

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

RP-030494

Title: CRs (Rel-5) to TS 25.321.

Source: TSG-RAN WG2

Agenda item: 7.3.5

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Workitem
25.321	174	1	Rel-5	MAC-hs Re-ordering Protocol Correction & MAC-hs window re-ordering	F	5.5.0	5.6.0	R2-032038	HDPa-L23
25.321	175	-	Rel-5	Addition of HS-DSCH Provided Bit Rate measurement	C	5.5.0	5.6.0	R2-031936	HDPa-L23

CHANGE REQUEST

25.321 CR 174 # rev **1** # Current version: **5.5.0**

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

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

Title:	# MAC-hs Re-ordering Protocol Correction & MAC-hs window re-ordering		
Source:	# RAN WG2		
Work item code:	# HSDPA-L23	Date:	# 15/08/2003
Category:	# F	Release:	# Rel-5
	<p>Use <u>one</u> of the following categories:</p> <p>F (correction)</p> <p>A (corresponds to a correction in an earlier release)</p> <p>B (addition of feature),</p> <p>C (functional modification of feature)</p> <p>D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>		<p>Use <u>one</u> of the following releases:</p> <p>2 (GSM Phase 2)</p> <p>R96 (Release 1996)</p> <p>R97 (Release 1997)</p> <p>R98 (Release 1998)</p> <p>R99 (Release 1999)</p> <p>Rel-4 (Release 4)</p> <p>Rel-5 (Release 5)</p> <p>Rel-6 (Release 6)</p>

Reason for change:	# The current specification seems to imply that the data discarded when the window is advanced is not considered in the rest of the algorithm
	MAC-hs does not have strict memory restrictions as in the case of RLC. It is therefore beneficial to add some notes as to how the UEs can best discard data to reduce the buffer utilization in MAC-hs.
	Aligning the naming for the disassembly entity and the naming of the state variable next_expected_TSN.
Summary of change:	# We are clarifying that the UE should consider the data that are discarded when the window is moved as having been received.
	We are improving the wording (consider discarded data as having been received) by making use of the fact that next_expected_TSN indicates up to which SN there may be discarded data that should be considered as having been received.
	The CR was merged with contents from Tdoc R2-031726. The wording of the added text was modified to eliminate any kind of ambiguity and ensure that data would not be delivered out of sequence.
Consequences if not approved:	# Erroneous triggers of the timer T1 would take place for data that has already been discarded by the window. Protocol errors would occur if next_expected_TSN is allowed to be outside the receive window.
	UEs in lack of memory could have an erroneous behavior, including potentially delivering data out of order.

Discrepancy of the naming in the MAC-hs protocol.

Clauses affected:	⌘	11.6.2.3.2, 11.6.2.x										
Other specs affected:	⌘	<table border="1"><tr><th>Y</th><th>N</th></tr><tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr></table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘
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<input type="checkbox"/>	<input checked="" type="checkbox"/>											
		Test specifications										
		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.

11.6.2.3 Reordering entity

11.6.2.3.1 Definitions

In the functions described in this section the following definitions apply:

Parameters

- Transmitter window size (TRANSMIT_WINDOW_SIZE)
TRANSMIT_WINDOW_SIZE is the size of the transmitter window according to the definition below. This is a parameter in the Node B and the value of the parameter is configured by higher layers.
- Receiver window size (RECEIVE_WINDOW_SIZE)
RECEIVE_WINDOW_SIZE is the size of the receiver window according to the definition below. This is a parameter in the UE and the value of the parameter is configured by higher layers.

State variables

- nNext_expected_TSN:
The next_expected_TSN is the Transmission sequence number (TSN) following the TSN of the last in-sequence MAC-hs PDU received. It shall be updated upon the receipt of the MAC-hs PDU with TSN equal to nNext_expected_TSN. The initial value of nNext_expected_TSN =0.
- RcvWindow_UpperEdge:
The RcvWindow_UpperEdge represents the TSN, which is at the upper edge of the receiver window. After the first MAC-hs PDU has been received successfully, it also corresponds to the MAC-hs PDU with the highest TSN of all received MAC-hs PDUs. The initial RcvWindow_UpperEdge equals 63. RcvWindow_UpperEdge is updated based on the reception of new payloads according to the procedure given below.
- T1_TSN:
The TSN of the latest MAC-hs PDU that cannot be delivered to the disassembly ~~function~~entity, when the timer T1 is started.

Timers

- Re-ordering release timer (T1):
The Re-ordering release timer T1 controls the stall avoidance in the UE reordering buffer as described below. The value of T1 is configured by upper layers.

Other definitions

- Receiver window:
The receiver window defines TSNs of those MAC-hs PDUs that can be received in the receiver without causing an advancement of the receiver window according to the procedure below. The size of the receiver window equals RECEIVE_WINDOW_SIZE and spans TSNs going from RcvWindow_UpperEdge – RECEIVE_WINDOW_SIZE + 1 to RcvWindow_UpperEdge included.

11.6.2.3.2 Reordering functionality

If no timer T1 is active:

- the timer T1 shall be started when a MAC-hs PDU with TSN=~~SN~~ > next_expected_TSN is correctly received, ~~but can not be delivered to the disassembly function.~~
- T1_TSN shall be set to the TSN of this MAC-hs PDU.

If a timer T1 is already active:

- no additional timer shall be started, i.e. only one timer T1 may be active at a given time.

The timer T1 shall be stopped if:

- the MAC-hs PDU with TSN = T1_TSN can be delivered to the disassembly ~~function~~entity before the timer expires.

When the timer T1 expires and T1_TSN > next_expected_TSN:

- all correctly received MAC-hs PDUs with TSN > next_expected_TSN up to and including T1_TSN-1 shall be delivered to the disassembly ~~function~~entity ~~and they shall be removed from the reordering buffer and be considered as having been received~~;
- all correctly received MAC-hs PDUs up to the next not received MAC-hs PDU shall be delivered to the disassembly ~~function~~entity.
- next_expected_TSN shall be set to the TSN of the next not received MAC-hs PDU.

When the timer T1 is stopped or expires, and there still exist some received MAC-hs PDUs that can not be delivered to higher layer:

- timer T1 is started
- set T1_TSN to the highest TSN among those of the MAC-hs PDUs that can not be delivered.

Transmitter operation:

After the transmitter has transmitted a MAC-hs PDU with TSN=SN, any MAC-hs PDU with TSN ≤ SN – TRANSMIT_WINDOW_SIZE should not be retransmitted to avoid sequence number ambiguity in the receiver.

Receiver operation:

~~MAC-hs PDUs that have been discarded by the timer based mechanism shall be considered as having been received in the following procedure.~~

When a MAC-hs PDU with TSN = SN is received:

- If SN is within the receiver window:
 - if SN < next_expected_TSN, and/or this MAC-hs PDU has ~~not~~ previously been received:
 - the MAC-hs PDU shall be discarded.
 - else:
 - the MAC-hs PDU is placed in the reordering buffer at the place indicated by the TSN.

~~If SN is within the receiver window, and this MAC-hs PDU has been previously received:~~

~~the MAC-hs PDU shall be discarded.~~

- If SN is outside the receiver window:
 - the received MAC-hs PDU shall be placed above the highest received TSN in the reordering buffer, at the position indicated by SN;
 - RcvWindow_UpperEdge shall be set to SN thus advancing the receiver window;
 - any MAC-hs PDUs with TSN ≤ RcvWindow_UpperEdge – RECEIVE_WINDOW_SIZE, i.e. outside the receiver window after its position is updated, shall be removed from the reordering buffer and be delivered to the disassembly entity;
 - next_expected_TSN shall be set to RcvWindow_UpperEdge – RECEIVE_WINDOW_SIZE + 1;
 - All received MAC-hs PDUs with consecutive TSNs from next_expected_TSN (included) up to the first not received MAC-hs PDU are delivered to the disassembly entity.
 - next_expected_TSN shall be advanced~~set~~ to the TSN of this first not received MAC-hs PDU.

~~When~~ In case a UE ~~needs to release~~ has insufficient memory to process a received MAC-hs PDU, it shall perform the following set of operations:

- select TSN_flush such that: next_expected_TSN < TSN_flush < RcvWindow_UpperEdge + 1;
- deliver all correctly received MAC-hs PDUs with TSN < next_expected_TSN to the disassembly entity;
- set next_expected_TSN to TSN_flush.

11.6.2.4 Disassembly entity

For each MAC-hs PDU that is delivered to the disassembly ~~function~~entity, the UE shall:

- remove any padding bits if present;
- remove the MAC-hs header;
- deliver the MAC-d PDUs in the MAC-hs PDU to MAC-d.

11.6.2.5 MAC-hs Reset

If a reset of the MAC-hs entity is requested by upper layers, the UE shall:

- flush soft buffer for all configured HARQ processes;
- stop all active re-ordering release timer (T1) and set all timer T1 to their initial value;
- start TSN with value 0 for the next transmission on every configured HARQ process;
- initialise the variables RcvWindow_UpperEdge and ~~n~~Next_expected_TSN to their initial values;
- disassemble all MAC-hs PDUs in the re-ordering buffer and deliver all MAC-d PDUs to the MAC-d entity;
- flush the re-ordering buffer.

and then:

- indicate to all AM RLC entities mapped on HS-DSCH to generate a status report.

11.6.2.6 Reconfiguration of MAC-hs parameters

The parameters for a MAC-hs entity may be reconfigured (modified) by upper layers.

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

- start using the reconfigured value of the parameter.

If the parameter RECEIVE_WINDOW_SIZE is reconfigured, the UE shall:

- ~~update the reordering receive window while not changing RcvWindow_UpperEdge~~ set RECEIVE_WINDOW_SIZE to the new value;
- remove any MAC-hs PDUs with TSN ≤ RcvWindow_UpperEdge – RECEIVE_WINDOW_SIZE (i.e. outside the receiver window after its ~~position~~size is updated) from the reordering buffer and deliver these MAC-hs PDUs to the disassembly entity.;
- if next_expected_TSN ≤ RcvWindow_UpperEdge – RECEIVE_WINDOW_SIZE:
 - set next_expected_TSN to RcvWindow_UpperEdge – RECEIVE_WINDOW_SIZE + 1;
 - deliver all received MAC-hs PDUs with consecutive TSNs from next_expected_TSN (included) up to the first not received MAC-hs PDU to the disassembly entity;
 - advance next_expected_TSN to the TSN of this first not received MAC-hs PDU.

CR-Form-v7

CHANGE REQUEST

⌘ **25.321 CR 175** ⌘ rev **-** ⌘ Current version: **5.5.0** ⌘

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

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

Title:	⌘ Addition of HS-DSCH Provided Bit Rate measurement		
Source:	⌘ RAN WG2		
Work item code:	⌘ HSDPA-L23	Date:	⌘ 19 August 2003
Category:	⌘ C	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 RAN3#36 meeting (May 2003) a new HSDPA-specific Common Measurement, called HS-DSCH Provided Bit Rate, was included in the NBAP specification (see TS 25.433 v5.5.0). The HS-DSCH Provided Bit Rate measurement relies on samples provided by the MAC-hs entity in the Node B. The text related to the HS-DSCH Provided Bit Rate measurement, which has been included in TS 25.433, refers to the 25.321 spec for the definition of the measurement. However, this definition is presently missing from the MAC spec.
Summary of change:	⌘ The MAC-hs support of HS-DSCH Provided Bit Rate measurement is introduced and some text specifying the HS-DSCH Provided Bit Rate measurement is proposed. The duration of the measurement period is proposed to be 100 ms.
Consequences if not approved:	⌘ HS-DSCH Provided Bit Rate measurement is not defined

Clauses affected:	⌘ 6.1, 11.7(new)										
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	⌘
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Other comments:	⌘										

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6 Functions

6.1 Description of the MAC functions

The functions of MAC include:

- mapping between logical channels and transport channels;
- selection of appropriate Transport Format for each Transport Channel depending on instantaneous source rate;
- priority handling between data flows of one UE;
- priority handling between UEs by means of dynamic scheduling;
- identification of UEs on common transport channels;
- multiplexing/demultiplexing of upper layer PDUs into/from transport blocks delivered to/from the physical layer on common transport channels;
- multiplexing/demultiplexing of upper layer PDUs into/from transport block sets delivered to/from the physical layer on dedicated transport channels;
- traffic volume measurement;
- Transport Channel type switching;
- ciphering for transparent mode RLC;
- Access Service Class selection for RACH and CPCH transmission;
- control of HS-DSCH transmission and reception including support of HARQ;
- [HS-DSCH Provided Bit Rate measurement.](#)

11.7 HS-DSCH Provided Bit Rate measurement

The HS-DSCH Provided Bit Rate measurements is defined as follows:

- for each priority class the MAC-hs entity measures the total number of MAC-d PDU bits whose transmission over the radio interface has been considered successful by MAC-hs in Node-B during the last measurement period, divided by the duration of the measurement period;
- the values reported by MAC-hs shall be raw samples;
- the measurement period shall be [100 ms].