TSG-RAN Working Group 2 (Radio layer 2 and Radio layer 3) ***TSGR2#2(99) 125***
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Agenda Item: 7.5

Source: Alcatel

Title: TFC selection in MAC-d

Document for: Decision

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1 Introduction

This document addresses the issue of the TFC selection function in MAC-d, as proposed in S2.21 document. An analysis of the role of this function is presented and a slightly different wording and description is then proposed.

2 Role of the TFC selection function in MAC-d for downlink direction

The MAC-d has to multiplex and schedule the different DCH which are multiplexed onto the same physical channel, in order to make sure that the combination of the different transport blocks, when transmitted on the radio interface, will not exceed the allocated bit rate on the physical channel. The allowed combinations of transport blocks are given by the RRC as the TFCS.

However, on downlink, the MAC-d schedules transport blocks which may have different transmission time intervals on the radio interface (interleaving periods) and also different transmission times on Iub interface. In order to save on Iub capacity, it may indeed be convenient to tolerate more delay on Iub transmission for services with less delay constraint than speech (for which a 5 or 10 ms transmission delay may be required).

This means that when scheduling a long delay DCH at frame n, the MAC-d can not know exactly which combination will effectively appears on the radio transmission at that frame, because transport blocks for low delay DCH may not have yet been received in MAC. The Node B is the only place where the effective TFC on each frame is known and this is why TFCI has to be built in Node B (as stated in S2.02 section 9.1.10). However, when scheduling transport blocks for the various DCH, the MAC-d has to make sure that the resulting TFC on each frame will be within the allowed TFCS, anticipating further arrivals of transport blocks for short delay DCH.

The TFC selection function in MAC-d is therefore a bit misleading (at least for the downlink direction), and it is proposed to replace it with ‘DL : scheduling/priority handling’, and to indicate in the description that the scheduling has to be performed in order to ensure that the TFC on the radio interface will always be within the allowed TFCS.

This will also impose some constraints on the definition of the TFCS, because all potential combinations of transport blocks need to be anticipated (taking into account the different transmission time intervals and transmission delays on Iub interface).

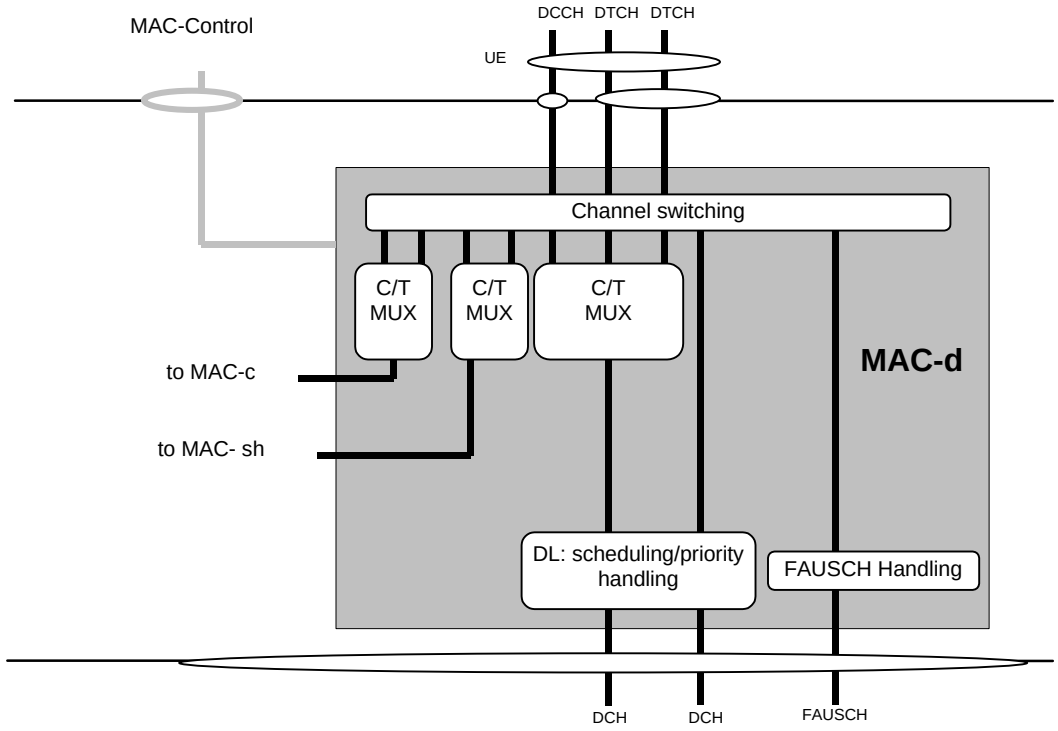
3 Proposed changes in S2.21 document

The following changes are proposed in section 4.2.4 of S2.21:

Figure 4.2.4.3 shows the UTRAN side MAC-d entity. The following functionality is covered:

- Dynamic transport channel type switching is performed by this entity, based on decision taken by RRC.
- The C/T MUX box is used when multiplexing of several dedicated logical channels onto one transport channel is used.
- Each MAC-d entity using common channels is connected to a MAC-c entity that handles the scheduling of the common channels to which the UE is assigned.
- Each MAC-d entity using downlink shared channel is connected to a MAC-sh entity that handles ~~the of~~ the shared channels to which the UE is assigned.

- In the downlink, scheduling and priority handling of transport channels is performed within the allowed transport format combinations of the TFCS assigned by RRC. ~~selection (out of the RRC assigned transport format combination set) is performed to prioritise transport channels.~~



DL	Downlink	RNTI	Radio Network Temporary Identity
TF	Transport Format	UE	User Equipment
TFC	Transport Format Combination	UL	Uplink
Note1 :	*for DCH and DSCH different scheduling mechanisms apply*	*Note 2:*	*The TFC selection place is under discussion*

Figure 4.2.4.3 UTRAN side MAC architecture / MAC-d details (revised)