3GPP TSG RAN WG3 *TSGR3#7(99)C04*
Sophia Antipolis, 20th-24th September 1999

Source: **Siemens/Italtel**

Title: **Status Report Study Item TDD Frame Protocols**

Agenda Item: 14.1
Document for: Approval, Change of 25.435

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1. Introduction

The temporary documents [1] and [2] have been considered as starting points for the discussion.
Comments have been received to harmonise to FDD the introduced TDD parameter 'Rx Timing Deviation' by changing its name to ‚Propagation Delay' and by assuming in both modes the same range and granularity.
It must be mentioned that the former definition is the one approved in RAN1, while the latter has been defined in [4] and included as mandatory in RACH FP.

In Chapter 2 changes related to RACH channels are introduced and text for TDD USCH chapter is added.
Main issue is that since in the "Standalone" USCH scenario and when accessing RACH the NodeB does not know which UE currently uses the resource, the NodeB can not send a Dedicated Measurements Report as NBAP message to the RRC. A "Common Measurement" will not be sufficient since the timing association between the received Transport Block and the Rx Timing Deviation can not be reported sufficiently accurate.
Therefore it is proposed to include the Rx Timing Deviation within the Iub USCH and RACH Data Frame.

Chapter 3 proposes an editorial enhancement to consider also TDD in the description.

It is proposed to include the content of the following chapters in the relevant specifications:

Chapter 2 in specification TS 25.435, chapter 5.1.1;
Chapter 3 in specification TS 25.435, chapter 5.1.3;
Chapter 4 in specification TS 25.435, chapter 5.1.4;

2. Random Access Channels

When a UE uses the RACH for uplink transmission, Timing Advance is not applied. However, the Rx Timing Deviation of RACH bursts can be measured (Propagation Delay) to give the starting value for Timing Advance after transition to another uplink channel, e.g. DCH or USCH.

Therefore, the first prerequisite to perfom Timing Advance is that the NodeB measures the Rx timing deviation for received RACH bursts, and reports this to the RNC, together with the received RACH Transport Blocks.

	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.
	Propagation Delay	Round trip delay (FDD), Rx Timing Deviation (TDD).
Payload	Checksum indicator 1	Indicates if the transport block CRC is correct
	Transport Block 1	Data from the Radio interface
	:	:
	Checksum indicator N	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

Note: Propagation Delay is defined over a range 0-255 (8 bits) with a resolution of 4 chips.

Normally, it is sufficient if this Propagation Delay measurement gets to the CRNC only because, during initial access, this is identical to the SRNC. However, there are two cases where the parameter must be forwarded to the SRNC, over Iur:

a) During Cell update, if the CRNC is not the SRNC: In this case, the RNSAP message "Uplink Transfer" is used to forward the access message to the SRNC. The Propagation Delay (Rx Timing Deviation) measurement should be included with that message, to enable the SRNC to derive the correct Timing Advance value for the Channel Allocation message to the UE.
b) In the RACH/FACH state, when RACH/FACH over Iur is supported: In this case, DCCH frames are forwarded to the SRNC. The Propagation Delay (Rx Timing Deviation) must be attached to that message.

3. Downlink Shared Channels

DSCH Data Frame includes the Cell SFN in which the payload shall be sent. If the payload is to be sent in several Cell SFNs the first Cell SFN shall be indicated.

The following frame structure is supposed to be applicable for both FDD DSCH and TDD DSCH, i.e. with and without a simultaneous DPCH connection, and independent of the different DSCH modeling in NodeB.

	Information element	**Description**
Header	Frame Type	Data Frame
	FN_{CELL}	Indicates the Cell Frame Number on which this DSCH TBSs need to be transmitted
	Transport Format Indicator	This TFI to denote the format of the Transport Block set carrying the DSCH payload.
	Transmission power level	Indicator of the transmission power level
Payload	Transport Block Set	The TBS includes the DSCH payload data to be transmitted by the physical layer over the air-interface.
Tail	Data frame checksum.	Checksum of the header and payload

Note: The parameter "Transmission power level" may be used for slow closed loop downlink TX power control on the DSCH.

4. [TDD - Uplink Shared Channels]

USCH 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 USCH was received.
	Transport Format Indicator	The TFI to denote the format of the Transport Block set carrying the USCH payload.
Payload	Transport Block Set	Data from the Radio interface
	Rx Timing Deviation	Reports the measured Rx Timing Deviation of the UL bursts
Tail	Data frame checksum.	Checksum of the header and payload

Note: Rx Timing Deviation is defined over a range 0-255 (8 bits) with a resolution of 4 chips.

The measured Propagation Delay can be evaluated in the CRNC by the USCH scheduler (MAC-sh) or by another entity.

5. References

[1] TSGR3#5(99)960, Timing Advance for TDD, Siemens/Italtel
[2] TSGR3#5(99)963, USCH/DSCH data frames on I_{ub}, Siemens/Italtel
[3] 3GPP TS 25.435 v.0.3.1, Iub user plane protocols for Common Transport Channel data streams.
[4] TSGR3#5(99)A05, Use of the Propagation Delay for the Uplink synchronisation, Nokia