs that are not discarded during reset, the corresponding Timer_Discard is stopped by the current specification. This will change the QoS requirement of the SDUs.
Summary of change:	⌘	<ol style="list-style-type: none"> 1. When a RLC UM entity is re-established, the RLC UM entity shall not stop Timer_Discard if the RLC SDU is not discarded. 4.2. When a RLC AM entity is re-established, the RLC AM entity shall stop all timers described in subclause 9.5 and start except Timer_Poll_Periodic and Timer_Status_Periodic. 2.3. Upon reception of a RESET PDU or a RESET ACK PDU, the RLC entity shall stop all the timers described in subclause 9.5 except Timer_RST, Timer_Discard, Timer_Poll_Periodic, and Timer_Status_Periodic. <p>Impact Analysis:</p> <ol style="list-style-type: none"> 1. The affected functionalities are isolated in timer handling during RLC reset and reconfiguration. 2. Since the corrected behaviours do not affect the peer entity, there are no foreseen backward compatibility problems.
Consequences if not approved:	⌘	Deadlock probably occurs after a RLC reset or a RLC re-establishment.

Clauses affected:	⌘	9.7.7, 11.4.3, 11.4.4, 11.4.5.3.
--------------------------	---	----------------------------------

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.

9.7.7 RLC re-establishment function for acknowledged and unacknowledged mode

The upper layers may re-establish an RLC entity.

The RLC re-establishment function is applicable for AM and UM and is used when upper layers request an RLC entity to be re-established.

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

- reset the state variables to their initial value;
- set the configurable parameters to their configured value;
- set the hyper frame number (HFN) in UL and DL to the value configured by upper layers;
- if the RLC entity is operating in unacknowledged mode:
 - if it is a receiving UM RLC entity:
 - discard all UMD PDUs;
 - if it is a transmitting UM RLC entity:
 - discard the RLC SDUs for which one or more segments have been submitted to a lower layer;
 - not stop Timer_Discard if the RLC SDU is not discarded;
- otherwise if the RLC entity is operating in acknowledged mode:
 - discard all AMD PDUs and control PDUs in both the receiving side and the transmitting side of the RLC entity;-
 - stop all timers described in subclause 9.5 except ~~Timer_Discard~~ Timer_Poll_Periodic and Timer_Status_Periodic.;
 - ~~start Timer_Poll_Periodic and Timer_Status_Periodic if they are configured.~~

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

11.4 RLC reset procedure

11.4.1 General

The RLC reset procedure is used to reset two RLC peer entities, which are operating in acknowledged mode. Figure 11.4 below illustrates the elementary procedure for an RLC reset. During the reset procedure the hyper frame numbers (HFN) in UTRAN and UE are synchronised. Two HFNs used for ciphering needs to be synchronised, DL HFN in downlink and UL HFN in uplink. In the reset procedure, the highest UL HFN and DL HFN used by the RLC entity in the transmitting sides, i.e. the HFNs associated with AMD PDUs of "Sequence Number"=VT(S)-1 if at least one AMD PDU had been transmitted or of "Sequence Number"=0 if no AMD PDU had been transmitted, are exchanged between UE and UTRAN.

The RESET PDUs and the RESET ACK PDUs have higher priority than AMD PDUs.

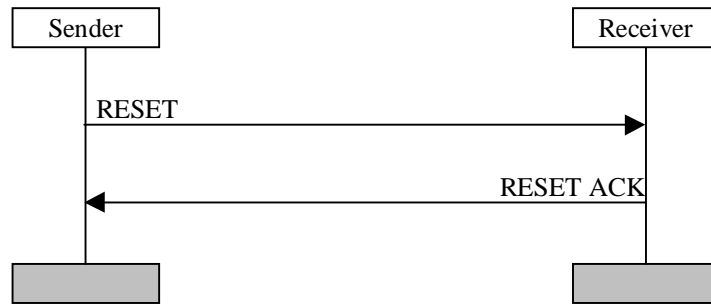


Figure 11.4: RLC reset procedure

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:
 - 1) "No_Discard after MaxDAT number of retransmissions" 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.

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.

11.4.2.1 RESET PDU contents to set

The Sender shall:

- set the HFNI field to the currently highest used HFN (DL HFN when the RESET PDU is sent by UTRAN or UL HFN when the RESET PDU is sent by the UE);
- set the RSN field to the sequence number of the RESET PDU. The sequence number of the first RESET PDU after the AM entity is established or re-established shall be "0". This sequence number is incremented every time a new RESET PDU is transmitted, but not when a RESET PDU is retransmitted.

11.4.3 Reception of the RESET PDU by the Receiver

Upon reception of a RESET PDU the Receiver shall:

- if the RSN value in the RESET PDU is the same as the RSN value in the last received RESET PDU:
 - either only submit a RESET ACK PDU to the lower layer with the contents set exactly as in the last transmitted RESET ACK PDU (i.e., in this case the RLC entity is not reset); or
 - perform the actions specified below as if the RSN value was different from the RSN value in the last received RESET PDU.
- otherwise, if the RESET PDU is the first RESET PDU received since the entity was (re-)established or the RSN value is different from the RSN value in the last received RESET PDU:
 - submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
 - reset the state variables described in subclause 9.4 except VT(RST) to their initial values;
 - stop all the timers described in subclause 9.5 except [Timer_RST](#), [Timer_Discard](#), [Timer_Poll_Periodic](#), and [Timer_Status_Periodic](#);
 - reset configurable parameters to their configured values;
 - discard all RLC PDUs in the receiving side of the AM RLC entity;
 - discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
 - set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;
 - increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.

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 SDUs discard in the transmitting side of the AM RLC entity until the end of the next TTI.

11.4.3.1 RESET ACK PDU contents to set

The Receiver shall:

- set the hyper frame number indicator field (HFNI) to the currently highest used HFN (DL HFN when the RESET ACK PDU is sent by UTRAN or UL HFN when the RESET ACK PDU is sent by the UE);
- set the RSN field to the same value as in the corresponding received RESET PDU.

11.4.4 Reception of the RESET ACK PDU by the Sender

Upon reception of a RESET ACK PDU, the Sender shall:

- if the Sender has already transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU:
 - if the received RSN value is the same as the one in the corresponding RESET PDU:
 - set the HFN value (DL HFN when the RESET ACK PDU is received in UE or UL HFN when the RESET ACK PDU is received in UTRAN) to the HFNI field of the received RESET ACK PDU;
 - reset the state variables described in subclause 9.4 to their initial values;
 - stop all the timers described in subclause 9.5 [except Timer_Discard, Timer_Poll_Periodic, and Timer_Status_Periodic](#);
 - reset configurable parameters to their configured values;
 - discard all RLC PDUs in the receiving side of the AM RLC entity;
 - discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;

- increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure;
- otherwise (if the received RSN value is not the same as the one in the corresponding RESET PDU):
 - discard the RESET ACK PDU;
- otherwise (if the Sender has not transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU):
 - discard the RESET ACK PDU.

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 SDUs discard in the transmitting side until the end of the next TTI.

11.4.4a Reached maximum number of attempts

If $VT(RST) = MaxRST$, the Sender shall:

- terminate the ongoing RLC RESET procedure;
- stop the timer `Timer_RST` if it was started;
- indicate unrecoverable error to upper layer.

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`.
- else (if $VT(RST) = MaxRST$):
 - perform the actions specified in subclause 11.4.4a.

11.4.5.2 Void

11.4.5.3 Reception of the RESET PDU by the Sender

Upon reception of a RESET PDU, the Sender shall:

- submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
- reset the state variables described in subclause 9.4 except $VT(RST)$ to their initial values;
- stop all the timers described in subclause 9.5 except `Timer_RST`, [Timer Discard](#), [Timer Poll Periodic](#), and [Timer Status Periodic](#);
- reset configurable parameters to their configured values;
- discard all RLC PDUs in the receiving side of the AM RLC entity;

- discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
- set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;
- increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.

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 SDUs discard in the transmitting side until the end of the next TTI.

CR-Form-v7

CHANGE REQUEST

⌘ **25.322 CR 206** ⌘ rev **-** ⌘ Current version: **4.5.0** ⌘

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:	⌘ Corrections on handling of timers during a RLC reset or re-establishment		
Source:	⌘ TSG-RAN WG2		
Work item code:	⌘ TEI	Date:	⌘ 22/08/2002
Category:	⌘ A	Release:	⌘ Rel-4
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(GSM Phase 2)
	A (corresponds to a correction in an earlier release)	R96	(Release 1996)
	B (addition of feature),	R97	(Release 1997)
	C (functional modification of feature)	R98	(Release 1998)
	D (editorial modification)	R99	(Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Rel-4	(Release 4)
		Rel-5	(Release 5)
		Rel-6	(Release 6)

Reason for change:	⌘	<ol style="list-style-type: none"> 1. Handling of timers during a RLC re-establishment is not specified in subclause 9.7.7. 2. By the current specification, all the timers except Timer_RST shall be stoped during a RLC reset. This behaviour might lead to deadlock for cases that not all the polling functions and STATUS transmission triggers are configured. 3. For SDUs that are not discarded during reset, the corresponding Timer_Discard is stopped by the current specification. This will change the QoS requirement of the SDUs.
Summary of change:	⌘	<ol style="list-style-type: none"> 1. <u>When a RLC UM entity is re-established, the RLC UM entity shall not stop Timer_Discard if the RLC SDU is not discarded.</u> 4.2. <u>When a RLC AM entity is re-established, the RLC AM entity shall stop all timers described in subclause 9.5 and start except Timer_Poll_Periodic and Timer_Status_Periodic.</u> 2.3. <u>Upon reception of a RESET PDU or a RESET ACK PDU, the RLC entity shall stop all the timers described in subclause 9.5 except Timer_RST, Timer_Discard, Timer_Poll_Periodic, and Timer_Status_Periodic.</u>
Consequences if not approved:	⌘	Deadlock probably occurs after a RLC reset or a RLC re-establishment.

Clauses affected:	⌘	9.7.7, 11.4.3, 11.4.4, 11.4.5.3.										
Other specs affected:	⌘	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> </table>	Y	N		X		X		X	Other core specifications Test specifications O&M Specifications	⌘
Y	N											
	X											
	X											
	X											

Other comments: ☒

How to create CRs using this form:

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

- 1) Fill out the above form. The symbols above marked ☒ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9.7.7 RLC re-establishment function for acknowledged and unacknowledged mode

The upper layers may re-establish an RLC entity.

The RLC re-establishment function is applicable for AM and UM and is used when upper layers request an RLC entity to be re-established.

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

- reset the state variables to their initial value;
- set the configurable parameters to their configured value;
- set the hyper frame number (HFN) in UL and DL to the value configured by upper layers;
- if the RLC entity is operating in unacknowledged mode:
 - if it is a receiving UM RLC entity:
 - discard all UMD PDUs;
 - if it is a transmitting UM RLC entity:
 - discard the RLC SDUs for which one or more segments have been submitted to a lower layer;
 - not stop Timer Discard if the RLC SDU is not discarded;
- otherwise if the RLC entity is operating in acknowledged mode:
 - discard all AMD PDUs and control PDUs in both the receiving side and the transmitting side of the RLC entity;-
 - stop all timers described in subclause 9.5 except Timer Poll Periodic and Timer Status Periodic.;
 - ~~start Timer Poll Periodic and Timer Status Periodic if they are configured.~~

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

11.4 RLC reset procedure

11.4.1 General

The RLC reset procedure is used to reset two RLC peer entities, which are operating in acknowledged mode. Figure 11.4 below illustrates the elementary procedure for an RLC reset. During the reset procedure the hyper frame numbers (HFN) in UTRAN and UE are synchronised. Two HFNs used for ciphering needs to be synchronised, DL HFN in downlink and UL HFN in uplink. In the reset procedure, the highest UL HFN and DL HFN used by the RLC entity in the transmitting sides, i.e. the HFNs associated with AMD PDUs of "Sequence Number"=VT(S)-1 if at least one AMD PDU had been transmitted or of "Sequence Number"=0 if no AMD PDU had been transmitted, are exchanged between UE and UTRAN.

The RESET PDUs and the RESET ACK PDUs have higher priority than AMD PDUs.

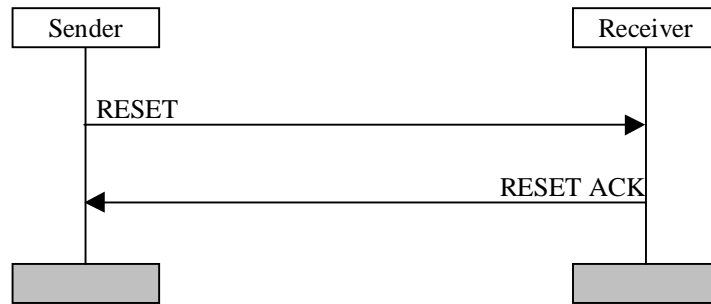


Figure 11.4: RLC reset procedure

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:
 - 1) "No_Discard after MaxDAT number of retransmissions" 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:
 - 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.

11.4.2.1 RESET PDU contents to set

The Sender shall:

- set the HFNI field to the currently highest used HFN (DL HFN when the RESET PDU is sent by UTRAN or UL HFN when the RESET PDU is sent by the UE);
- set the RSN field to the sequence number of the RESET PDU. The sequence number of the first RESET PDU after the AM entity is established or re-established shall be "0". This sequence number is incremented every time a new RESET PDU is transmitted, but not when a RESET PDU is retransmitted.

11.4.3 Reception of the RESET PDU by the Receiver

Upon reception of a RESET PDU the Receiver shall:

- if the RSN value in the RESET PDU is the same as the RSN value in the last received RESET PDU:

- only submit a RESET ACK PDU to the lower layer with the contents set exactly as in the last transmitted RESET ACK PDU (i.e., in this case the RLC entity is not reset).
- if the RESET PDU is the first RESET PDU received since the entity was (re-)established or the RSN value is different from the RSN value in the last received RESET PDU:
 - submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
 - reset the state variables described in subclause 9.4 except VT(RST) to their initial values;
 - stop all the timers described in subclause 9.5 except [Timer_RST](#), [Timer Discard](#), [Timer Poll Periodic](#), and [Timer Status Periodic](#);
 - reset configurable parameters to their configured values;
 - discard all RLC PDUs in the receiving side of the AM RLC entity;
 - discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
 - set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;
 - increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.

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 SDUs discard in the transmitting side of the AM RLC entity until the end of the next TTI.

11.4.3.1 RESET ACK PDU contents to set

The Receiver shall:

- set the hyper frame number indicator field (HFNI) to the currently highest used HFN (DL HFN when the RESET ACK PDU is sent by UTRAN or UL HFN when the RESET ACK PDU is sent by the UE);
- set the RSN field to the same value as in the corresponding received RESET PDU.

11.4.4 Reception of the RESET ACK PDU by the Sender

Upon reception of a RESET ACK PDU, the Sender shall:

- if the Sender has already transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU:
 - if the received RSN value is the same as the one in the corresponding RESET PDU:
 - set the HFN value (DL HFN when the RESET ACK PDU is received in UE or UL HFN when the RESET ACK PDU is received in UTRAN) to the HFNI field of the received RESET ACK PDU;
 - reset the state variables described in subclause 9.4 to their initial values;
 - stop all the timers described in subclause 9.5 [except Timer Discard](#), [Timer Poll Periodic](#), and [Timer Status Periodic](#);
 - reset configurable parameters to their configured values;
 - discard all RLC PDUs in the receiving side of the AM RLC entity;
 - discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
 - increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure;
 - otherwise (if the received RSN value is not the same as the one in the corresponding RESET PDU):

- discard the RESET ACK PDU;
- otherwise (if the Sender has not transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU):
 - discard the RESET ACK PDU.

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 SDUs discard in the transmitting side until the end of the next TTI.

11.4.4a Reached maximum number of attempts

If $VT(RST) = MaxRST$, the Sender shall:

- terminate the ongoing RLC RESET procedure;
- stop the timer `Timer_RST` if it was started;
- indicate unrecoverable error to upper layer.

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`.
- else (if $VT(RST) = MaxRST$):
 - perform the actions specified in subclause 11.4.4a.

11.4.5.2 Void

11.4.5.3 Reception of the RESET PDU by the Sender

Upon reception of a RESET PDU, the Sender shall:

- submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
- reset the state variables described in subclause 9.4 except $VT(RST)$ to their initial values;
- stop all the timers described in subclause 9.5 except `Timer_RST`, [Timer_Discard](#), [Timer_Poll_Periodic](#), and [Timer_Status_Periodic](#);
- reset configurable parameters to their configured values;
- discard all RLC PDUs in the receiving side of the AM RLC entity;
- discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
- set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;

- increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.

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 SDUs discard in the transmitting side until the end of the next TTI.

CHANGE REQUEST

⌘ **25.322 CR 207** ⌘ rev **-** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘ Corrections on handling of timers during a RLC reset or re-establishment		
Source:	⌘ TSG-RAN WG2		
Work item code:	⌘ TEI	Date:	⌘ 22/08/2002
Category:	⌘ A	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
	B (addition of feature),		R97 (Release 1997)
	C (functional modification of feature)		R98 (Release 1998)
	D (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	⌘	<ol style="list-style-type: none"> 1. Handling of timers during a RLC re-establishment is not specified in subclause 9.7.7. 2. By the current specification, all the timers except Timer_RST shall be stoped during a RLC reset. This behaviour might lead to deadlock for cases that not all the polling functions and STATUS transmission triggers are configured. 3. For SDUs that are not discarded during reset, the corresponding Timer_Discard is stopped by the current specification. This will change the QoS requirement of the SDUs.
---------------------------	---	---

Summary of change:	⌘	<ol style="list-style-type: none"> 1. When a RLC UM entity is re-established, the RLC UM entity shall not stop Timer_Discard if the RLC SDU is not discarded. 4.2. When a RLC AM entity is re-established, the RLC AM entity shall stop all timers described in subclause 9.5 and startexcept Timer_Poll_Periodic and Timer_Status_Periodic. 2.3. Upon reception of a RESET PDU or a RESET ACK PDU, the RLC entity shall stop all the timers described in subclause 9.5 except Timer_RST, Timer_Discard, Timer_Poll_Periodic, and Timer_Status_Periodic.
---------------------------	---	--

Consequences if not approved:	⌘	Deadlock probably occurs after a RLC reset or a RLC re-establishment.
--------------------------------------	---	---

Clauses affected:	⌘	9.7.7, 11.4.3, 11.4.4, 11.4.5.3.
--------------------------	---	----------------------------------

Other specs affected:	⌘	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> </table> Other core specifications ⌘ Test specifications ⌘ O&M Specifications ⌘	Y	N		X		X		X
Y	N									
	X									
	X									
	X									

Other comments: ☹

How to create CRs using this form:

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

- 1) Fill out the above form. The symbols above marked ☹ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9.7.7 RLC re-establishment function for acknowledged and unacknowledged mode

The upper layers may re-establish an RLC entity.

The RLC re-establishment function is applicable for AM and UM and is used when upper layers request an RLC entity to be re-established.

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

- reset the state variables to their initial value;
- set the configurable parameters to their configured value;
- set the hyper frame number (HFN) in UL and DL to the value configured by upper layers;
- if the RLC entity is operating in unacknowledged mode:
 - if it is a receiving UM RLC entity:
 - discard all UMD PDUs;
 - if it is a transmitting UM RLC entity:
 - discard the RLC SDUs for which one or more segments have been submitted to a lower layer;
 - not stop Timer Discard if the RLC SDU is not discarded;
- otherwise if the RLC entity is operating in acknowledged mode:
 - discard all AMD PDUs and control PDUs in both the receiving side and the transmitting side of the RLC entity;-
 - stop all timers described in subclause 9.5 except Timer Poll Periodic and Timer Status Periodic.;
 - ~~start Timer Poll Periodic and Timer Status Periodic if they are configured.~~

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

11.4 RLC reset procedure

11.4.1 General

The RLC reset procedure is used to reset two RLC peer entities, which are operating in acknowledged mode. Figure 11.4 below illustrates the elementary procedure for an RLC reset. During the reset procedure the hyper frame numbers (HFN) in UTRAN and UE are synchronised. Two HFNs used for ciphering needs to be synchronised, DL HFN in downlink and UL HFN in uplink. In the reset procedure, the highest UL HFN and DL HFN used by the RLC entity in the transmitting sides, i.e. the HFNs associated with AMD PDUs of "Sequence Number"=VT(S)-1 if at least one AMD PDU had been transmitted or of "Sequence Number"=0 if no AMD PDU had been transmitted, are exchanged between UE and UTRAN.

The RESET PDUs and the RESET ACK PDUs have higher priority than AMD PDUs.

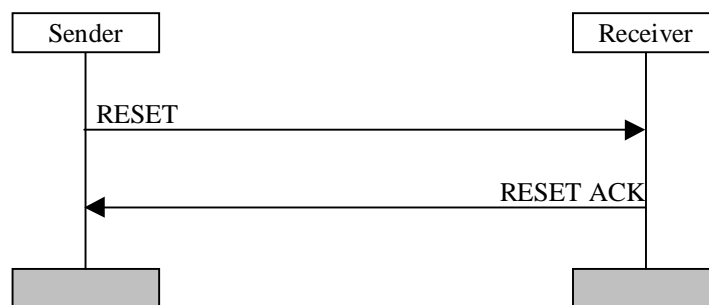


Figure 11.4: RLC reset procedure

11.4.2 Initiation

The Sender shall:

- if one of the following triggers is detected:
 - 1) "No_Discard after MaxDAT number of retransmissions" 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:
 - 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.

11.4.2.1 RESET PDU contents to set

The Sender shall:

- set the HFNI field to the currently highest used HFN (DL HFN when the RESET PDU is sent by UTRAN or UL HFN when the RESET PDU is sent by the UE);
- set the RSN field to the sequence number of the RESET PDU. The sequence number of the first RESET PDU after the AM entity is established or re-established shall be "0". This sequence number is incremented every time a new RESET PDU is transmitted, but not when a RESET PDU is retransmitted.

11.4.3 Reception of the RESET PDU by the Receiver

Upon reception of a RESET PDU the Receiver shall:

- if the RSN value in the RESET PDU is the same as the RSN value in the last received RESET PDU:

- only submit a RESET ACK PDU to the lower layer with the contents set exactly as in the last transmitted RESET ACK PDU (i.e., in this case the RLC entity is not reset).
- if the RESET PDU is the first RESET PDU received since the entity was (re-)established or the RSN value is different from the RSN value in the last received RESET PDU:
 - submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
 - reset the state variables described in subclause 9.4 except VT(RST) to their initial values;
 - stop all the timers described in subclause 9.5 except [Timer_RST](#), [Timer Discard](#), [Timer Poll Periodic](#), and [Timer Status Periodic](#);
 - reset configurable parameters to their configured values;
 - discard all RLC PDUs in the receiving side of the AM RLC entity;
 - discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
 - set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;
 - increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.

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 SDUs discard in the transmitting side of the AM RLC entity until the end of the next TTI.

11.4.3.1 RESET ACK PDU contents to set

The Receiver shall:

- set the hyper frame number indicator field (HFNI) to the currently highest used HFN (DL HFN when the RESET ACK PDU is sent by UTRAN or UL HFN when the RESET ACK PDU is sent by the UE);
- set the RSN field to the same value as in the corresponding received RESET PDU.

11.4.4 Reception of the RESET ACK PDU by the Sender

Upon reception of a RESET ACK PDU, the Sender shall:

- if the Sender has already transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU:
 - if the received RSN value is the same as the one in the corresponding RESET PDU:
 - set the HFN value (DL HFN when the RESET ACK PDU is received in UE or UL HFN when the RESET ACK PDU is received in UTRAN) to the HFNI field of the received RESET ACK PDU;
 - reset the state variables described in subclause 9.4 to their initial values;
 - stop all the timers described in subclause 9.5 [except Timer Discard](#), [Timer Poll Periodic](#), and [Timer Status Periodic](#);
 - reset configurable parameters to their configured values;
 - discard all RLC PDUs in the receiving side of the AM RLC entity;
 - discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
 - increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure;
 - otherwise (if the received RSN value is not the same as the one in the corresponding RESET PDU):

- discard the RESET ACK PDU;
- otherwise (if the Sender has not transmitted a RESET PDU which has not been yet acknowledged by a RESET ACK PDU):
 - discard the RESET ACK PDU.

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 SDUs discard in the transmitting side until the end of the next TTI.

11.4.4a Reached maximum number of attempts

If $VT(RST) = MaxRST$, the Sender shall:

- terminate the ongoing RLC RESET procedure;
- stop the timer `Timer_RST` if it was started;
- indicate unrecoverable error to upper layer.

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`.
- else (if $VT(RST) = MaxRST$):
 - perform the actions specified in subclause 11.4.4a.

11.4.5.2 Void

11.4.5.3 Reception of the RESET PDU by the Sender

Upon reception of a RESET PDU, the Sender shall:

- submit a RESET ACK PDU to the lower layer with the content set as specified in subclause 11.4.3.1;
- reset the state variables described in subclause 9.4 except $VT(RST)$ to their initial values;
- stop all the timers described in subclause 9.5 except `Timer_RST`, [Timer_Discard](#), [Timer_Poll_Periodic](#), and [Timer_Status_Periodic](#);
- reset configurable parameters to their configured values;
- discard all RLC PDUs in the receiving side of the AM RLC entity;
- discard all RLC SDUs that were transmitted before the reset in the transmitting side of the AM RLC entity;
- set the HFN (DL HFN when the RESET PDU is received in UE or UL HFN when the RESET PDU is received in UTRAN) equal to the HFNI field in the received RESET PDU;

- increase with one the UL HFN and DL HFN, and the updated HFN values shall be used for the first transmitted and received AMD PDUs after the reset procedure.

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 SDUs discard in the transmitting side until the end of the next TTI.