TSG-RAN Working Group 2 (Radio layer 2 and Radio layer 3) ***TSGR2#5(99)905***

Sophia Antipolis 16th to 20th August 1999

Agenda Item: 10

Source: LGIC

Title: CR to 25.321 for MAC Assisted Dynamic Radio Access Bearer Control (revised version)

Document for: Decision

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1. Overview

This document proposes changes to 25.321 based on the agreement on MAC assisted Dynamic Radio Access Bearer Control presented by LGIC at the last WG2 meeting

2. Proposed Changes

8.2 Primitives between MAC and RLC

8.2.1 Primitives

The primitives between MAC layer and RLC layer are shown in Table 8.2.1.1

Generic Name	Type				Parameters
	Request	Indication	Response	Confirm	
MAC-DATA	X	X			MU, BO
MAC-ERROR		X			[FFS]
MAC-STATUS		X	X		[FFS]

Table 8.2.1 Primitives between MAC layer and RLC layer

MAC-DATA Request/Indication

- MAC-DATA Request primitive is used to request that an upper layer PDU be sent using the procedures for the information transfer service.
- MAC-DATA Indication primitive indicates the arrival of an upper layer PDU received by means of the information transfer service.

MAC-ERROR Indication

- MAC-ERROR Indication primitive indicates to RLC that an error condition has occurred.

MAC-STATUS Indication/Response

- MAC-STATUS Indication primitive indicates to RLC about changes in the rules under which it may transfer data to MAC. Parameters of the primitive can indicate a transmission timer value, whether the RLC can transfer data and whether that data is restricted to supervisory frames only.
- MAC-STATUS Response enables RLC to acknowledge a MAC-STATUS Indication. It is possible that RLC would use this primitive to indicate that it has nothing to send or that it is in a suspended state.

8.2.2 Parameters

a) Message Unit (MU)
It contains the RLC layer message (RLC-PDU) to be transmitted or received by the MAC sub-layer.

b) Buffer Occupancy (BO)

The parameter Buffer Occupancy (BO) indicates the amount of data that is currently queued for transmission (or retransmission) in RLC layer

[Note (from Tdoc WG2 009/99): This description are based on L2-LAC specification drafted TTC/ARIB Joint meeting. Because SAP between LAC and MAC is defined in our structure of MAC, the name of Signal is changed to Primitive. And format of explanation of primitives are changed to avoid verbose description. Request and Indication are combined to explain. Primitives for Activation/Deactivation or Establish/Release or Connect/Disconnect for MAC connection are FFS.]

[Note (from Tdoc WG2 009/99): The parameters for RLCMAC-ERROR and RLCMAC-STATUS are FFS.]

8.3 Primitives between MAC and RRC

8.3.1 Primitives

The primitives between MAC and RRC are shown in Table 8.3.1

Generic Name	Type				Parameters
	Request	Indication	Response	Confirm	
CMAC-CONFIG	**X**				CHI
CMAC-CONNECT	**X**			**X**	ffs
CMAC-MEASUREMENT	**X**	**X**			~~TRIG. TH, RESULT, PER~~ Measurement information elements (for Request), Measurement result (for Indication)
CMAC-STATUS		**X**			Status info.
CMAC-ERROR		**X**			Reason for error

Table 8.3.1 Primitives between MAC sub-layer and RRC

CMAC-CONFIG Request

- CMAC-CONFIG Request is used to request for the switching the connection between logical channels and transport channels

CMAC-CONNECT Request/Confirm

- CMAC-CONNECT Request is used initiate a RRC connection
- CMAC-CONNECT Confirm is used to confirm the establishment of a RRC connection.

CMAC-MEASUREMENT Request/Indication

- CMAC-MEASUREMENT .Request is used to request to measure something radio quality at both BS and MS sides. (for example : Transport Block Error)
- CMAC-MEASUREMENT. Indication is used to notify measuring result.

CMAC-STATUS Indication

- CMAC-STATUS Indication primitive notifies the management entity of status information.

CMAC-ERROR Indication

- CMAC-ERROR Indication primitive notifies the management entity of an error detected in the operation of the MAC sub layer protocol such as excessive number of transmission attempts for Ack-mode. and timer time out.

8.3.2 Parameters

a) Channel Information (CHI)
Channel information for active transport channel. For example, common channel or dedicated channel notification in user packet transmission.

b) Measurement information elements
- Mode (periodic, event-trigerred)
- TH_U
- TH_L (Optional)

- Measurement quantity identifiers

- Report Interval

c) Measurement result
- Mode
- Reporting Quantities
- Event Type (overflow or underflow)

~~b)TH~~
~~Threshold information for measurement. For example, traffic monitor or transmission quality. When an specific value is assigned, it means measuring should be reported with law data.~~

~~c)PER~~
~~Period information for measurement. When an specific value is assigned, it means measuring should be reported only when measuring result exceed the given threshold.~~

~~d)TRIG~~
~~Trigger information which request to start measuring.~~

~~e)RESULT~~
~~Measurement result.~~

~~f)~~d) Status info
It is management entity of status information.

~~g)~~e) Reason for error
It contains the management entity of an error detected in the operation of the MAC sub layer protocol (e.g. excessive number of transmission attempts for Ack-mode).

[Note(from Tdoc WG2 009/99): If used with a threshold information, the MEASURE primitive is same as an alarm indication or request for channel switching. When the condition that channel switching is needed is detected at UE side, appropriate RRC message will be sent to Network side.

11 Elementary procedures

Examples: data transfer, random access procedure, transport channel type switching (dedicated/common channel)

11.1 Dynamic radio access bearer control ~~in UE~~

~~This procedure is applicable only in case of optimisation of established radio bearers~~

~~The algorithm exist in the UE and is controlled by the network. The algorithm requests to RRC for a reconfiguring of radio resources, details are ffs.~~

Dynamic radio access bearer control is performed in RRC, based on the traffic volume measurement reported by MAC. Traffic volume information is gathered and measured in MAC layer and the result is reported from MAC layer to RRC layer.

Traffic volume monitoring procedure in MAC is shown in figure 11.1.1 MAC receives RLC PDUs together with information of RLC transmission buffer. Every TTI, MAC compares the amount of data corresponding to a Transport Channel with the thresholds set by RRC. If the value is out of range, MAC indicates the measurement reports on traffic volume status to RRC. Thereby, RRC can be informed the traffic volume status of each transport channel, and therefore can take proper action for new radio access bearer configuration accordingly.

RRC requests MAC measurement report with the primitive CMAC-Measure-REQ including following parameters.

Measurement information elements

- Mode

Indicates whether the report should be periodically or by event-triggered way

- TH_U

Upper threshold value for every transport channel, applicable when mode is event-triggered

- TH_L (Optional)

Lower threshold value for every transport channel, applicable when mode is event-triggered

- Measurement quantity identifiers

Indicates what should be reported to RRC layer

For each RAB, Buffer amount (mandatory), Variance (optional), or Average (optional)

- Report Interval

Indicates the report interval, applicable when report mode is periodic

MAC receives RLC PDUs with the primitive MAC-Data-REQ including following parameters:

- Data (RLC PDU)

- Buffer Occupancy (BO)

The parameter Buffer Amount (BA) indicates the amount of data that is currently queued for transmission (or retransmission)

MAC receives measurement information elements with the primitive CMAC-Measure-REQ which includes parameters such as Mode, mesurement period, report interval, and TH_L and TH_U for each transport channel. Whenever MAC receives RLC PDUs from different RLC entities, it is notified by RLC amount of data queued in RLC transmission buffer. If the mode is an event-triggered way, MAC compares the amount of data to be transmitted on a transport channel and threshold passed by RRC, TH_L and TH_U. In case that the measured value is out of range, MAC reports the status of result of comparison and status of each RAB to RRC. On the other hand, if the mode is periodic way, MAC reports measurement result to RRC periodically. Measurement result can contain average and variance as well as amount of data for each RAB with CMAC-Measure-IND primitive as follows:

Measurement result

- Mode

Periodic, or event-triggered

- Reporting Quantity

For each RAB, Buffer Occupancy (mandatory), Variance (optional), and Average (optional)

- Event type

Indicates overflow or underflow for each transport channel, applicable when mode is event-triggered

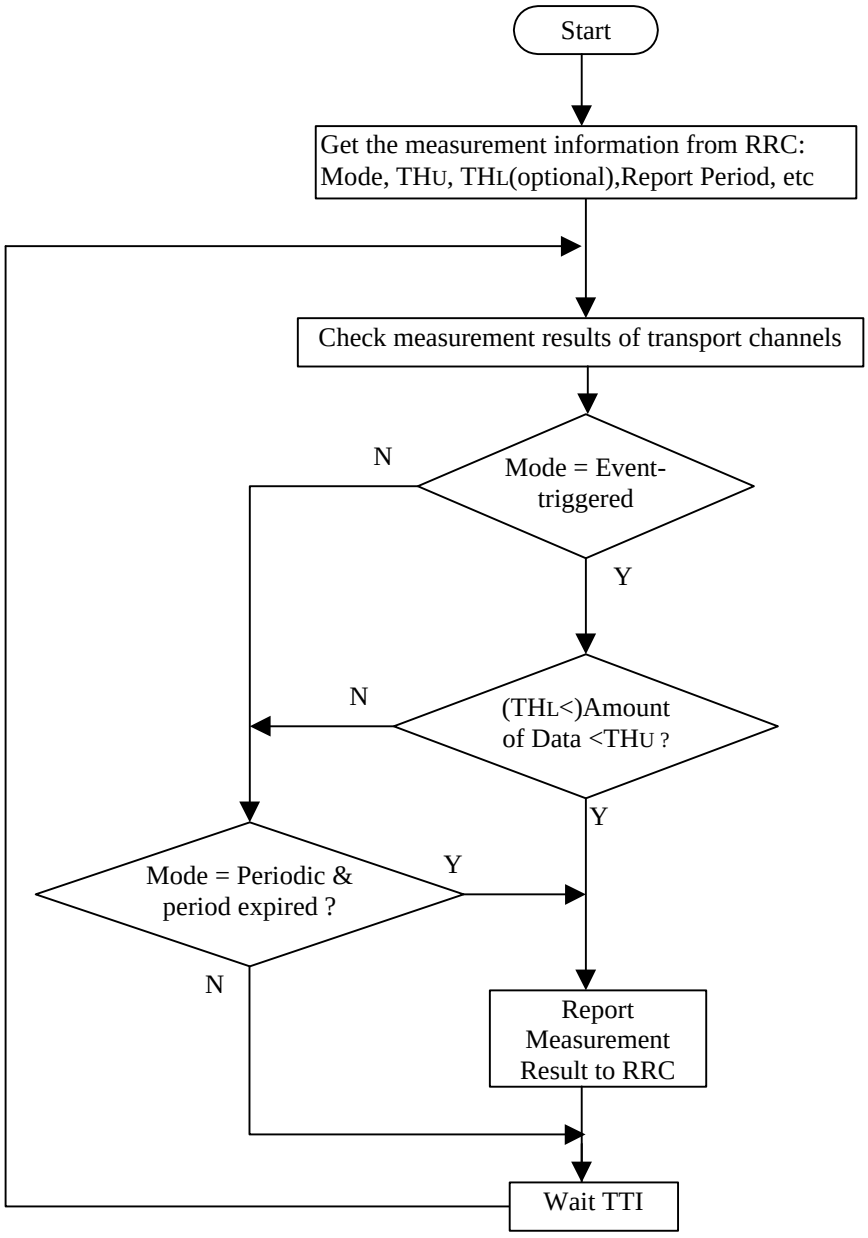

Figure 11.1.1: Dynamic radio access bearer control procedure