

3GPP TSG-RAN Meeting #16
Marco Island, FL, U.S.A., 4 – 7, June, 2002

RP-020439

Title: Revised CR on HSDPA UE capabilities
Source: Nokia

Agenda item:

No.	Spec	CR	Rev	Subject	Phase	Cat
1	25.306	040	1	Corrections in HSDPA UE capabilities	Rel-5	F

CHANGE REQUEST

⌘ **25.306 CR 040** ⌘ rev **1** ⌘ Current version: **5.0.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘ Corrections in HSDPA UE capabilities		
Source:	⌘ TSG-RAN WG2		
Work item code:	⌘ HSDPA-L23	Date:	⌘ May 09, 2002
Category:	⌘ F	Release:	⌘ REL-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
	B (addition of feature),		R97 (Release 1997)
	C (functional modification of feature)		R98 (Release 1998)
	D (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.		REL-4 (Release 4)
			REL-5 (Release 5)

Reason for change:	⌘ From LS R1-020684, R2-020865: "The category definition is rather messy and makes people confuse the reason of the order of the category. The category with inter-TTI=2 has only one choices of HARQ buffer size. The inter-TTI=2 have a character of simple implementation and efficient hardware resource when UE is designed with front receiver and turbo decoder. In the other hand, the category with inter-TTI=1 and 3 has three choices of HARQ buffer."
Summary of change:	⌘ From LS R1-020684, R2-020865: " - The order is sorted in ascending order of the bit rate and the complexity. - Two different values of HARQ buffer for each code and inter-TTI processing combinations. - The soft buffer value of inter-TTI is update to align other categories in case of inter-TTI is two. - More categories are not necessary from FDD physical layer point of view in this release was agreed. Therefore the note was removed." Nokia: - Based on the agreement in RAN2#28 the minimum L2 buffer sizes are defined for FDD physical layer categories.
Consequences if not approved:	⌘ - The category table kept rather untidy.

Clauses affected:	⌘ 4.5.1, 5.1, 5.2.2
Other specs affected:	⌘ <input type="checkbox"/> Other core specifications ⌘ <input type="checkbox"/> <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications

Other comments: ☒

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ☒ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.5.1 Transport channel parameters in downlink

Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant

NOTE 1: "Being received" refers to all bits in the active TFC within the TFCS over all simultaneous transport channels received by the UE. "Arbitrary time instant" means that the time instant corresponding to the highest sum of number of bits is relevant. This note also applies to similar parameter definitions below.

This parameter is defined as:

$$\sum_i(N_i)$$

where N_i is defined as the number of bits in transport block # i , and the sum is over all transport blocks being received at an arbitrary time instant. All transport blocks that are to be simultaneously received by the UE on DCH, FACH, PCH and DSCH transport channels are included in the parameter.

NOTE 2: A UE does not need to support a TFC within the TFCS for which the sum of *Number of Transport Blocks* * *Transport Block size* over all simultaneous transport channels is larger than what the UE capability indicates.

This UE capability also limits the maximum number of bits before de-rate-matching as follows: The maximum number of bits before de-rate matching being received at an arbitrary time instant (DPCH, PDSCH, S-CCPCH) shall be less or equal to 6.6 times the Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant.

Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant.

This parameter is defined similar to the parameter above, but the sum includes only transport blocks that are to be convolutionally coded.

Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant.

This parameter is defined similar to the parameter above, but the sum includes only transport blocks that are to be turbo coded.

Maximum number of simultaneous transport channels

This is defined as the maximum number of downlink Transport Channels that the UE is capable to process simultaneously, not taking into account the rate of each Transport Channel.

NOTE: The number of simultaneous transport channels affects how the total memory space and processing capacity can be shared among the transport channels. A UE does not need to support more simultaneous transport channels than the UE capability allows for.

Maximum number of simultaneous CCTrCH

This is defined as the maximum number of downlink CCTrCH that the UE is capable to process simultaneously. CCTrCH should be interpreted as consisting of DCH, FACH or DSCH.

Maximum total number of transport blocks received within TTIs that end within the same 10 ms interval

All transport blocks that are to be simultaneously received by the UE on DCH, FACH, PCH and DSCH transport channels are included in the parameter.

NOTE: Relates to processing requirements for CRC in downlink. A UE does not need to support a TFC within the TFCS for which the sum of *Number of Transport Blocks* is larger than what the UE capability indicates. In the case of several CCTrCHs, the combination of the TFCs within the respective TFCSs for simultaneous TTIs at an arbitrary time instant shall not exceed this parameter.

Maximum number of TFC

Defines the maximum number of transport format combinations the UE can store, where all transport format combinations for all downlink transport format combination sets are counted. Different channelisation code mapping shall be counted as separate TFC in case of DSCH.

Maximum number of TF

The maximum total number of downlink transport formats the UE can store, where all transport formats for all downlink transport channels are counted.

Support for turbo decoding

Defines whether turbo decoding is supported or not.

Maximum number of HS-DSCH transport channel bits received within a HS-DSCH TTI
Maximum number of bits of an HS-DSCH transport block received within an HS-DSCH TTI

Defines maximum number of bits of an HS-DSCH transport block received within an HS-DSCH TTI ~~the maximum number of HS-DSCH transport channel bits~~ the UE is capable of receiving within a HS-DSCH TTI.

5.1 Value ranges

Table 5.1: UE radio access capability parameter value ranges

		UE radio access capability parameter	Value range
PDCP parameters		Support for RFC 2507	Yes/No
		Support for RFC 3095	Yes/No
		Support for loss-less SRNS relocation	Yes/No
		Maximum header compression context space	512, 1024, 2048, 4096, 8192 bytes
RLC and MAC-hs parameters		Total RLC AM and MAC-hs buffer size	2, 10, 50, 100, 150, 500, 1000 kBytes
		Maximum number of AM entities	3, 4, 5, 6, 8, 16, 30
PHY parameters	Transport channel parameters in downlink	Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum number of simultaneous transport channels	4, 8, 16, 32
		Maximum number of simultaneous CCTrCH	1, 2, 3, 4, 5, 6, 7, 8
		Maximum total number of transport blocks received within TTIs that end within the same 10 ms interval	4, 8, 16, 32, 48, 64, 96, 128, 256, 512
		Maximum number of TFC	16, 32, 48, 64, 96, 128, 256, 512, 1024
		Maximum number of TF	32, 64, 128, 256, 512, 1024
		Support for turbo decoding	Yes/No
		Transport channel parameters in	Maximum sum of number of bits of all transport blocks being transmitted at an arbitrary time instant

		UE radio access capability parameter	Value range
	uplink	Maximum sum of number of bits of all convolutionally coded transport blocks being transmitted at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all turbo coded transport blocks being transmitted at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum number of simultaneous transport channels	2, 4, 8, 16, 32
		Maximum number of simultaneous CCTrCH of DCH type (TDD only)	1, 2, 3, 4, 5, 6, 7, 8
		Maximum total number of transport blocks transmitted within TTIs that start at the same time	2, 4, 8, 16, 32, 48, 64, 96, 128, 256, 512
		Maximum number of TFC	4, 8, 16, 32, 48, 64, 96, 128, 256, 512, 1024
		Maximum number of TF	32, 64, 128, 256, 512, 1024
		Support for turbo encoding	Yes/No
FDD Physical channel parameters in downlink		Maximum number of DPCH/PDSCH codes to be simultaneously received	1, 2, 3, 4, 5, 6, 7, 8
		Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH)	600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 48000, 57600, 67200, 76800
		Support for SF 512	Yes/No
		Support of PDSCH	Yes/No
		Support of HS-PDSCH	Yes/No
		Simultaneous reception of SCCPCH and DPCH	Yes/No
		Simultaneous reception of SCCPCH, DPCH and PDSCH	Yes/No
		Maximum number of simultaneous S-CCPCH radio links	1 NOTE: Only the value 1 is part of this release of the specification
		Support of dedicated pilots for channel estimation	Yes/No
		FDD Physical channel parameters in uplink	
Support of PCPCH	Yes/No		
TDD 3.84 Mcps physical channel parameters in downlink		Maximum number of timeslots per frame	1..14
		Maximum number of physical channels per frame	1, 2, 3..224
		Minimum SF	16, 1
		Support of PDSCH	Yes/No
TDD 3.84 Mcps physical channel parameters in uplink		Maximum number of physical channels per timeslot	1..16
		Maximum Number of timeslots per frame	1..14
		Maximum number of physical channels per timeslot	1, 2
		Minimum SF	16, 8, 4, 2, 1
TDD 1.28 Mcps physical channel parameters in downlink		Support of PUSCH	Yes/No
		Maximum number of timeslots per subframe	1..6
		Maximum number of physical channels per subframe	1, 2, 3, ..., 96
		Minimum SF	16, 1
		Support of PDSCH	Yes/No
TDD 1.28 Mcps physical channel		Maximum number of physical channels per timeslot	1..16
		Support 8PSK	Yes/No
		Maximum number of timeslots per subframe	1..6

		UE radio access capability parameter	Value range
	parameters in uplink	Maximum number of physical channels per timeslot	1, 2
		Minimum SF	16, 8, 4, 2, 1
		Support of 8PSK	Yes/No
		Support of PUSCH	Yes/No
RF parameters	FDD RF parameters	UE power class	3, 4 NOTE: Only power classes 3 and 4 are part of this release of the specification
		Tx/Rx frequency separation	190 MHz 174.8 MHz to 205.2 MHz 134.8 MHz to 245.2 MHz
RF parameters	TDD 3.84 Mcps RF parameters	UE power class	2, 3 NOTE: Only power classes 2 and 3 are part of this release of the specification
		Radio frequency bands	a), b), c), a+b), a+c), b+c), a+b+c)
	TDD 1.28 Mcps RF parameters	UE power class	2, 3
		Radio frequency bands	a), b), c), a+b), a+c), b+c), a+b+c)
Multi-mode related parameters		Support of UTRA FDD	Yes/No
		Support of UTRA TDD 3.84 Mcps	Yes/No
		Support of UTRA TDD 1.28 Mcps	Yes/No
Multi-RAT related parameters		Support of GSM	Yes/No (per GSM frequency band)
		Support of multi-carrier	Yes/No
UE positioning related parameters		Standalone location method(s) supported	Yes/No
		Network assisted GPS support	Network based / UE based / Both/ None
		GPS reference time capable	Yes/No
		Support for IPDL	Yes/No
		Support for OTDOA UE based method	Yes/No
		Support for Rx-Tx time difference type 2 measurement	Yes/No
		Support for UE Positioning measurement validity in CELL_PCH and URA_PCH RRC states	Yes/No
Measurement related capabilities		Need for downlink compressed mode	Yes/No (per frequency band, UTRA mode and RAT)
		Need for uplink compressed mode	Yes/No (per frequency band, UTRA mode and RAT)
General capabilities		Access Stratum release indicator	R99, REL-4

Table 5.1a: FDD HS-DSCH physical layer categories

HS-DSCH category	Maximum number of HS-DSCH codes received	Minimum inter-TTI interval	Maximum number of HS-DSCH transport-channel bits received within an HS-DSCH TTI	Total number of soft channel bits
Category 1	15	4	20456	172800
Category 2	10	4	14600	115200
Category 3	5	4	7300	57600
Category 4	5	2	7300	28000
Category 5	5	3	7300	19200
Category 6	10	4	14600	153600
Category 7	5	4	7300	96000
Category 8	5	4	7300	76800
Category 9	5	3	7300	48000
Category 10	5	3	7300	38400
Category 11	15	4	[28800]	172800

HS-DSCH category	Maximum number of HS-DSCH codes received	Minimum inter-TTI interval	Maximum number of bits of an HS-DSCH transport block received within an HS-DSCH TTI	Total number of soft channel bits
Category 1	5	3	7300	19200
Category 2	5	3	7300	28800
Category 3	5	2	7300	28800
Category 4	5	2	7300	38400
Category 5	5	1	7300	57600
Category 6	5	1	7300	67200
Category 7	10	1	14600	115200
Category 8	10	1	14600	134400
Category 9	15	1	20432	172800
Category 10	15	1	28776	172800

NOTE: More categories may be added at a later stage.

Table 5.1b: RLC and MAC-hs parameters for FDD HS-DSCH physical layer categories

HS-DSCH category	Maximum number of AM RLC entities	Minimum total RLC AM and MAC-hs buffer size
Category 1	6	50
Category 2	6	50
Category 3	6	50
Category 4	6	50
Category 5	6	[50]
Category 6	6	[50]
Category 7	8	[100]
Category 8	8	[100]
Category 9	8	[150]
Category 10	8	[150]

Table 5.1cb: 1.28 Mcps TDD HS-DSCH physical layer categories

HS-DSCH category	Maximum number of HS-DSCH codes per timeslot	Maximum number of HS-DSCH timeslots per TTI	Maximum number of HS-DSCH transport channel bits that can be received within an HS-DSCH TTI	Total number of soft channel bits	Support of SF=1 for HS-PDSCH
Category 1	8	5	7040	28160	No
Category 2	8	5	7040	56320	No
Category 3	8	5	7040	84480	No
Category 4	8	5	14080	56320	Yes
Category 5	8	5	14080	112640	Yes
Category 6	12	5	10228	40912	No
Category 7	12	5	10228	81824	No
Category 8	12	5	10228	122736	No
Category 9	12	5	14080	56320	Yes
Category 10	12	5	14080	112640	Yes
Category 11	16	5	14080	56320	Yes
Category 12	16	5	14080	112640	Yes
Category 13	16	5	14080	168960	Yes

5.2.2 Combinations of UE Radio Access Parameters for DL

Table 5.2.2.1: UE radio access capability parameter combinations, DL parameters

Reference combination of UE Radio Access capability parameters in DL	32 kbps class	64 kbps class	128 kbps class	384 kbps class	768 kbps class	2048 kbps class
Transport channel parameters						
Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	640	3840	3840	6400	10240	20480
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	640	640	640	640	640	640
Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	NA	3840	3840	6400	10240	20480(1) 10240(2) NOTE 5
Maximum number of simultaneous transport channels	8 NOTE 4	8 NOTE 4	8 NOTE 4	8 NOTE 4	8 NOTE 4	16 NOTE 4
Maximum number of simultaneous CCTrCH (FDD)	1 NOTE 3	2/1 NOTE 2 NOTE 3	2/1 NOTE 2 NOTE 3	2 NOTE 3	2 NOTE 3	2 NOTE 3
Maximum number of simultaneous CCTrCH (TDD)	2 NOTE 3	3 NOTE 3	3 NOTE 3	3 NOTE 3	4 NOTE 3	4 NOTE 3
Maximum total number of transport blocks received within TTIs that end at the same time	8	8	16	32	64	96
Maximum number of TFC	32	48	96	128	256	1024
Maximum number of TF	32	64	64	64	128	256
Support for turbo decoding	No	Yes	Yes	Yes	Yes	Yes
Physical channel parameters (FDD)						
Maximum number of DPCH/PDSCH codes to be simultaneously received	1	2/1 NOTE 2	2/1 NOTE 2	3	3	3
Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH).	1200	3600/2400 NOTE2	7200/4800 NOTE2	19200	28800	57600
Support for SF 512 for DPCH NOTE 6	No	No	No	No	No	No
Support of PDSCH	No	Yes/No NOTE 1	Yes/No NOTE 1	Yes	Yes	Yes
Support of HS-PDSCH	No	Yes/No NOTE 1 NOTE 7	Yes/No NOTE 1 NOTE 7	Yes/No NOTE 1 NOTE 7	Yes/No NOTE 1 NOTE 7	Yes/No NOTE 1 NOTE 7
Maximum number of simultaneous S-CCPCH radio links	1	1	1	1	1	1
Support of dedicated pilots for channel estimation	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1
Physical channel parameters (TDD 3.84 Mcps)						
Maximum number of timeslots per frame	1	2	4	5	10	12
Maximum number of physical channels per frame	8	9	14	28	64	136
Minimum SF	16	16	16	1/16 NOTE 1	1/16 NOTE 1	1/16 NOTE 1
Support of PDSCH	Yes/No NOTE 1	Yes	Yes	Yes	Yes	Yes
Maximum number of physical channels per timeslot	8	9	9	9	9	13
Physical channel parameters (TDD 1.28 Mcps)						
Maximum number of timeslots per subframe	1	2	3	4	6	6
Maximum number of physical	8	12	18	43	77	77

Reference combination of UE Radio Access capability parameters in DL	32 kbps class	64 kbps class	128 kbps class	384 kbps class	768 kbps class	2048 kbps class
channels per subframe						
Minimum SF	16	16	16	1/16 NOTE 1	1/16 NOTE 1	1
Support of PDSCH	Yes/no NOTE 1	Yes	Yes	Yes	Yes	Yes
Maximum number of physical channels per timeslot	8	11	14	14	14	14
Support of 8PSK	No	No	No	No	No	Yes

NOTE 1: Options represent different combinations that should be supported with conformance tests.

NOTE 2: Options depend on the support of PDSCH. The highest value is required if PDSCH is supported.

NOTE 3: The given number does not contain the BCH CCTrCH of the current cell nor of the neighbour cells.

NOTE 4: The given number does not contain the BCH of the neighbour cell.

NOTE 5: (1) For FDD and 3.84 Mcps TDD (2) For 1.28 Mcps TDD.

NOTE 6: This UE capability does not relate to the support of CPCH in the uplink for which SF 512 is needed

NOTE 7: When HS-DSCH is configured the UE shall simultaneously support the UE capability values defined in the 64 kbps reference class. However, simultaneous support of PDSCH and HS-PDSCH is not required.

The reference combinations for HS-DSCH capabilities are shown in tables 5.2.2.2 and 5.2.2.3. These tables are subject to further discussions in TSG-RAN WG1 and TSG-RAN WG2.

Table 5.2.2.2: FDD UE radio access capability parameter combinations, DL HS-DSCH parameters

Reference combination	1.2 Mbps class	3.6 Mbps class	7 Mbps class	10 Mbps class
RLC and MAC-hs parameters				
Total RLC AM and MAC-hs buffer size (kbytes)	50	[50][100]	[100][200]	[150][300]
Maximum number of AM RLC entities	6	6	8	8
PHY parameters				
FDD HS-DSCH category	Category 15	Category 53	Category 72	Category 94

Table 5.2.2.3: 1.28 Mcps TDD UE radio access capability parameter combinations, DL HS-DSCH parameters

Reference combination	1.4 Mbps class	2.0 Mbps class	2.8 Mbps class
RLC and MAC-HS parameters			
Total RLC AM and MAC-hs buffer size (kbytes)	50	50	100
Maximum number of AM RLC entities	6	6	6
PHY parameters			
1.28 Mcps TDD HS-DSCH Category	Category 1	Category 6	Category 11