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To: RAN WG2

Source: RAN WG1

Title: Liason to WG2: "Comments on TR 25.926 "UE Radio Access Capabilities""

1   Introduction

RAN WG1 has studied the document TR 25.926 "UE Radio Access Capabilities". RAN WG1 would like to give its view on some of the proposed UE capability parameters. WG1 would also like to give its view on what could be an appropriate set of allowed values for the different parameters. This liason only deals with the Transport Channel parameters and Physical Channel parameters of Table 1 in TR 25.926.

2   Discussion on the proposed UE capability parameters

Maximum total number of bits of all transport blocks received/transmitted in TTIs that end at the same time" (Transport channel parameters in downlink/uplink)

For the downlink WG2 has proposed a parameter "Maximum total number of bits of all transport blocks received in TTIs that end at the same time". WG1 would like to add a second parameter.

Defining N_i as the number of bits in transport block #i, the current parameter can be defined as

$$\Sigma_i(N_i)$$

where the sum is over all transport blocks received in TTIs that end at the same time. This parameter could also be refered to as "*Maximum sum of number of bits of all transport blocks received in TTIs that end at the same time*".

WG1 would like to add a parameter defined as

$$\Sigma_i(N_i*8/T_i)$$

where the sum is is over all transport blocks received in TTIs that end at the same time and $T_i \in \{1, 2, 4, 8\}$ is the TTI length (in number of radio frames) of the transport channel to which transport block #i belongs. It should be noted that the factor 8 is just a scaling constant that ensures that the defined parameter is always an integer.

This parameter could be refered to as "*Maximum sum of number of sustainedly processable bits of all transport blocks received in TTIs that end at the same time, normalized with the respective TTI lengths in number of radio frames*". WG1 is currently considering if this capability parameter should be split into two separate capabilitiy parameters for convolutional coded and Turbo coded transport channels respectively.

The same parameters would also be applicable for the uplink in which case "received" should be replaced by "transmitted".

Maximum number of simultaneous transport channels (Transport channel parameters downlink/uplink)

WG1 would like to propose that it should clearly be defined in TS 25.926 that this capability refers to the maximum number of Transport Channels that should be possible to *process* simultaneously, not taking into account the rate of each Transport Channel.

Maximum number of simultaneous CCTrCH (Transport channel parameters downlink)

WG1 would like to propose that this should be expressed as the maximum number of simultaneous CCTrCH *of DCH type*, where a CCTrCH of DCH type is defined as a CCTrCH consisting of one or several DCH. Simultaneous reception of CCTrCH of DCH type with CCTrCH of non-DCH type, e.g. DSCH or FACH, is, as far as WG1 understands, covered by the UE capabilities "*support of PDSCH*" and "*Simultaneous reception of SCCPCH and DPCH*".

Minimum SF (FDD physical channel parameters in downlink)

WG1 would like to propose that this parameter should be replaced by the parameter "*Maximum number of DPCH bits received per 10 ms*". It is believed that this parameter, together with the parameter "Maximum number of DPCH per RL" better reflect relevant UE properties.

Maximum number of PDSCH (FDD physical channel parameters in downlink)

WG1 would like to propose that this parameter should be removed. It should be sufficient for a UE to be able to receive at most one PDSCH simultaneously.

Maximum number of DPDCH and **Minimum SF** (FDD physical channel parameters in uplink)

WG1 would like to propose that these two parameters should be replaced by the parameter "*Maximum number of DPDCH bits transmitted per 10 ms*". As multiple DPDCH in the uplink is only possible for SF=4, this parameter includes all i nformation of the previous two parameters together.

TDD physical channel parameters in downlink

WG1 would like to propose that the parameter *"Minimum SF"* should be added.

3 Discussion on the set of allowed values for the UE capability parameters

Table 1. UE radio access capability parameter value ranges

PHY parameters	Transport channel parameters in downlink	Maximum ~~total~~sum of number of bits of all transport blocks received in TTIs that end at the same time	~~FFS~~640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840	Maximum: 2 Mbps in TTI=80 ms
		Maximum sum of number of sustainedly processable bits of all transport blocks received in TTIs that end at the same time, normalized with the respective TTI lengths in number of radio frames.	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840	Maximum: 2 Mbps (regardless of TTI)
		Maximum number of simultaneous transport channels	~~FFS~~ 4, 8, 16, 32	Baseline: Processing of 3 FACH + 1 PCH on one S-CCPCH
		Maximum number of simultaneous CCTrCH ~~(TDD) (FFS for FDD)~~ of DCH type	~~FFS~~1, 2, 3, …, 8	
		Maximum total number of transport blocks received within TTIs that end at the same time	~~FFS~~4, 8, 16, 32, 48, 64, 96, 128, 256, 512	Baseline: Four transport channels with one block each (compare "Maximum number of simultaneous transport channels" above)
		Maximum number of TFC in the TFCS	~~FFS~~16, 32, 48, 64, 96, 128, 256, 512, 1024	Baseline: 2^4 (four transport channels with on/off transmission, compare above) Maximum: Limited by specification
		Support for turbo decoding	Yes/No	
		Support of 24 bits CRC	Yes/No	
		Support of blind rate detection (FFS)	Yes/No	

Transport channel parameters in uplink	Maximum sum~~total~~ of number of bits of all transport blocks transmitted in TTIs that start at the same time	~~FFS~~640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840	Maximum: 2 Mbps in TTI=80 ms
	Maximum sum of number of sustainedly processable bits of all transport blocks transmitted in TTIs that end at the same time, normalized with the respective TTI lengths in number of radio frames	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840	Maximum; 2 Mbps (regardless of TTI)
	Maximum number of simultaneous transport channels	~~FFS~~2, 4, 8, 16, 32	Baseline: 2 transpart channels required for testing
	Maximum number of simultaneous CCTrCH of DCH type (TDD only)	~~FFS~~ 1, 2, …, 8	
	Maximum total number of transport blocks transmitted within TTIs that start at the same time	~~FFS~~2, 4, 8, 16, 32, 48, 64, 96, 128, 256, 512	Baseline: Two transport channels with one block each (compare "Maximum number of simultaneous transport channels" above)
	Maximum number of TFC in the TFCS	~~FFS~~4, 8, 16, 32, 48, 64, 96, 128, 256, 512, 1024	Baseline: 2^2 (two transport channels with on/off transmission, compare above) Maximum: Limited by specification
	Support for turbo encoding	Yes/No	
	Support of 24 bits CRC	Yes/No	
FDD Physical channel parameters in downlink	Maximum number of DPCH per RL	~~FFS~~1, 2, …, 8	

	~~Minimum SF~~ Maximum number of DPCH bits received per 10 ms	~~FFS~~300, 600, 1200, 2400, 4800, 9600, 19200, 28800, 38400, 48000, 57600, 67200	The values correspond to single-code with SF=256, 128, …, 4 and multi-code with SF = 8 and SF = 4. Note that these values do not preclude the use of multi-code for other SF.
	Support for SF 512	Yes/No	
	Support of PDSCH	Yes/No	
	~~Maximum number of PDSCH~~	~~FFS~~	
	Simultaneous reception of SCCPCH and DPCH	Yes/No	
FDD Physical channel parameters in uplink	~~Maximum number of DPDCH~~ Maximum number of DPDCH bits transmitted per 10 ms	~~FFS~~150, 300, 600, 1200, 2400, 4800. 9600. 19200, 28800, 38400, 48000, 57600	The values correspond to single-code with SF = 256, 128, …4 and multi code with SF = 4.
	~~Minimum SF~~	~~FFS~~	
	Support of PCPCH	FFS	
TDD physical channel parameters in downlink	Maximum number of timeslots per frame	~~[1..14]~~ 1, 2, …, 14	
	Maximum number of physical channels per frame	~~[1,2,..,224]~~ 1, 2, 3, …, 224	
	Minimum SF	16, 1	
	Support of PDSCH	Yes/No	
TDD physical channel parameters in uplink	Maximum Number of timeslots per frame	~~[1..14]~~ 1, 2, …, 14	

			Maximum number of physical channels per timeslot	{1, 2}	
			Minimum SF	{16,8,4,2,1}	
			Support of PUSCH	Yes/No	