TSG-RAN Working Group 3 ***TSGR3#6(99) 848***
Sophia Antipolis, 23-27th August 1999

Agenda Item: 14.1 and 14.2

Source: Alcatel

Title: New proposal for the structure of checksum indicator in the DCH data frame (TS 25.427) and RACH data frame (TS 25.435)

Document for: Decision

---

1 Introduction

This document proposes a new structure for the checksum indicators of the DCH and RACH data frames, that will permit to improve the coding efficiency.

2 Discussion

In the current description of the DCH and RACH data frames in TS 25.427 and TS 25.435, the checksum indicators are written before each transport block, thus being coded independently. It is however likely that, in many cases, either all CRC will be good or all will be bad, due to the strong correlation of errors within a transport block set received during the same TTI. Therefore the coding efficiency of the CRC checksums could be optimised if all were grouped at the same place, before the transport blocks.

The grouping of CRC checksum indicators before all transport blocks may also ease the selection/combining procedure in the RNC. Indeed, since all CRC results are at the beginning of the data frame, it may not be useful in some cases to decode the entire data frame before applying some selection. This should therefore allow speeding up the selection function in the RNC.

It is therefore proposed that the Checksum indicator list shall indicate either that all transport blocks have been received successfully, or that all transport blocks have not been received successfully, or the list of CRC for each block in case some are good and others are bad.

3 Change proposal to TS 25.427

Changes are proposed in sections 7.1.

7.1 Data frame structure

The purpose of the user data frames is to transparently transport the transport blocks between Node B and Serving RNC.

The protocol allows for multiplexing of coordinated dedicated transport channels, with the same transmission time interval, onto one transport bearer.

The transport blocks of all the coordinated DCHs for one transmission time interval are included in one frame.

SRNC indicates the multiplexing of cordinated dedicated transport channels in the appropriate RNSAP/NBAP message. For RNSAP this concerns RL Setup and RL Reconfiguration. For NBAP this concerns RL Setup and RL Reconfiguration.

Table 1 below summarises the data sent in a DCH user data frame, the two last columns shows in which direction the data is present. It is FFS if the data frame can contain some control information.

	Information element	Description	Present on	
			UL	DL
Header	Frame Type	DCH data frame	X	X
	Connection Frame Number	Connection Frame Number, indicator as to which radio frame the first data was received on uplink or shall be transmitted on downlink.	X	X
	Transport Format Indicators	List of TFI of the transport block sets contained in the frame	X	X
Payload	Quality Estimate	Used by macro-diversity function	X	
	Checksum indicator list for DCH1	Indicates ~~if the transport block CRC is correct~~ either that CRC of all transport blocks of DCH1 are correct, either that CRC of all transport blocks of DCH1 are incorrect, or the list of CRC for each transport block of DCH1	X	
	Transport Block Set ~~1~~ of DCH1	This contains the data to/from the radio interface for all transport blocks of DCH1	X	X
	:	*CRCOK list and TBS are repeated for all DCH ~~transport blocks in all transport block sets~~*		
	Checksum indicator list for DCH M	Indicates ~~if the transport block CRC is correct~~either that CRC of all transport blocks of DCH M are correct, either that CRC of all transport blocks of DCH M are incorrect, or the list of CRC for each transport block of DCH M	X	
	Transport Block Set ~~N~~ of DCH M	~~Last~~ transport block set ~~in~~of the last ~~transport block set~~DCH	X	X
Tail	DCH data frame checksum	Checksum of the header and payload	X	X

4 Change proposal in TS 25.435

Changes are proposed in section 5.1.1.

5.1 Data frame structure

5.1.1 RACH Channels

RACH Data Frame includes the Cell SFN in which the payload was received. If the payload was received in several Cell SFNs the first Cell SFN shall be indicated.

	Information element	Description
Header	Frame Type	Data Frame
	FN_{CELL}	Indicates the Cell Frame Number count when the RACH was received.
	Transport Format Indicator	The TFI to denote the format of the Transport Block set carrying the RACH payload.
Payload	Checksum indicator list	~~Indicates if the transport block CRC is correct~~ either that CRC of all transport blocks of RACH are correct, either that CRC of all transport blocks of RACH are incorrect, or the list of CRC for each transport block of RACH
	Transport Block set of RACH~~1~~	Data from the Radio interface
	~~:~~	~~:~~
	~~Checksum indicator~~	~~Indicates if the transport block CRC is correct~~
	~~Transport Block N~~	~~Data from the Radio interface~~
Tail	Data frame checksum.	Checksum of the header and payload

5 Conclusion

It is proposed to include changes proposed in section 3 of this document into TS 25.427 and changes proposed in section 4 of this document into TS 25.435.

6 References

[1] TS 25.427 version 0.3.1, July 1999

[2] TS 25.435 version 0.3.1, July 1999