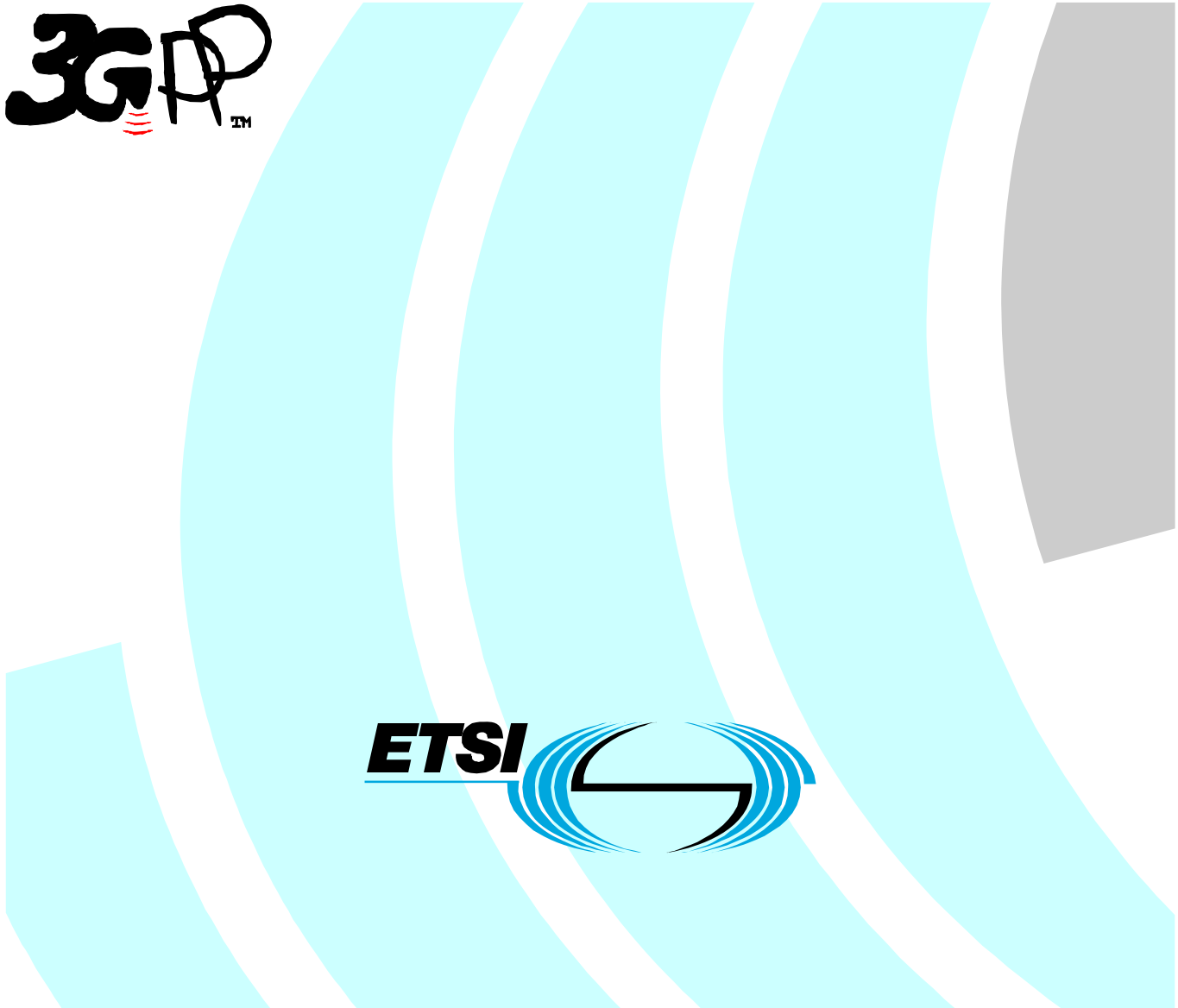
ETSI TS 125 306 V8.5.0 (2009-01)

Technical Specification

Universal Mobile Telecommunications System (UMTS);
UE Radio Access capabilities
(3GPP TS 25.306 version 8.5.0 Release 8)



Reference
RTS/TSGR-0225306v850

Keywords
UMTS

ETSI

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Foreword

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- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document identifies the parameters of the access stratum part of the UE radio access capabilities. Furthermore, some reference configurations of these values are defined. The intention is that these configurations will be used for test specifications.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 25.323: "Packet Data Convergence Protocol (PDCP) specification".

[2] 3GPP TS 34.108: "Common Test Environments for User Equipment (UE) Conformance Testing".

[3] 3GPP TS 34.123-2: "User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) proforma specification".

[4] 3GPP TS 25.101 "UE Radio Transmission and Reception (FDD)".

[5] 3GPP TS 25.102 "UTRA (UE) TDD; Radio transmission and reception".

[6] 3GPP TS 25.215 "Physical layer; Measurements (FDD)".

[7] RFC 2507: "IP Header Compression".

[8] RFC 3095: "RObust Header Compression (ROHC): Framework and four profiles".

[9] 3GPP TS 25.321 "Medium Access Control (MAC) protocol specification".

[10] 3GPP TS 25.322 "Radio Link Control (RLC) protocol specification".

[11] 3GPP TS 25.211 "Physical channels and mapping of transport channels onto physical channels (FDD)".

[12] 3GPP TS 25.331 "Radio Resource Control (RRC); Protocol Specification".

[13] 3GPP TS 25.308 "High Speed Downlink Packet Access (HSDPA); Overall description; Stage 2".

3 Void

4 UE radio access capability parameters

In the following the UE radio capability parameters are defined. When using the RRC configuration parameters, UTRAN needs to respect the UE capabilities. Only parameters for which there is a need to set different values for different UEs are considered as UE capability parameters. Therefore, the capabilities that are the same for all UEs, including baseline capabilities, are not listed here.

UTRAN needs to respect the UE capabilities when configuring the RBs. Actions in the UE when capabilities are in conflict with a UTRAN request are specified in RRC.

4.1 PDCP parameters

Support for RFC 2507

This parameter defines whether the UE supports header compression according to RFC 2507 as defined in [1] or not.

Support for RFC 3095

This parameter defines whether the UE supports header compression according to RFC 3095 as defined in [1] or not. If the UE supports IMS, as described in [23.228], the UE shall support header compression according to RFC 3095 as defined in [1].

Support for RFC 3095 context relocation

This parameter defines whether the UE supports RFC 3095 context relocation as defined in [1] or not.

Support for loss-less SRNS relocation

Defines whether the UE supports loss-less SRNS relocation as defined in [1] or not.

Support for lossless DL RLC PDU size change

Defines whether the UE supports lossless DL RLC PDU size change as defined in [1] or not.

Maximum header compression context space

This parameter is only applicable if the UE supports header compression according to RFC 2507. It is defined as the maximum header compression context size supported by the UE for all RFC 2507 protocol entities for all RBs. UTRAN controls that the UE capability can be fulfilled through the following parameters:

1. MAX_HEADER;
2. TCP_SPACE;
3. NON_TCP_SPACE;

The context space for a single RFC 2507 protocol entity calculates from:

(2 * (TCP_SPACE + 1 + NON_ TCP_SPACE + 1) * MAX_HEADER).

The following criterion must be fulfilled in the configuration:

Maximum header compression context space ≥ sum of context spaces for all RFC 2507 protocol entities for all RBs.

Maximum number of ROHC context sessions

This parameter is only applicable if the UE supports header compression according to RFC3095. It is defined as the maximum number of header compression context sessions supported by the UE.

Support for Reverse Decompression

This parameter determines whether reverse decompression is supported or not and the maximum number of packets that can be reverse decompressed by the decompressor in the UE.

Support for CS voice over HSPA

Defines whether the UE is able to route CS voice (AMR and AMR WB) data over HS-DSCH and E-DCH transport channels. If the UE supports CS voice over HS-DSCH and E-DCH, then the UE shall also support HS-PDSCH and E-DPDCH in CELL_DCH and DPCCH Discontinuous Transmission and MAC-ehs.

4.2 Void

4.3 RLC, MAC-hs, MAC-ehs and MAC-i/is parameters

Total RLC AM and MAC-hs buffer size

When HS-DSCH is not configured this is defined as the maximum total buffer size across all RLC AM entities supported by the UE. When HS-DSCH is configured this is defined as the maximum total buffer size across all MAC-hs reordering entities and all RLC AM entities supported by the UE. The memory signalled in this capability is dynamically shared by RLC AM entities and MAC-hs reordering entities at any time.

In order to evaluate memory consumption in the UE, it shall be assumed that:

- a stored AMD PDU of N octets requires a memory equal to N octets;
- a stored MAC-hs PDU of N bits requires a memory equal to (N – 10) bits.

The UE shall only consider itself in a memory shortage situation as defined in [9] [10] when the amount of stored AM RLC PDUs and MAC-hs PDUs exceeds its capability.

Maximum number of AM entities

This is defined as the maximum number of RLC AM entities supported by the UE.

Maximum RLC AM Window Size

This is defined as the maximum transmission and receiving window size of RLC AM entities supported by the UE.

Support of MAC-ehs

Defines whether the UE supports reception of MAC-ehs operation. If the UE supports MAC-ehs operation then the UE shall also support HS-PDSCH in CELL_DCH and flexible RLC AM PDU size in downlink.

Support of Two Logical Channels

Defines whether the UE supports an AM RLC entity configurationed with two logical channels.

Support of MAC-i/is

Defines whether the UE supports MAC-i/is operation. If the UE supports MAC-i/is operation then the UE shall also support MAC-ehs operation, E-DPDCH in CELL_DCH and flexible RLC AM PDU size in uplink.

4.4 Void

4.5 PHY parameters

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:

$$\Sigma_i(N_i)$$

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 bits of an HS-DSCH transport block received within an HS-DSCH TTI

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

4.5.2 Transport channel parameters in uplink

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

NOTE 1: "Being transmitted" refers to all bits in the active TFC within the TFCS over all simultaneous transport channels transmitted 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:

$$\Sigma_i(N_i)$$

where N_i is defined as the number of bits in transport block #i, and the sum is over all transport blocks being transmitted at an arbitrary time instant.

NOTE 2: This parameter is related to memory requirements for uplink data received from MAC before it can be transmitted over the radio interface. As shown in Figure 4.1 the worst case occurs for the maximum TTI. 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.

Maximum sum of number of bits of all convolutionally coded transport blocks being transmitted 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 transmitted 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 uplink transport channels that the UE is capable to process simultaneously, not taking into account the rate of each transport channel.

NOTE: 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.

Maximum number of simultaneous CCTrCH

This parameter is applicable for TDD only. For FDD there is always only one CCTrCH at a time. The parameter is defined as the maximum number of uplink CCTrCH that the UE is capable to process simultaneously.

Maximum total number of transport blocks transmitted within TTIs that start at the same time

Defines the maximum number of transport blocks that the UE is capable to transmit within TTIs that start at the same time. An example is shown in figure 4.1.

NOTE: Relates to processing requirements for CRC in uplink.

Maximum number of TFC

Defines the maximum number of transport format combinations the UE can store, where all transport format combinations for all uplink transport format combination sets are counted.

Maximum number of TF

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

Support for turbo encoding

Defines whether turbo encoding is supported or not.

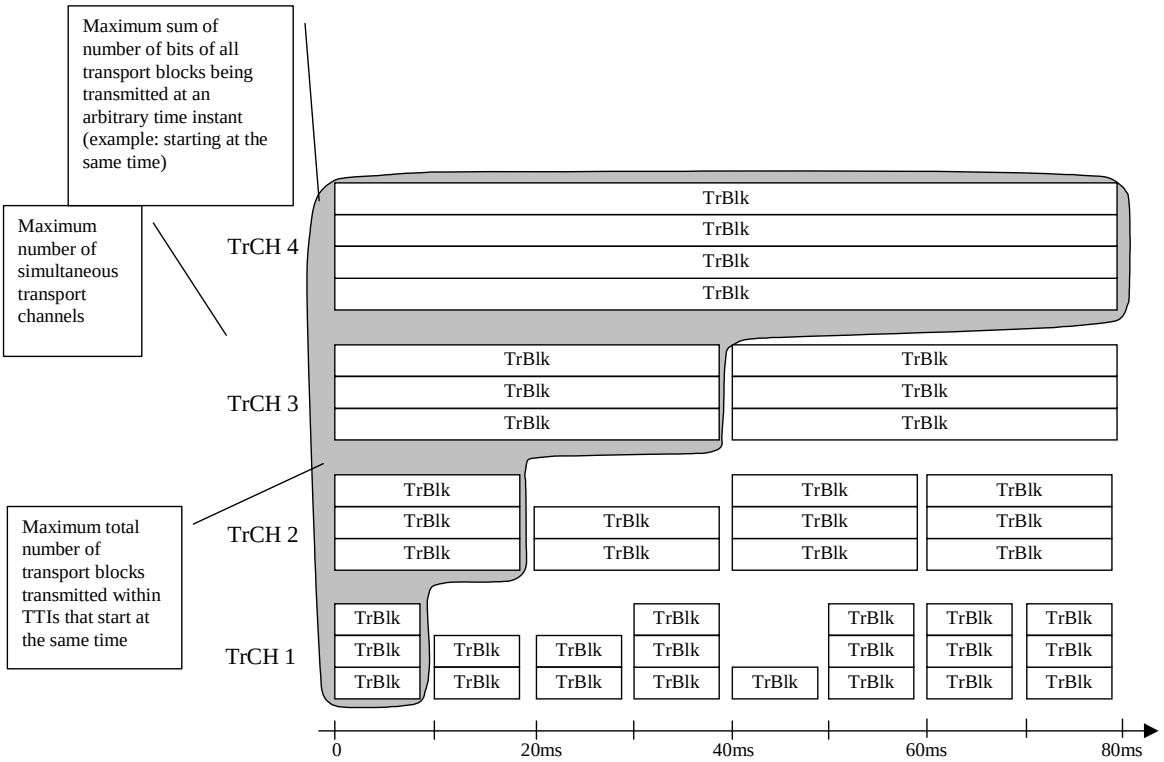

Figure 4.1: UE transport channel processing limitations in uplink

4.5.3 FDD Physical channel parameters in downlink

Maximum number of DPCH codes to be simultaneously received

Defines the number of codes the UE is capable of receiving in parallel. For DPCH in soft/softer handover, each DPCH is only calculated once in this capability. The capability does not include codes used for S-CCPCH.

Maximum number of physical channel bits received in any 10 ms interval (DPCH, S-CCPCH)

Defines the number of physical channel bits the UE is capable of receiving. For DPCH in soft/softer handover, each DPCH is only calculated once in this capability.

The number of DPCH channel bits indicates the capability of the UE when operating in non-compressed mode.

The parameter also indicates the capability of the UE to support compressed mode by spreading factor reduction as follows. The UE shall:

- for parameter values up to and including 9600 bits:
  - support compressed mode by spreading factor reduction when operating at any value up to the reported capability.
- for parameter values greater than 9600 bits:
  - support compressed mode by spreading factor reduction when operating at any value up to the greater of:
    - half the reported capability; or
    - 9600bits.

NOTE: Compressed mode by spreading factor reduction is not applicable when operating at spreading factor 4.

Support for SF 512 and 80 ms TTI for DPCH

Defines whether the UE supports spreading factor 512 and 80 ms TTI in downlink DPCH or not.

Support of HS-PDSCH

Defines whether the UE supports HS-PDSCH in CELL_DCH state or not. If the UE supports HS-PDSCH in CELL_DCH state then the UE shall support also F-DPCH.

Support of HS-SCCHless HS-DSCH

Defines whether the UE supports HS-PDSCH reception in CELL_DCH without prior reception of HS-SCCH. If the UE supports HS-SCCHless HS-DSCH then the UE shall support HS-PDSCH in CELL_DCH and E-DPDCH.

Support of HS-PDSCH in CELL_FACH

Defines whether the UE supports HS-PDSCH in CELL_FACH state or not. If the UE supports HS-PDSCH in CELL_FACH then the UE shall support also HS-PDSCH in CELL_DCH and MAC-ehs.

Support of HS-PDSCH in CELL_PCH and URA_PCH

Defines whether the UE supports HS-PDSCH in CELL_PCH and URA_PCH states or not. If the UE supports HS-PDSCH in CELL_PCH then the UE shall support also HS-PDSCH in CELL_FACH.

Support of Enhanced F-DPCH

Defines whether the UE supports enhanced F-DPCH operation. If the UE supports Enhanced F-DPCH then the UE shall also support HS-PDSCH in CELL_DCH and E-DPDCH.

Maximum number of HS-DSCH codes received

Defines the maximum number of HS-DSCH codes the UE is capable of receiving. When the UE supports either MIMO or dual cell operation, this parameter defines the maximum number of HS-DSCH codes that the UE is capable of receiving per transport block.

Total number of soft channel bits in HS-DSCH

Defines the maximum number of soft channel bits over all HARQ processes. When explicit signalling is used, UTRAN configures Process Memory Size for each HARQ process so that the following criterion must be fulfilled in the configuration:

Total number of soft channel bits in HS-DSCH ≥ sum of Process Memory Size of all the HARQ processes.

Minimum inter-TTI interval in HS-DSCH

Defines the distance from the beginning of a TTI to the beginning of the next TTI that can be assigned to the UE.

Support of Target Cell Pre-Configuration

Defines if the UE supports simultaneous HS-DSCH reception from serving cell and decoding of an HS-SCCH sent from another cell in the active set. If the UE supports Target Cell Pre-Configuration then the UE shall also support Enhanced F-DPCH.

Support of HS-DSCH DRX operation

Defines whether the UE supports HS-DSCH DRX operation in CELL_FACH state as defined in [13]. If the UE supports HS-DSCH DRX operation in CELL_FACH state then the UE shall also support HS-PDSCH in CELL_FACH.

4.5.4 FDD physical channel parameters in uplink

Maximum number of DPDCH bits per 10 ms

Defines the maximum number of the DPDCH bits the UE is capable to transmit per 10 ms.

If the reported capability is lower than 9600, the number of DPDCH channel bits indicates the capability of the UE when operating in non-compressed mode; if the reported capability is equal to or greater than 9600 it indicates the maximum capability of the UE considering both compressed and non compressed mode operation.

NOTE 1: This capability combines the 'Max number of DPDCH' and 'Minimum SF' capabilities into one capability. Note that no flexibility is lost due to this, as multiple DPDCH is only used for SF = 4, i.e. when the number of DPDCH bits exceed a certain value.

NOTE 2: Compressed mode by spreading factor reduction is not applicable when operating at spreading factor 4.

Support of E-DPDCH

Defines whether the UE supports E-DPDCH in CELL_DCH or not.

Maximum number of E-DCH codes transmitted

Defines the maximum number of E-DCH codes and spreading factors the UE is capable of transmitting. The UE can support 1, 2 or 4 E-DPDCHs using either SF=2 or/and SF=4.

Support of 2ms TTI for E-DCH

Defines whether the UE supports 2ms TTI or not.

Support of DPCCH Discontinuous Transmission

Defines whether the UE supports DPCCH Discontinuous Transmission in CELL_DCH. If the UE supports DPCCH Discontinuous Transmission then the UE shall also support

- HS-PDSCH in CELL_DCH
- E-DPDCH in CELL-DCH
- Uplink DRX with E-DCH start time restriction in CELL-DCH as definied in [13]
- The configuration of the Downlink DRX as definied in [13].

Support of Slot Format #4

Defines whether the UE supports slot format #4.

Support of common E-DCH

Defines whether the UE supports E-DCH enhanced random access in CELL_FACH state and Idle mode. If the UE supports common E-DCH then the UE shall also support

- MAC-i/is
- FDD E-DCH physical layer category 2, 4, 6 or 7
- Enhanced F-DPCH
- HS-PDSCH in CELL_FACH

4.5.5 TDD physical channel parameters in downlink

4.5.5.1 3.84 Mcps TDD and 7.68 Mcps TDD physical channel parameters in downlink

Maximum number of timeslots per frame

Defines the maximum number of timeslots per frame that the UE can receive.

Maximum number of physical channels per frame

This parameter defines how many physical channels can be received during one frame. The distribution of the received physical channels on the received timeslots can be arbitrary.

Minimum SF

Defines the minimum SF supported by the UE.

Support of PDSCH

Defines whether PDSCH is supported or not.

Support of HS-PDSCH

Defines whether the UE supports HS-PDSCH or not.

Maximum number of physical channels per timeslot

This parameter defines how many physical channels can be received within one timeslot.

Maximum number of HS-DSCH codes per timeslot

This is the maximum number of channelisation codes that can be used for the HS-DSCH in a given downlink timeslot. Where the parameter "Maximum number of physical channels per timeslot" is larger than "Maximum number of HS-DSCH codes per timeslot", this indicates that the UE is able to receive HS-SCCH or associated DPCH transmissions in the same timeslot as HS-PDSCHs, even if the maximum HS-DSCH code allocation for that slot is being used.

Maximum number of HS-DSCH timeslots per TTI

This is the maximum number of timeslots in a given 10 ms frame that can be used for HS-DSCH transmissions.

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 UE is capable of receiving within an HS-DSCH TTI.

Total number of soft channel bits

Defines the maximum number of soft channel bits over all HARQ processes.

4.5.5.2 1.28 Mcps TDD physical channel parameters in downlink

Maximum number of timeslots per subframe

Defines the maximum number of timeslots per subframe that the UE can receive.

Maximum number of physical channels per subframe

This parameter defines how many physical channels can be received during one subframe. The distribution of the received physical channels on the received timeslots can be arbitrary.

Minimum SF

Defines the minimum SF supported by the UE.

Support of PDSCH

Defines whether PDSCH is supported or not.

Support of HS-PDSCH

Defines whether the UE supports HS-PDSCH or not.

Maximum number of physical channels per timeslot

This parameter defines how many physical channels can be received within one timeslot.

Support of 8PSK

Defines whether 8PSK modulation is supported or not.

Maximum number of HS-DSCH codes per timeslot

This is the maximum number of channelisation codes that can be used for the HS-DSCH in a given downlink timeslot. Where the parameter "Maximum number of physical channels per timeslot" is larger than "Maximum number of HS-DSCH codes per timeslot", this indicates that the UE is able to receive HS-SCCH or associated DPCH transmissions in the same timeslot as HS-PDSCHs, even if the maximum HS-DSCH code allocation for that slot is being used.

Maximum number of HS-DSCH timeslots per TTI

This is the maximum number of timeslots in a given 5 ms subframe that can be used for HS-DSCH transmissions.

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 UE is capable of receiving within an HS-DSCH TTI.

Total number of soft channel bits

Defines the maximum number of soft channel bits over all HARQ processes.

Maximum number of the total HS-DSCH timeslots on the all assigned carriers per TTI (Multi-frequency HS-DSCH operation mode only)

This is the maximum number of the total timeslots of all the carriers in a given 5 ms subframe that can be used for HS-DSCH transmissions. This is used by the UE which has the multi-carrier capability.

NOTE: If it is not specified explicitly, these parameters in this section are defined for single frequency operation mode.

4.5.6 TDD physical channel parameters in uplink

4.5.6.1 3.84 Mcps TDD and 7.68 Mcps TDD physical channel parameters in uplink

Maximum Number of timeslots per frame

Defines the maximum number of timeslots per frame that the UE can transmit.

Maximum number of physical channels per timeslot

Defines the maximum number physical channels transmitted in parallel during one timeslot.

Minimum SF

Defines the minimum SF supported by the UE.

Support of PUSCH

Defines whether PUSCH is supported or not.

Support of E-PUCH

Defines whether the UE supports E-PUCH or not.

Maximum number of physical channel bits on E-PUCH that can be transmitted in a 10ms TTI

Defines the maximum number of physical channel bits, N_{data}, that the UE is capable of transmitting on E-PUCH in a 10ms TTI.

Maximum number of bits of an E-DCH transport block that can be transmitted within a 10ms E-DCH TTI

Defines the maximum number of bits of an E-DCH transport block that the UE is capable of transmitting within a 10ms E-DCH TTI.

4.5.6.2 1.28 Mcps TDD physical channel parameters in uplink

Maximum Number of timeslots per subframe

Defines the maximum number of timeslots per subframe that the UE can transmit.

Maximum number of physical channels per timeslot

Defines the maximum number of physical channels transmitted in parallel during one timeslot.

Minimum SF

Defines the minimum SF supported by the UE.

Support of PUSCH

Defines whether PUSCH is supported or not.

Support of 8PSK

Defines whether 8PSK modulation is supported or not.

Support of E-PUCH

Defines whether the UE supports E-PUCH or not.

Maximum number of physical channel bits on E-PUCH that can be transmitted in a 5ms TTI

Defines the maximum number of physical channel bits, N_{data}, that the UE is capable of transmitting on E-PUCH in a 5ms TTI.

Maximum number of bits of an E-DCH transport block that can be transmitted within a 5ms E-DCH TTI

Defines the maximum number of bits of an E-DCH transport block that the UE is capable of transmitting within a 5ms E-DCH TTI.

4.5.7 RF parameters

UE power class

Indicates the UE power class as defined in [4] for FDD and [5] for TDD.

Radio frequency bands

Defines the uplink and downlink frequency bands supported by the UE as defined in [4] for FDD and [5] for TDD.

Tx/Rx frequency separation

This parameter is only applicable for FDD. It defines the uplink/downlink frequency separations supported by the UE. The value range depends on the radio frequency band the UE supports, as defined in [4].

4.6 Multi-mode related parameters

Support of UTRA FDD

Defines whether UTRA FDD is supported.

There is no explicit configuration parameter.

Support of UTRA TDD 3.84 Mcps

Defines whether UTRA TDD 3.84 Mcps is supported.

There is no explicit configuration parameter.

Support of UTRA TDD 7.68 Mcps

Defines whether UTRA TDD 7.68 Mcps is supported.

There is no explicit configuration parameter.

Support of UTRA TDD 1.28 Mcps

Defines whether UTRA TDD 1.28 Mcps is supported.

There is no explicit configuration parameter.

4.7 Multi-RAT related parameters

Support of GSM

Defines whether GSM is supported or not. There is a separate parameter for each GSM frequency band.

Support of multi-carrier

Defines whether multi-carrier is supported or not.

Support of UTRAN to GERAN NACC

Defines whether UTRAN to GERAN NACC is supported or not.

Support of Handover to GAN

Defines whether CS Handover to GAN is supported or not.

Support of Inter-RAT PS Handover

Defines whether Inter-RAT PS Handover to GERAN is supported or not.

Support of PS Handover to GAN

Defines whether PS Handover to GAN is supported or not.

Support of E-UTRA FDD

Defines whether E-UTRA FDD is supported or not. There is a separate parameter for each E-UTRA frequency band.

Support of Inter-RAT PS Handover to E-UTRA FDD

Defines whether Inter-RAT PS Handover to E-UTRA FDD is supported or not.

Support of E-UTRA TDD

Defines whether E-UTRA TDD is supported or not. There is a separate parameter for each E-UTRA frequency band.

Support of Inter-RAT PS Handover to E-UTRA TDD

Defines whether Inter-RAT PS Handover to E-UTRA TDD is supported or not.

4.7a Security parameters

Ciphering algorithm capability

This capability defines the ciphering algorithms supported by the UE. In this version of the protocol, the UE shall support UEA0, UEA1 and UEA2.

Integrity protection algorithm capability

This capability defines the integrity protection algorithms supported by the UE. In this version of the protocol, the UE shall support UIA1 and UIA2.

4.8 UE positioning related parameters

Standalone location method(s) supported

Defines if a UE can measure its location by some means unrelated to UTRAN (e.g. if the UE has access to a standalone GPS receiver).

UE based OTDOA supported

Defines if a UE supports the OTDOA UE based schemes.

Network Assisted GPS support

Defines if a UE supports either of the two types of assisted GPS schemes, namely "Network based", "UE based", "Both", or "none".

Network Assisted GANSS support List

Defines if a UE supports assisted GANSS schemes. The GANSS gathers Galileo and Additional Navigation Satellite Systems. It defines which GANSS(s) is/are supported, and for each supported GANSS it further defines:

- the GANSS mode supported (namely "Network based", "UE based", "Both", or "none");
- the GANSS signals supported;
- the capability to perform GANSS timing of cell frames measurement;
- the capability to perform GANSS carrier phase measurement;
- the capability to support non-native assistance data choices.

Support for GPS timing of cell frames measurement

Defines if a UE has the capability to measure GPS reference time as defined in [6].

Support for IPDL

Defines if a UE has the capability to use IPDL to enhance its "SFN-SFN observed time difference –type 2" measurement.

Support for Rx-Tx time difference type 2 measurement

Defines if a UE has the capability to perform the Rx-Tx time difference type 2 measurement.

Support for UE Positioning assisted GPS measurement validity in CELL_PCH and URA_PCH RRC states

Defines if UE Positioning measurements using the assisted GPS method are valid in CELL_PCH and URA_PCH RRC states.

Support for SFN-SFN observed time difference type 2 measurement

Defines if the UE has the capability to perform the SFN-SFN observed time difference type 2 measurement.

4.9 Measurement related capabilities

Need for downlink compressed mode

Defines whether the UE needs compressed mode in the downlink in order to perform inter-frequency or inter-RAT measurements. There are separate parameters for measurements on each UTRA mode, on each RAT, and in each frequency band.

Need for uplink compressed mode

Defines whether the UE needs compressed mode in the uplink in order to perform inter-frequency or inter-RAT measurements. There are separate parameters for measurements on each UTRA mode, on each RAT, and in each frequency band.

Adjacent Frequency measurements without compressed mode

Defines whether the UE needs compressed mode to perform measurements on an adjacent frequency, i.e. a frequency whose center is within 5MHz of the center of the currently used frequency and belongs to the same frequency band as that of the currently used frequency.

Support for System Information Block type 11bis

Defines whether the UE supports System Information Block type 11bis.

4.10 General capabilities

Access stratum release indicator

This is defined as the release of the UTRA layer 1, 2, and 3 specifications that is applicable for the UE e.g. R'99, Rel-4.

4.11 DL capabilities with simultaneous HS-DSCH

DL capability with simultaneous HS-DSCH configuration

Defines the modification of reception capabilities in downlink in terms of DPCH in case an HS-DSCH is configured simultaneously. The parameter values in table 4.11-1 replace the signalled values in case an HS-DSCH is configured simultaneously depending on the setting of the parameter DL DPCH capability with simultaneous HS-DSCH configuration. Other parameters are valid irrespective whether HS-DSCH is configured simultaneously or not.

Table 4.11-1: DL capabilities with simultaneous HS-DSCH

DL DPCH capability with simultaneous HS-DSCH configuration	32 kbps	64 kbps	128 kbps	384 kbps
Transport channel parameters				
Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	640	3840	3840	6400
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	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
Maximum number of simultaneous transport channels	8	8	8	8
Maximum number of simultaneous CCTrCH (FDD)	1	1	1	1
Maximum number of simultaneous CCTrCH (TDD)	2	3	3	3
Maximum total number of transport blocks received within TTIs that end at the same time	8	8	16	32
Maximum number of TFC	32	48	96	128
Maximum number of TF	32	64	64	64
Support for turbo decoding	No	Yes	Yes	Yes
Physical channel parameters (FDD)				
Maximum number of DPCH codes to be simultaneously received	1	1	1	3
Maximum number of physical channel bits received in any 10 ms interval (DPCH, S-CCPCH).	1200	2400	4800	19200
Physical channel parameters (TDD 3.84 Mcps)				
Maximum number of timeslots per frame	1	2	4	5
Maximum number of physical channels per frame	8	9	14	28
Support of PDSCH	No	No	No	No
Maximum number of physical channels per timeslot	8	9	9	9

DL DPCH capability with simultaneous HS-DSCH configuration	32 kbps	64 kbps	128 kbps	384 kbps
Physical channel parameters (TDD 7.68 Mcps)				
Maximum number of timeslots per frame	1	2	4	5
Maximum number of physical channels per frame	8	9	14	28
Support of PDSCH	No	No	No	No
Maximum number of physical channels per timeslot	8	9	9	9
Physical channel parameters (TDD 1.28 Mcps)				
Maximum number of timeslots per subframe	1	2	3	4
Maximum number of physical channels per subframe	8	12	18	43
Support of PDSCH	No	No	No	No
Maximum number of physical channels per timeslot	8	11	14	14

4.12 UL capabilities with simultaneous E-DCH

UL capability with simultaneous E-DCH configuration

Defines the modification of transmission capabilities in uplink in terms of DPCH in case an E-DCH is configured simultaneously. The parameter values in table 4.12-1 replace the signalled values in case an E-DCH is configured simultaneously depending on the setting of the parameter UL DPCH capability with simultaneous E-DCH configuration. Other parameters are valid irrespective whether E-DCH is configured simultaneously or not.

Table 4.12-1: UL capabilities with simultaneous E-DCH

UL DPCH capability with simultaneous E-DCH configuration	64 kbps
Transport channel parameters	
Maximum sum of number of bits of all transport blocks being transmitted at an arbitrary time instant	3840
Maximum sum of number of bits of all convolutionally coded transport blocks being transmitted at an arbitrary time instant	640
Maximum sum of number of bits of all turbo coded transport blocks being transmitted at an arbitrary time instant	3840
Maximum number of simultaneous transport channels	8
Maximum total number of transport blocks transmitted within TTIs that end at the same time	8
Maximum number of TFC	32
Maximum number of TF	32
Support for turbo encoding	Yes
Physical channel parameters (FDD)	
Maximum number of DPDCH bits transmitted per 10 ms	2400
Physical channel parameters (3.84Mcps TDD)	
Maximum number of timeslots per frame	2
Maximum number of physical channels per timeslot	1
Minimum SF	2
Physical channel parameters (7.68Mcps TDD)	
Maximum number of timeslots per frame	2
Maximum number of physical channels per timeslot	1
Minimum SF	4
Physical channel parameters (1.28Mcps TDD)	
Maximum number of timeslots per frame	2
Maximum number of physical channels per timeslot	1
Minimum SF	2

4.13 UE minimum capabilities for reception of MBMS not provided in MBSFN mode

For FDD, the minimum UE capability for MBMS reception for MBMS services that are not provided in MBSFN mode consists of two separate and independent parts ("MBMS capability part A" and "MBMS capability part B").

MBMS capability part A parameters defined in Table 4.13-1 are the same as the 64kbps UE reference class for DL described in subclause 5.2 and provides capability to enable reception of logical channels other than MTCHs and MSCH when MBMS PTM is received simultaneously.

Table 4.13-1: MBMS capability part A (FDD)

Capability for reception of DL DPCH or S-CCPCH carrying logical channels other than MTCH during MTCH reception	**64 kbps Class**
Transport channel parameters	**Value**
Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	3840
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	640
Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	3840
Maximum number of simultaneous transport channels	8
Maximum number of simultaneous CCTrCH (FDD)	1
Maximum total number of transport blocks received within TTIs that end at the same time	8
Maximum number of TFC	48
Maximum number of TF	64
Support for turbo decoding	Yes
Physical channel parameters (FDD)	
Number of DPCH or S-CCPCH codes (Note 1)	1
Maximum number of physical channel bits received in any 10 ms interval (DPCH or S-CCPCH).	2400

NOTE: Capability for reception of DPCH is applicable only if UE supports MBMS PTM reception in CELL_DCH state for reception of MBMS services that are not provided in MBSFN mode.

MBMS capability part B for reception of MBMS services that are not provided in MBSFN mode is defined in the following Table 4.13-2. MBMS capability part B enables reception of the S-CCPCHs onto which at least MTCH is multiplexed. MBMS capability part B supports selection combining and soft combining of S-CCPCHs on different cells. The UE is not required to support simultaneous selection combining and soft combining.

The exhaustive lists of supported configurations (slot formats, TTI and combining parameters) for capability part B is given in Table 4.13-3. Only FACH can be mapped on the S-CCPCHs listed in table 4.13-3. In addition to MTCH, the MSCH, BCCH, CCCH, DCCH and DTCH can be multiplexed onto the S-CCPCHs listed in table 4.13-3. The FACH TTI restrictions in table 4.13-3 only apply to FACHs carrying MTCH or MSCH.

Table 4.13-2: MBMS capability part B (FDD)

Combination of UE Radio Access capability parameters in DL for all S-CCPCHs that carry at least MTCH	
Transport channel parameters	**Value**
Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	21504
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	640
Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	21504
Maximum number of transport channels for the configuration	12
Maximum total number of transport blocks received within TTIs that end at the same	32

Combination of UE Radio Access capability parameters in DL for all S-CCPCHs that carry at least MTCH	
time	
Maximum number of TFC per S-CCPCH	32
Maximum number of TF	64
Support for turbo decoding	Yes
Number of CRC bits	16
Support for slot formats that do not contain TFCI	No
Supported slot formats and TTI combinations	See table 4.13-3
Physical channel parameters	
Maximum number of S-CCPCHs simultaneously received per cell for S-CCPCH Selection Combining or Soft Combining	1
Maximum number of cells for S-CCPCH Selection Combining or Soft Combining	See table 4.13-3

Table 4.13-3: Supported slot formats and FACH TTI combinations for MBMS capability part B (FDD)

S-CCPCH slot format (see [11])	FACH TTI (ms) for FACHs carrying MTCH or MSCH	Maximum Number of cells for S-CCPCH Selection Combining (Note 1)	Maximum Number of cells for S-CCPCH Soft Combining (Note 1)	Maximum Number of Simultaneous Transport Channels per S-CCPCH
14 (SF=8)	40	2	None	1
14 (SF=8)	40	None	3	1
12 (SF=16)	40	3	None	1
12 (SF=16)	80	2	None	1
12 (SF=16)	80	None	3	1
10 (SF=32)	80	3	None	4
10(SF=32)	80	None	3	1
8 (SF=64)	80	3	None	4
8 (SF=64)	80	None	3	1
6 (SF=128)	80	3	None	4
6 (SF=128)	80	None	3	1
2 (SF=256)	80	3	None	4
2 (SF=256)	80	None	3	1

NOTE: 'None' indicates that either selection combining or soft combining is not required for the respective combination.

Since MBMS capability part A and B are independent, the maximum total number of S-CCPCHs, including the S-CCPCH that the UE is required to monitor by subclause 8.5.19 of [12], that the UE is required to receive is 4.

MBMS Capability part B may be used to receive MCCH in the following cases:

- When the UE is in CELL_FACH state, and the MCCH is on a different S-CCPCH than the S-CCPCH that the UE is required to monitor by subclause 8.5.19 of [12].
- When the UE is in CELL_DCH, if the UE supports MBMS PTM reception in CELL_DCH.

Furthermore, in case MBMS PTM reception is ongoing, the UE may soft or selectively combine one less cell than shown in table 4.13-3 while receiving the S-CCPCH carrying the MCCH.

Further restrictions on the supported configurations of the S-CCPCH carrying the MCCH apply. The exhaustive lists of supported slot formats, TTI size, and maximum number of configured transport channels that can be received, depend on the capability of the UE to support MBMS PTM reception in CELL_DCH. Table 4.13-3a applies when UE does support MBMS PTM reception in CELL_DCH, while Table 4.13-3b applies when UE does not support MBMS PTM reception in CELL_DCH. In addition to MCCH, the BCCH, PCCH, CCCH, DCCH and DTCH can be multiplexed onto the S-CCPCHs listed in tables 4.13-3a and 4.13-3b. The FACH TTI restrictions in tables 4.13-3a and 4.13-3b only apply to FACH carrying MCCH.

Table 4.13-3a: Alternate supported slot formats and FACH TTI for MBMS capability part B (FDD)

S-CCPCH slot format (see [11])	FACH TTI (ms) for FACH carrying MCCH	Maximum Number of Configured Transport Channels
10 (SF=32)	20,10	4
8 (SF=64)	20,10	4
6 (SF=128)	20,10	4
2 (SF=256)	20,10	4

NOTE: One of the transport channels could be PCH.

Table 4.13-3b: Alternate supported slot formats and FACH TTI for MBMS capability part B (FDD)

S-CCPCH slot format (see [11])	FACH TTI (ms) for FACH carrying MCCH	Maximum Number of Configured Transport Channels
8 (SF=64)	10	1
6 (SF=128)	10	1
2 (SF=256)	20, 10	1

For FDD, the UE only supports reception of the MCCH, MTCH and MSCH on S-CCPCHs configured with flexible position.

For 3.84 Mcps TDD, a UE which supports the minimum capabilities defined in Table 4.13-4 should be capable of supporting transport channel combining of up to three radio links.

Table 4.13-4: MBMS Capabilities (3.84 Mcps TDD)

Combination of UE Radio Access capability parameters in DL for MBMS	
Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	10752
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	640
Maximum number of bits of all turbo coded transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	10752
Maximum number of bits before de-rate matching being received at an arbitrary time instant for S-CCPCH which carries MTCH (and MCCH/MSCH)	31856
Maximum number of physical channel bits received in any 10ms interval	13248
Maximum number of simultaneous transport channels per S-CCPCH carrying MTCH (and MCCH/MSCH)	16
Maximum number of physical channels per timeslot	16

Maximum number of synchronised radio links per frame which carry MTCH (and MCCH/MSCH)	3
Support for turbo decoding	Yes

NOTE: In the above table, the S-CCPCH refers to the CCTrCH carrying FACH

For 7.68 Mcps TDD, a UE which supports the minimum capabilities defined in Table 4.13-4a should be capable of supporting transport channel combining of up to three radio links.

Table 4.13-4a: MBMS Capabilities (7.68 Mcps TDD)

Combination of UE Radio Access capability parameters in DL for MBMS	
Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	21504
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	1280
Maximum number of bits of all turbo coded transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	21504
Maximum number of bits before de-rate matching being received at an arbitrary time instant for S-CCPCH which carries MTCH (and MCCH/MSCH)	63712
Maximum number of physical channel bits received in any 10ms interval	26496
Maximum number of simultaneous transport channels per S-CCPCH carrying MTCH (and MCCH/MSCH)	16
Maximum number of physical channels per timeslot	16
Maximum number of synchronised radio links per frame which carriy MTCH (and MCCH/MSCH)	3
Support for turbo decoding	Yes

NOTE: In the above table, the S-CCPCH refers to the CCTrCH carrying FACH.

For 1.28 Mcps TDD, a UE which supports the minimum capabilities defined in Table 4.13-5 should be capable of supporting transport channel combining of up to three radio links.

Table 4.13-5: DL Capabilities with simultaneous MBMS (1.28Mcps TDD)

Combination of UE Radio Access capability parameters in DL for MBMS	
Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	10752

Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	640
Maximum number of bits of all turbo coded transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	10752
Maximum number of bits before de-rate matching being received at an arbitrary time instant for S-CCPCH which carries MTCH (and MCCH/MSCH)	23920
Maximum number of physical channel bits received in any 5ms interval	4224
Maximum number of simultaneous transport channels per S-CCPCH carrying MTCH (and MCCH/MSCH)	16
Maximum number of physical channels per timeslot	16
Maximum number of synchronised radio links received per frame which carry MTCH (and MCCH/MSCH)	3
Support for turbo decoding	Yes

NOTE: In the above table, the S-CCPCH refers to the CCTrCH carrying FACH

4.13a UE minimum capabilities for reception of MBMS provided in MBSFN mode

For FDD, the minimum UE capability for reception of MBMS on cells that are operating in MBSFN mode consists of two separate and independent parts ("MBMS capability part C" and "MBMS capability part D").

For FDD MBSFN capability part C parameters defined in Table 4.13a-1 are the same as the 64kbps UE reference class for DL described in subclause 5.2 and provides capability to enable reception of MCCH when MBMS PTM is received simultaneously, and is applicable when a cell is operating in MBSFN mode.

Table 4.13a-1: MBSFN capability part C (FDD)

Capability for reception of S-CCPCH carrying logical channels other than MTCH during MTCH reception in MBSFN Mode	
Transport channel parameters	**Value**
Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	1280
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	640
Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	1280
Maximum number of simultaneous transport channels	1
Maximum number of simultaneous CCTrCH (FDD)	1
Maximum total number of transport blocks received within TTIs that end at the same time	8
Maximum number of TFC	32
Maximum number of TF	32
Support for turbo decoding	Yes
Physical channel parameters (FDD)	
Number of S-CCPCH codes	1
Maximum number of physical channel bits received in any 10 ms interval (S-CCPCH).	1200

For FDD, MBSFNcapability part D for cells that do operate in MBSFN mode is defined in Table 4.13a-2 for the reception of MTCH and MSCH on a S-CCPCH. This allows the UE to receive at least one service sent on a S-CCPCH of a cell operating in MBSFN mode.

The exhaustive lists of supported configurations (slot formats and TTI) for capability part D is given in Table 4.13a-3. Only FACH can be mapped on the S-CCPCHs listed in table 4.13a-2.

Table 4.13a-2: MBSFN capability part D (FDD)

Combination of UE Radio Access capability parameters in DL for MBMS reception in MBSFN Mode	
Maximum number of bits of all transport blocks being received at an arbitrary time instant for S-CCPCHs carrying MTCH (and MSCH)	81920 / 40960 Note 1
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	640
Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	81920 / 40960 Note 1
Maximum number of transport channels for the configuration	8
Maximum total number of transport blocks received within TTIs that end at the same time	128
Maximum number of TFC per S-CCPCH	128
Maximum number of TF	64
Support for turbo decoding	Yes
Number of CRC bits	16
Support for slot formats that do not contain TFCI	No
Supported slot formats and TTI combinations	See table 4.13-3
Maximum Number of Simultaneous Transport Channels per S-CCPCH	2 (Note 2)

NOTE 1: 81920 is only applicable for combinations in table 4.13a-3 where scheduling is restriced by a value bigger than 1 of MBMS minimum inter-TTI interval.

NOTE 2: Only one MTCH at a time and in addition possibly MSCH

Table 4.13a-3: Supported slot formats and FACH TTI combinations for MBSFN capability part D (FDD)

S-CCPCH slot format (see [11])	FACH TTI (ms)	MBMS minimum inter-TTI interval
23 (SF=8, 16QAM)	80	2
23 (SF=8, 16QAM)	40	1
22 (SF=16, 16QAM)	80	1
21 (SF=32, 16QAM)	80	1
20 (SF=64, 16QAM)	80	1
19 (SF=128, 16QAM)	80	1
18 (SF=256, 16QAM)	80	1
16 (SF=4, QPSK)	80	2
14 (SF=8, QPSK)	80	1
12 (SF=16, QPSK)	80	1
10 (SF=32, QPSK)	80	1
8 (SF=64, QPSK)	80	1
6 (SF=128, QPSK)	80	1
4 (SF=128, QPSK)	80	1
2 (SF=256, QPSK)	80	1
0 (SF=256, QPSK)	80	1

The MBMS minimum inter-TTI interval for MBSFN reception defines the minimum distance from the beginning of a TTI in which a given transport channel is scheduled to the beginning of the next TTI which corresponds to the earliest TTI in which which the same transport channel is allowed to be scheduled according to table 4.13a-3.

For 3.84 Mcps TDD, a MBSFN (MBMS over a Single Frequency Network) capable UE should support the minimum capabilities defined in Table 4.13a-4

Table 4.13a-4: MBSFN Capabilities (3.84 Mcps TDD)

Combination of UE Radio Access capability parameters in DL for MBMS reception in MBSFN Mode	
Maximum number of bits of all transport blocks being received at an arbitrary time instant for S-CCPCHs carrying MTCH (and MCCH/MSCH)	43603
Maximum number of bits before de-rate matching being received at an arbitrary time instant for S-CCPCHs which carry MTCH (and MCCH/MSCH)	69696
Maximum number of physical channel bits received in any 10ms interval	8712
Maximum number of simultaneous transport channels per S-CCPCH carrying MTCH (and MCCH/MSCH)	4
Maximum total number of transport blocks received within TTIs that end at the same time	130
Maximum number of TFC per S-CCPCH carrying MTCH (and MCCH / MSCH)	32
Maximum number of physical channels per timeslot	16
Maximum number of physical channels per frame	33
Maximum number of timeslots per frame	3

NOTE 3: In the above table, the S-CCPCH refers to the CCTrCH carrying FACH. Only turbo coding is supported.

For 7.68 Mcps TDD, a MBSFN (MBMS over a Single Frequency Network) capable UE should support the minimum capabilities defined in Table 4.13a-5.

Table 4.13a-5: MBSFN Capabilities (7.68 Mcps TDD)

Combination of UE Radio Access capability parameters in DL for MBMS reception in MBSFN Mode	
Maximum number of bits of all transport blocks being received at an arbitrary time instant for S-CCPCHs carrying MTCH (and MCCH/MSCH)	84572
Maximum number of bits before de-rate matching being received at an arbitrary time instant for S-CCPCHs which carry MTCH (and MCCH/MSCH)	137280
Maximum number of physical channel bits received in any 10ms interval	17160
Maximum number of simultaneous transport channels per S-CCPCH carrying MTCH (and MCCH/MSCH)	4
Maximum total number of transport blocks received within TTIs that end at the same time	130
Maximum number of TFC per S-CCPCH carrying MTCH (and MCCH / MSCH)	32
Maximum number of physical channels per timeslot	32
Maximum number of physical channels per frame	65
Maximum number of timeslots per frame	3

NOTE 4: In the above table, the S-CCPCH refers to the CCTrCH carrying FACH. Only turbo coding is supported.

For 1.28 Mcps TDD, a MBSFN (MBMS over a Single Frequency Network) capable for mixed-carrier UE should support the minimum capabilities defined in Table 4.13a-6

Table 4.13a-6: MBSFN Capabilities for Mixed-carrier (1.28 Mcps TDD)

Combination of UE Radio Access capability parameters in DL for MBMS reception in MBSFN Mode	
Maximum number of bits of all transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	16448
Maximum number of bits before de-rate matching being received at an arbitrary time instant for S-CCPCH which carries MTCH (and MCCH/MSCH)	23232
Maximum number of physical channel bits received in any 10ms interval	5808
Maximum number of simultaneous transport channels per S-CCPCH carrying MTCH (and MCCH/MSCH)	1
Maximum total number of transport blocks received within TTIs that end at the same time	49
Maximum number of TFC per S-CCPCH carrying MTCH (and MCCH / MSCH)	32
Maximum number of physical channels per timeslot	16

Maximum number of physical channels per frame	17
Maximum number of timeslots per frame	2

NOTE: In the above table, the S-CCPCH refers to the CCTrCH carrying FACH.

For 1.28 Mcps TDD, a MBSFN (MBMS over a Single Frequency Network) capable for dedicated-carrier UE should support the minimum capabilities defined in Table 4.13a-7

Table 4.13a-7: MBSFN Capabilities for Dedicated-carrier (1.28 Mcps TDD)

Combination of UE Radio Access capability parameters in DL for MBMS reception in MBSFN Mode	
Maximum number of bits of all transport blocks being received at an arbitrary time instant for S-CCPCH carrying MTCH (and MCCH/MSCH)	16448
Maximum number of bits before de-rate matching being received at an arbitrary time instant for S-CCPCH which carries MTCH (and MCCH/MSCH)	25224
Maximum number of physical channel bits received in any 10ms interval	6306
Maximum number of simultaneous transport channels per S-CCPCH carrying MTCH (and MCCH/MSCH)	1
Maximum total number of transport blocks received within TTIs that end at the same time	49
Maximum number of TFC per S-CCPCH carrying MTCH (and MCCH / MSCH)	32
Maximum number of physical channels per timeslot	16
Maximum number of physical channels per frame	35
Maximum number of timeslots per frame	3

NOTE: In the above table, the S-CCPCH refers to the CCTrCH carrying FACH.

For MBSFN Integrated Mobile Broadcast (3.84 Mcps TDD IMB), the minimum UE capability for reception of MBMS on cells that are operating in MBSFN mode consists of two separate and independent parts ("MBMS capability part E" and "MBMS capability part F").

For 3.84 Mcps TDD MBSFN IMB, capability part E parameters defined in Table 4.13a-8 enable reception of MCCH on S-CCPCH frame type 1 when MBMS PTM is received simultaneously, and is applicable when a cell is operating in MBSFN mode.

Table 4.13a-8: MBSFN capability part E (3.84 Mcps TDD MBSFN IMB)

Capability for reception of S-CCPCH frame type 1 carrying logical channels other than MTCH during MTCH reception in MBSFN Mode	
Transport channel parameters	**Value**
Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	[320]
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	[320]
Maximum number of simultaneous transport channels	1
Maximum number of simultaneous CCTrCH	1
Maximum total number of transport blocks received within TTIs that end at the same time	8
Maximum number of TFC	32
Maximum number of TF	32
Support for turbo decoding	No
Physical channel parameters	
Number of S-CCPCH frame type 1 codes	1
Maximum number of physical channel bits received in any 10 ms interval (S-CCPCH frame type 1).	270

For 3.84 Mcps TDD MBSFN IMB, capability part F for cells that do operate in MBSFN mode is defined in Table 4.13a-9 for the reception of an MTCH (and MSCH) on S-CCPCH frame type 2. This allows the UE to receive at least one service sent on S-CCPCHs frame type 2 of a cell operating in MBSFN mode.

Table 4.13a-9: MBSFN capability part F (3.84 Mcps TDD MBSFN IMB)

Combination of UE Radio Access capability parameters in DL for MBMS reception in MBSFN Mode	
Maximum number of bits of all transport blocks being received at an arbitrary time instant for S-CCPCHs frame type 2 carrying MTCH (and MSCH)	40960
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	0
Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	40960
Maximum number of transport channels for the configuration	8
Maximum total number of transport blocks received within TTIs that end at the same time	128
Maximum number of TFC per S-CCPCH frame type 2	32
Maximum number of TF	32
Support for turbo decoding	Yes
Number of CRC bits	16
Support for CCTrCH that do not contain TFCI	No
Maximum Number of Simultaneous Transport Channels per S-CCPCH type 2	2 (Note 5)
Physical channel parameters	
Maximum number of S-CCPCH frame type 2 codes using QPSK modulation	10
Maximum number of S-CCPCH frame type 2 codes using 16-QAM modulation	5
Maximum number of physical channel bits received in any 10 ms interval (S-CCPCH frame type 2).	8640

NOTE 5: Only one MTCH at a time and in addition possibly MSCH

5 Possible UE radio access capability parameter settings

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 RFC 3095 context relocation	Yes/No
		Support for loss-less SRNS relocation	Yes/No
		Support for loss-less DL RLC PDU size change	Yes/No
		Maximum header compression context space	1024, 2048, 4096, 8192, 16384, 32768, 65536, 131072 bytes
		Maximum number of ROHC context sessions	2, 4, 8, 12, 16, 24, 32, 48, 64, 128, 256, 512, 1024, 16384
		Support for Reverse Decompression	Not supported, 1..65535
		Support for CS voice over HSPA	Yes/No
RLC, MAC-hs, MAC-ehs and MAC-i/is parameters		Total RLC AM, MAC-hs and MAC-ehs buffer size	2, 10, 50, 100, 150, 200, 300, 400, 500, 750, 1000, 2000 kBytes
		Maximum number of AM entities	3, 4, 5, 6, 8, 16, 30
		Maximum RLC AM window size	2047, 4095
		Support for MAC-ehs	Yes/No
		Support for two logical channels	Yes/No
		Support of MAC-i/is	Yes/No
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, 204640
		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, 204640
		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, 204640
		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 uplink	Maximum sum of number of bits of all 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 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

		UE radio access capability parameter	Value range
		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 DPCHcodes 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, S-CCPCH)	600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 48000, 57600, 67200, 76800
		Support for SF 512 and 80 ms TTI for DPCH	Yes/No
		Support of HS-PDSCH in CELL_DCH	Yes/No
		Support of HS-SCCHless HS-DSCH	Yes/No
		Support of HS-PDSCH in CELL_FACH	Yes/No
		Support of HS-PDSCH in CELL_PCH and URA_PCH	Yes/No
		Support of Enhanced F-DPCH	Yes/No
		Support of Target Cell Pre-Configuration	Yes/No
		Support of HS-DSCH DRX operation	Yes/No
	FDD Physical channel parameters in uplink	Maximum number of DPDCH bits transmitted per 10 ms	600, 1200, 2400, 4800, 9600, 19200, 28800, 38400, 48000, 57600
		Support of E-DPDCH	Yes/No
		Support of Discontinuous Transmission in CELL_DCH	Yes/No
		Support of Slot Format #4	Yes/No
		Support of common E-DCH	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
		Support of HS-PDSCH	Yes/No
		Maximum number of physical channels per timeslot	1..16
	TDD 3.84 Mcps physical channel parameters in uplink	Maximum Number of timeslots per frame	1..14
		Maximum number of physical channels per timeslot	1, 2
		Minimum SF	16, 8, 4, 2, 1
		Support of PUSCH	Yes/No
		Support of E-PUCH	Yes/No
	TDD 7.68 Mcps physical channel parameters in downlink	Maximum number of timeslots per frame	1..14
		Maximum number of physical channels per frame	1, 2, 3..448
	TDD 7.68 Mcps physical channel parameters in downlink	Minimum SF	32, 1
		Support of PDSCH	Yes/No
		Support of HS-PDSCH	Yes/No
		Maximum number of physical channels per timeslot	1..32
	TDD 7.68 Mcps physical channel parameters in uplink	Maximum Number of timeslots per frame	1..14
		Maximum number of physical channels per timeslot	1, 2
		Minimum SF	32, 16, 8, 4, 2, 1
		Support of PUSCH	Yes/No
		Support of E-PUCH	Yes/No

		UE radio access capability parameter	Value range
	TDD 1.28 Mcps physical channel parameters in downlink	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
		Support of HS-PDSCH	Yes/No
		Maximum number of physical channels per timeslot	1..16
		Support 8PSK	Yes/No
	TDD 1.28 Mcps physical channel parameters in uplink	Maximum number of timeslots per subframe	1..6
		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
		Support of E-PUCH	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
		Radio frequency bands	The radio frequency bands defined in [4]
		Tx/Rx frequency separation	Defined in [4] for the respective supported radio frequency band
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
		Support of UTRAN to GERAN Network Assisted Cell Change	Yes/No
		Support of Handover to GAN	Yes/No
		Support of Inter-RAT PS Handover	Yes/No
		Support of PS Handover to GAN	Yes/No
		Support of E-UTRA FDD	Yes/No (per E-UTRA frequency band)
		Support of Inter-RAT PS Handover to E-UTRA FDD	Yes/No
		Support of E-UTRA TDD	Yes/No (per E-UTRA frequency band)
		Support of Inter-RAT PS Handover to E-UTRA TDD	Yes/No
Security parameters		Support of ciphering algorithm UEA0	Yes
		Support of ciphering algorithm UEA1	Yes
		Support of ciphering algorithm UEA2	Yes
		Support of integrity protection algorithm UIA1	Yes
		Support of integrity protection algorithm UIA2	Yes
UE positioning related parameters		Standalone location method(s) supported	Yes/No
		UE based OTDOA supported	Yes/No
		Network assisted GPS support	Network based / UE based / Both/ None
		Network Assisted GANSS support List:	per GANSS

	UE radio access capability parameter	Value range
	>GANSS ID	Galileo / SBAS / Modernized GPS / QZSS / GLONASS
	>SBAS IDs	WAAS / EGNOS / MSAS / GAGAN
	>GANSS mode	Network based / UE based / Both/ None
	>GANSS Signal ID	0..7
	>GANSS Signal IDs	Yes/No (per GANSS signal)
	>Support for GANSS timing of cell frames measurement	Yes/No
	>Support for GANSS Carrier-Phase Measurement	Yes/No
	>Support for non-native assistance choices	Yes/No
	Support for GPS timing of cell frames measurement	Yes/No
	Support for IPDL	Yes/No
	Support for Rx-Tx time difference type 2 measurement	Yes/No
	Support for UE Positioning assisted GPS measurement validity in CELL_PCH and URA_PCH RRC states	Yes
	Support for SFN-SFN observed time difference type 2 measurement	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)
	Support for System Information Block type 11bis	Yes
General capabilities	Access Stratum release indicator	R99, REL-4, REL-5, REL-6, REL-7, REL-8
	Device type	Benefits from NW-based battery consumption optimisation / Does not benefit from NW-based battery consumption optimisation
DL capabilities with simultaneous HS-DSCH	DL capability with simultaneous HS-DSCH configuration	32 kbps, 64 kbps, 128 kbps, 384 kbps
UL capabilities with simultaneous E-DCH	UL capabilities with simultaneous E-DCH	64 kbps

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 bits of an HS-DSCH transport block received within an HS-DSCH TTI NOTE 1	Total number of soft channel bits	Supported modulations without MIMO operation or dual cell operation	Supported modulations simultaneous with MIMO operation and without dual cell operation	Supported modulations with dual cell operation
Category 1	5	3	7298	19200	QPSK, 16QAM	Not applicable (MIMO not supported)	Not applicable (dual cell operation not
Category 2	5	3	7298	28800			
Category 3	5	2	7298	28800			
Category 4	5	2	7298	38400			
Category 5	5	1	7298	57600			

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 NOTE 1	Total number of soft channel bits	Supported modulations without MIMO operation or dual cell operation	Supported modulations simultaneous with MIMO operation and without dual cell operation	Supported modulations with dual cell operation
Category 6	5	1	7298	67200			supported)
Category 7	10	1	14411	115200			
Category 8	10	1	14411	134400			
Category 9	15	1	20251	172800			
Category 10	15	1	27952	172800			
Category 11	5	2	3630	14400	QPSK		
Category 12	5	1	3630	28800			
Category 13	15	1	35280	259200	QPSK, 16QAM, 64QAM		
Category 14	15	1	42192	259200			
Category 15	15	1	23370	345600	QPSK, 16QAM		
Category 16	15	1	27952	345600			
Category 17 NOTE 2	15	1	35280	259200	QPSK, 16QAM, 64QAM	–	
			23370	345600	–	QPSK, 16QAM	
Category 18 NOTE 3	15	1	42192	259200	QPSK, 16QAM, 64QAM	–	
			27952	345600	–	QPSK, 16QAM	
Category 19	15	1	35280	518400	QPSK, 16QAM, 64QAM		
Category 20	15	1	42192	518400			
Category 21	15	1	23370	345600	-	-	QPSK, 16QAM
Category 22	15	1	27952	345600			
Category 23	15	1	35280	518400			QPSK, 16QAM, 64QAM
Category 24	15	1	42192	518400			

For any category, in addition to the requirements in Table 5.1a, an HS-SCCH less capable UE shall allocate 24960 raw channel bits for HS-SCCH less operation in order to buffer the last 13 subframes and 13599 soft channel bits to receive 3 parallel HARQ processes.

UE Categories 1 to 4 and Category 11 do not support HS-DSCH reception in CELL_FACH, CELL_PCH or URA_PCH states.

UEs of Category 13 are only required to support code rates up to 0.823 when 64QAM is used, which is represented by a limitation in the maximum value of K_i. in the transport block calculation in [9]. For other modulation formats, this restriction does not apply.

UEs of Category 15 are only required to support code rates up to 0.823 for 16QAM when two transport blocks are received in the same TTI, which is represented by a limitation in the maximum value of K_i. in the transport block calculation in [9]. For other modulation formats or when a single transport block is received, this restriction does not apply.

UEs of Category 21 are only required to support code rates up to 0.823 when 16QAM is used, which is represented by a limitation in the maximum value of K_i. in the transport block calculation in [9]. For other modulation formats, this restriction does not apply.

UEs of Category 23 are only required to support code rates up to 0.823 when 64QAM is used, which is represented by a limitation in the maximum value of K_i. in the transport block calculation in [9]. For other modulation formats, this restriction does not apply.

A UE that supports categories greater or equal to category 13, also supports E-DPDCH.

A UE that supports categories greater or equal to category 13, also supports MAC-ehs.

UEs of categories 13, 15, 17 or 19 also support category 9 when MAC-ehs is configured.

UEs of categories 14, 16, 18 or 20 also support category 10 when MAC-ehs is configured.

UEs of categories 21 shall also support one of category 9, 10, 13, 14, 15, 16, 17 or 18 when dual cell operation is not configured.

UEs of categories 22 shall also support one of category 10, 14, 16 or 18 when dual cell operation is not configured.

UEs of categories 23 shall also support one of category 13, 14, 17, 18, 19 or 20 when dual cell operation is not configured.

UEs of categories 24 shall also support one of category 14, 18 or 20 when dual cell operation is not configured.

NOTE 1: Depending on the HS-DSCH configuration, the indicated maximum number of bits of an HS-DSCH transport block does not have to correspond exactly to an entry in the transport block size table to be applied [9].

NOTE 2: A UE of category 17 supports the physical capabilities of categories 13 and 15, but not simultaneously. The first row of category 17 in table 5.1a specifies the capabilities when MIMO is not configured and the capabilities of category 13 apply, the second row specifies the capabilities when MIMO is configured and the capabilities of category 15 apply.

NOTE 3: A UE of category 18 supports the physical capabilities of categories 14 and 16, but not simultaneously. The first row of category 18 in table 5.1a specifies the capabilities when MIMO is not configured and the capabilities of category 14 apply, the second row specifies the capabilities when MIMO is configured and the capabilities of category 16 apply.

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 [kBytes]
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
Category 11	6	50
Category 12	6	50
Category 13	8	300
Category 14	8	300
Category 15	8	400
Category 16	8	400
Category 17	8	400
Category 18	8	400
Category 19	8	600
Category 20	8	600
Category 21	8	400
Category 22	8	400
Category 23	8	600
Category 24	8	600

Table 5.1c: 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	Supported modulations
Category 1	16	2	2788	11264	QPSK
Category 2	16	2	2788	22528	
Category 3	16	2	2788	33792	
Category 4	16	2	5600	22528	QPSK,16QAM
Category 5	16	2	5600	45056	
Category 6	16	2	5600	67584	
Category 7	16	3	8416	33792	
Category 8	16	3	8416	67584	
Category 9	16	3	8416	101376	
Category 10	16	4	11226	45056	
Category 11	16	4	11226	90112	
Category 12	16	4	11226	135168	
Category 13	16	5	14043	56320	
Category 14	16	5	14043	112640	
Category 15	16	5	14043	168960	
Category 16	16	3	12636	50688	QPSK,16QAM, 64QAM
Category 17	16	3	12636	101376	
Category 18	16	3	12636	152064	
Category 19	16	4	16856	67584	
Category 20	16	4	16856	135168	
Category 21	16	4	16856	202752	
Category 22	16	5	21076	84480	
Category 23	16	5	21076	168960	
Category 24	16	5	21076	253440	

Table 5.1d: RLC and MAC-hs parameters for 1.28 Mcps TDD HS-DSCH physical layer categories

HS-DSCH category	Maximum number of AM RLC entities	Minimum total RLC AM and MAC-hs buffer size [kBytes]
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	6	50
Category 8	6	50
Category 9	6	50
Category 10	6	50
Category 11	6	50
Category 12	6	50
Category 13	6	100
Category 14	6	100
Category 15	6	100
Category 16	6	100
Category 17	6	100
Category 18	6	100
Category 19	6	100
Category 20	6	100
Category 21	6	100
Category 22	6	100
Category 23	6	100
Category 24	6	100

Table 5.1d-a: 1.28 Mcps TDD HS-DSCH physical layer categories (Multi-frequency HS-DSCH operation mode only)

HS-DSCH category	Maximum number of the total HS-DSCH timeslots on the all assigned carriers 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
Category 1	30	84258	1013760
Category 2	30	84258	675840
Category 3	30	84258	337920
Category 4	24	67356	811008
Category 5	24	67356	540672
Category 6	24	67356	270336
Category 7	18	50496	608256
Category 8	18	50496	405504
Category 9	18	50496	202752
Category 10	15	42129	506880
Category 11	15	42129	337920
Category 12	15	42129	168960
Category 13	12	33678	405504
Category 14	12	33678	270336
Category 15	12	33678	135168
Category 16	9	25248	304128
Category 17	9	25248	202752
Category 18	9	25248	101376
Category 19	30	126456	1520640
Category 20	30	126456	1013760
Category 21	30	126456	506880
Category 22	24	101136	1216512
Category 23	24	101136	811008
Category 24	24	101136	405504
Category 25	18	75816	912384
Category 26	18	75816	608256
Category 27	18	75816	304128
Category 28	15	63228	760320
Category 29	15	63228	506880
Category 30	15	63228	253440
Category 31	12	50568	608256
Category 32	12	50568	405504
Category 33	12	50568	202752
Category 34	9	37908	456192
Category 35	9	37908	304128
Category 36	9	37908	152064

NOTE: UEs of Categories 1 to 18 support QPSK and 16QAM

Table 5.1d-b: RLC and MAC-hs parameters for 1.28 Mcps TDD HS-DSCH physical layer categories (Multi-frequency HS-DSCH operation mode only)

HS-DSCH category	Maximum number of AM RLC entities	Minimum total RLC AM and MAC-hs buffer size [kBytes]
Category 1	6	500
Category 2	6	500
Category 3	6	500
Category 4	6	400
Category 5	6	400
Category 6	6	400
Category 7	6	300
Category 8	6	300

HS-DSCH category	Maximum number of AM RLC entities	Minimum total RLC AM and MAC-hs buffer size [kBytes]
Category 9	6	250
Category 10	6	250
Category 11	6	250
Category 12	6	200
Category 13	6	200
Category 14	6	200
Category 15	6	200
Category 16	6	150
Category 17	6	150
Category 18	6	150
Category 19	6	1000
Category 20	6	1000
Category 21	6	1000
Category 22	6	900
Category 23	6	900
Category 24	6	900
Category 25	6	800
Category 26	6	800
Category 27	6	800
Category 28	6	700
Category 29	6	700
Category 30	6	700
Category 31	6	600
Category 32	6	600
Category 33	6	600
Category 34	6	550
Category 35	6	550
Category 36	6	550

Table 5.1e: 3.84 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
Category 1	16	2	12000	52992
Category 2	16	12	12000	52992
Category 3	16	4	24000	105984
Category 4	16	12	24000	105984
Category 5	16	6	36000	158976
Category 6	16	12	36000	158976
Category 7	16	12	53000	211968
Category 8	16	12	73000	264960
Category 9	16	12	102000	317952

Table 5.1f: RLC and MAC-hs parameters for 3.84 Mcps TDD HS-DSCH physical layer categories

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

HS-DSCH category	Maximum number of AM RLC entities	Minimum total RLC AM and MAC-hs buffer size [kBytes]
Category 9	8	200

Table 5.1f-a: 7.68 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
Category 1	32	1	12000	52992
Category 2	32	12	12000	52992
Category 3	32	2	24000	105984
Category 4	32	12	24000	105984
Category 5	32	3	36000	158976
Category 6	32	12	36000	158976
Category 7	32	4	53000	211968
Category 8	32	12	53000	211968
Category 9	32	5	73000	264960
Category 10	32	12	73000	264960
Category 11	32	8	106000	423936
Category 12	32	12	106000	423936
Category 13	32	12	204000	635904

Table 5.1f-b: RLC and MAC-hs parameters for 7.68 Mcps TDD HS-DSCH physical layer categories

HS-DSCH category	Maximum number of AM RLC entities	Minimum total RLC AM and MAC-hs buffer size [kBytes]
Category 1	6	50
Category 2	6	50
Category 3	6	50
Category 4	6	50
Category 5	6	100
Category 6	6	100
Category 7	6	150
Category 8	6	150
Category 9	8	150
Category 10	8	150
Category 11	8	200
Category 12	8	200
Category 13	8	400

Table 5.1g: FDD E-DCH physical layer categories

E-DCH category	Maximum number of E-DCH codes transmitted	Minimum spreading factor	Support for 10 and 2 ms TTI EDCH	Maximum number of bits of an E-DCH transport block transmitted within a 10 ms E-DCH TTI	Maximum number of bits of an E-DCH transport block transmitted within a 2 ms E-DCH TTI
Category 1	1	SF4	10 ms TTI only	7110	-
Category 2	2	SF4	10 ms and 2 ms TTI	14484	2798
Category 3	2	SF4	10 ms TTI only	14484	-
Category 4	2	SF2	10 ms and 2 ms TTI	20000	5772

E-DCH category	Maximum number of E-DCH codes transmitted	Minimum spreading factor	Support for 10 and 2 ms TTI EDCH	Maximum number of bits of an E-DCH transport block transmitted within a 10 ms E-DCH TTI	Maximum number of bits of an E-DCH transport block transmitted within a 2 ms E-DCH TTI
Category 5	2	SF2	10 ms TTI only	20000	-
Category 6	4	SF2	10 ms and 2 ms TTI	20000	11484
Category 7	4	SF2	10ms and 2 ms TTI	20000	22996
NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4					

UEs of Categories 1 to 6 support QPSK only.

UEs of Category 7 supports QPSK and 16QAM.

Table 5.1h: Total RLC and MAC-hs parameters for FDD HS-DSCH and E-DCH physical layer categories

These values reflect the total buffer sizes of HS-DSCH and E-DCH categories for simultaneous HS-DSCH/E-DCH operation.

HS-DSCH category / E-DCH category	Categories 1 to 4 [kBytes]	Categories 5 and 6 [kBytes]	Categories 7 and 8 [kBytes]	Category 9 [kBytes]	Category 10 [kBytes]	Category 11 [kBytes]	Category 12 [kBytes]
Category 1	100	100	200	300	300	50	50
Categories 2 and 3	100	150	200	300	300	50	100
Category 5	100	150	200	300	300	100	100
Category 4	-	150	300	300	400	100	100
Category 6	-	200	300	400	400	150	150
Category 7	-	300	300	400	500	200	200

HS-DSCH category / E-DCH category	Categories 13 and 14 [kBytes]	Categories 15, 16, 21 and 22 [kBytes]	Categories 17 and 18 [kBytes]	Categories 19, 20, 23 and 24 [kBytes]
Category 1	-	-	-	-
Categories 2 and 3	-	-	-	-
Category 5	400	-	-	-
Category 4	400	400	400	-
Category 6	400	500	500	750
Category 7	500	500	500	1000

NOTE: Maximum number of AM RLC entities for simultaneous HS-DSCH/E-DCH operation is defined in Table 5.1b.

Table 5.1i: 3.84Mcps TDD E-DCH physical layer categories

E-DCH category	maximum number of physical channel bits on E-UCH that can be transmitted in a 10ms TTI	Maximum number of bits of an E-DCH transport block that can be transmitted within a 10ms E-DCH TTI
Category 1	17360	12146
Category 2	34752	24161
Category 3	52416	36782
Category 4	69536	53896
Category 5	104864	92014

NOTE: A UE of any 3.84Mcps TDD category can transmit E-DCH on up to (and including) 12 timeslots at spreading factors between 1 and 16 subject to the capabilities in table 5.1i.

Table 5.1j - Total RLC and MAC-hs parameters for 3.84Mcps TDD HS-DSCH and E-DCH physical layer categories

These values reflect the total buffer sizes of HS-DSCH and E-DCH categories for simultaneous HS-DSCH/E-DCH operation.

HS-DSCH category E-DCH category	Categories 1 / 2 [Kbytes]	Categories 3 / 4 [Kbytes]	Categories 5 / 6 [Kbytes]	Category 7 [Kbytes]	Category 8 [Kbytes]	Category 9 [Kbytes]
Category 1	100	100	150	200	300	400
Category 2	100	150	200	300	300	400
Category 3	150	150	200	300	300	400
Category 4	150	200	300	300	300	400
Category 5	300	300	300	300	300	400

NOTE: Maximum number of AM RLC entities for simultaneous HS-DSCH/E-DCH operation is defined in Table 5.1f.

Table 5.1k: 7.68Mcps TDD E-DCH physical layer categories

E-DCH category	maximum number of physical channel bits on E-UCH that can be transmitted in a 10ms TTI	Maximum number of bits of an E-DCH transport block that can be transmitted within a 10ms E-DCH TTI
Category 1	17360	12347
Category 2	34752	24830
Category 3	52416	36782
Category 4	69536	54488
Category 5	87200	73967
Category 6	139104	104891
Category 7	209760	177130

NOTE: A UE of any 7.68Mcps TDD category can transmit E-DCH on up to (and including) 12 timeslots at spreading factors between 1 and 32 subject to the capabilities in table 5.1k.

Table 5.1l: Total RLC and MAC-hs parameters for 7.68Mcps TDD HS-DSCH and E-DCH physical layer categories

These values reflect the total buffer sizes of HS-DSCH and E-DCH categories for simultaneous HS-DSCH/E-DCH operation.

HS-DSCH category E-DCH category	Categories 1 / 2 [Kbytes]	Categories 3 / 4 [Kbytes]	Categories 5 / 6 [Kbytes]	Categories 7 / 8 [Kbytes]	Categories 9 / 10 [Kbytes]	Categories 11 / 12 [Kbytes]	Category 13 [Kbytes]
Category 1	100	100	150	200	300	400	700
Category 2	100	150	200	300	300	400	700
Category 3	150	150	200	300	300	400	700
Category 4	150	200	300	300	400	500	700
Category 5	200	300	300	300	400	500	700
Category 6	300	300	400	400	500	700	700
Category 7	400	400	500	500	500	700	700

NOTE: Maximum number of AM RLC entities for simultaneous HS-DSCH/E-DCH operation is defined in Table 5.1f-b.

Table 5.1m: 1.28 Mcps TDD E-DCH physical layer categories

E-DCH category	Maximum number of E – DCH timeslots per TTI	Maximum number of E – DCH transport channel bits that can be received within an E-DCH TTI
Category 1	2 (Note 1, 3)	2754
Category 2	3 (Note 1, 3)	4162
Category 3	2 (Note 2, 3)	5532
Category 4	3 (Note 2, 3)	8348
Category 5	4 (Note 2, 3)	11160
Category 6	5 (Note 2, 3)	11160

NOTE 1: Category 1 and category 2 UEs support QPSK only.

NOTE 2: Category 3, 4, 5 and 6 UEs support QPSK and 16QAM.

NOTE 3: All category UEs support up to 2 physical channels per timeslot unless 16QAM is adopted.

Table 5.1n - Total RLC and MAC-hs parameters for 1.28 Mcps TDD HS-DSCH and E-DCH physical layer categories

These values reflect the total buffer sizes of HS-DSCH and E-DCH categories for simultaneous HS-DSCH/E-DCH operation.

HS-DSCH category E-DCH category	Categories 1/2/3 [Kbytes]	Categories 4/5/6 [Kbytes]	Categories 7/8/9 [Kbytes]	Category 10/11/12 [Kbytes]	Category 13/14/15 [Kbytes]
Category 1	100	100	150	200	300
Category 2	100	150	200	300	300
Category 3	150	150	200	300	300
Category 4	150	150	200	300	300
Category 5	150	200	300	300	400
Category 6	200	300	300	300	400

Table 5.1n-a - Total RLC and MAC-hs parameters for 1.28 Mcps TDD HS-DSCH and E-DCH physical layer categories (Multi-frequency HS-DSCH operation mode only)

These values reflect the total buffer sizes of HS-DSCH and E-DCH categories for simultaneous HS-DSCH/E-DCH operation.

HS-DSCH category E-DCH category	Categories 1/2/3 [Kbytes]	Categories 4/5/6 [Kbytes]	Categories 7/8/9 [Kbytes]	Category 10/11/12 [Kbytes]	Category 13/14/15 [Kbytes]	Category 16/17/18 [Kbytes]
Category 1	500	400	300	250	200	150
Category 2	500	400	300	250	200	150
Category 3	500	400	300	250	200	150
Category 4	500	400	300	300	200	150
Category 5	600	400	300	300	250	200
Category 6	600	500	400	300	250	200

5.2 Reference UE radio access capability combinations

Based on required UE radio access capabilities to support reference RABs as defined in [2], this clause lists reference UE Radio Access capability combinations. Subclause 5.2.1 defines reference combinations of UE radio access capability parameters common for UL and DL. Subclauses 5.2.2 and 5.2.3 define reference combinations of UE radio access capability parameters that are separate for DL and UL respectively. A reference combination for common UL and DL parameters, one combination for UL parameters and one combination for DL parameters together relate to a UE with a certain implementation complexity, that allows support for one or several combined reference RABs. Combinations for UL and DL can be chosen independently. The bit rate supported by the selected combination of common UL and DL parameters needs to be at least as high as the maximum out of the supported bit rates of the selected combination of DL parameters and the selected combination of UL parameters. Different combinations have different levels of implementation complexity.

For defined reference RABs, it is possible to require a UE to meet a certain reference UE radio access capability combination. Each UE needs to have capabilities complying with a given reference radio access capability combination. Each individual radio access capability parameter as defined in subclause 5.1 shall be signalled.

The reference combination numbers shall not be used in the signalling of UE radio access capabilities between the UE and UTRAN. Reference UE radio access capability combinations provide default configurations that should be used as a basis for conformance testing against reference RABs.

The UE shall support at least the UE radio access capability parameter values as specified for the 12kbps UE reference class for both UL and DL.

Allowed values of UE capability parameters are limited by the defined range and granularity of values in subclause 5.1. Values might change depending on further definition of reference RABs for testing.

5.2.1 Combinations of common UE Radio Access Parameters for UL and DL

NOTE: Measurement-related capabilities are not included in the combinations. These capabilities are independent from the supported RABs.

Table 5.2.1.1: UE radio access capability parameter combinations, parameters common for UL and DL

Reference combination of UE Radio Access capability parameters common for UL and DL	12 kbps class	32 kbps class	64 kbps class	128 kbps class	384 kbps class	768 kbps class	2048 kbps class
PDCP parameters							
Support for RFC 2507	No	No	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1
Support for RFC 3095	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1
Support for RFC 3095 context relocation	No/Yes NOTE 1						
Support for loss-less SRNS relocation	No/Yes NOTE 1						
Maximum header compression context space	Not applicable for conformance testing						
Maximum number of ROHC context sessions	Not applicable for conformance testing						
Support for Reverse decompression	No/Yes NOTE 1						
RLC parameters							
Total RLC AM buffer size (kbytes)	10	10	10	50	50	100	500
Maximum number of AM entities	4	4	4	5	6	8	8
Maximum RLC AM window size	2047/4095 NOTE 1	2047/4095 NOTE 1	2047/4095 NOTE 1	2047/4095 NOTE 1	2047/4095 NOTE 1	2047/4095 NOTE 1	2047/4095 NOTE 1
Multi-mode related parameters							
Support of UTRA FDD	Yes/No NOTE 1						

Reference combination of UE Radio Access capability parameters common for UL and DL	12 kbps class	32 kbps class	64 kbps class	128 kbps class	384 kbps class	768 kbps class	2048 kbps class
Support of UTRA TDD 3.84 Mcps	Yes/No NOTE 1						
Support of UTRA TDD 1.28 Mcps	Yes/No NOTE 1						
Multi-RAT related parameters							
Support of GSM	Yes/No NOTE 1						
Support of multi-carrier	Yes/No NOTE 1						
Support of UTRAN to GERAN Network Assisted Cell Change	Yes/No						
Support of E-UTRA FDD	Yes/No NOTE 1						
Support of E-UTRA TDD	Yes/No NOTE 1						
Security parameters							
Support of ciphering algorithm UEA0	Yes						
Support of ciphering algorithm UEA1	Yes						
Support of ciphering algorithm UEA2	Yes						
Support of integrity protection algorithm UIA1	Yes						
Support of integrity protection algorithm UIA2	Yes						
UE positioning related parameters							
Standalone location method(s) supported	Yes/No NOTE 1						
UE based OTDOA supported	Yes/No NOTE 1						
Network assisted GPS support	Network based / UE based / Both/ None NOTE 1						
Network Assisted GANSS support List	Per supported GANSS NOTE 1						
>GANSS ID	Galileo / SBAS / Modernized GPS / QZSS / GLONASS NOTE 1						
>SBAS IDs	WAAS / EGNOS / MSAS / GAGAN NOTE 1						
>GANSS mode	Network based / UE based / Both/ None NOTE 1						
>GANSS Signal ID	0..7 NOTE 1						
>GANSS Signal IDs	Yes/No (per GANSS signal) NOTE 1						
>Support for GANSS timing of cell frames measurement	Yes/No NOTE 1						
>Support for GANSS Carrier-Phase Measurement	Yes/No NOTE 1						
>Support for non-native assistance choices	Yes/No NOTE 1						
Support for GPS timing of cell frames measurement	Yes/No NOTE 1						
Support for IPDL	Yes/No NOTE 1						
Support for Rx-Tx time difference type 2 measurement	Yes/No NOTE 1						
Support for UE Positioning assisted GPS measurement validity in CELL_PCH and URA_PCH RRC states	Yes						
Support for SFN-SFN observed time difference type 2 measurement	Yes/No NOTE 1						
RF parameters for FDD							

Reference combination of UE Radio Access capability parameters common for UL and DL	12 kbps class	32 kbps class	64 kbps class	128 kbps class	384 kbps class	768 kbps class	2048 kbps class
Radio frequency bands	The radio frequency bands defined in [4]						
UE power class	3 / 4 NOTE 1						
Tx/Rx frequency separation	Defined in [4] for the respective supported radio frequency band						
RF parameters for TDD 3.84 Mcps							
Radio frequency bands	A / b / c / a+b / a+c / b+c / a+b+c NOTE 1						
UE power class	2 / 3 NOTE 1						
RF parameters for TDD 7.68 Mcps							
Radio frequency bands	A / b / c / a+b / a+c / b+c / a+b+c NOTE 1						
UE power class	2 / 3 NOTE 1						
RF parameters for TDD 1.28 Mcps							
Radio frequency bands	A / b / c / a+b / a+c / b+c/ a+b+c NOTE 1						
UE power class	2 / 3 NOTE 1						

NOTE 1: Options represent different combinations that should be supported with Conformance Tests.

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	12 kbps class	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 (FDD) 1280(TDD)	1280	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	640
Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	NA (FDD) 1280(TDD)	1280	3840	3840	6400	10240	20480(1) 10240(2) NOTE 5
Maximum number of simultaneous transport channels	4	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	1 NOTE 3	1 NOTE 3	1 NOTE 3	1 NOTE 3	1 NOTE 3	1 NOTE 3
Maximum number of simultaneous CCTrCH (TDD)	1 NOTE 3	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	4	8	8	16	32	64	96
Maximum number of TFC	16	32	48	96	128	256	1024
Maximum number of TF	32	32	64	64	64	128	256
Support for turbo decoding	No (FDD) Yes (TDD)	Yes	Yes	Yes	Yes	Yes	Yes
Support for loss-less DL RLC PDU size change	No	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Physical channel parameters (FDD)							
Maximum number of DPCH codes to be simultaneously received	1	1	1	1	3	3	3

Reference combination of UE Radio Access capability parameters in DL	12 kbps class	32 kbps class	64 kbps class	128 kbps class	384 kbps class	768 kbps class	2048 kbps class
Maximum number of physical channel bits received in any 10 ms interval (DPCH, S-CCPCH).	1200	1200	2400	4800	19200	28800	57600
Support for SF 512 and 80 ms TTI for DPCH	No	No	No	No	No	No	No
Support of HS-PDSCH	No	No	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	1	2	4	5	10	12
Maximum number of physical channels per frame	5	8	9	14	28	64	136
Minimum SF	16	16	16	16	1/16 NOTE 1	1/16 NOTE 1	1/16 NOTE 1
Support of PDSCH	No	Yes/No NOTE 1	Yes	Yes	Yes	Yes	Yes
Support of HS-PDSCH	No	No	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1
Maximum number of physical channels per timeslot	5	8	9	9	9	9	13
Physical channel parameters (TDD 7.68 Mcps)							
Maximum number of timeslots per frame	1	1	2	4	5	10	12
Maximum number of physical channels per frame	5	8	9	14	28	64	136
Minimum SF	32	32	32	32	1/32 NOTE 1	1/32 NOTE 1	1/32 NOTE 1
Support of PDSCH	No	Yes/No NOTE 1	Yes	Yes	Yes	Yes	Yes
Support of HS-PDSCH	No	No	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1
Maximum number of physical channels per timeslot	5	8	9	9	9	9	13
Physical channel parameters (TDD 1.28 Mcps)							
Maximum number of timeslots per subframe	1	1	2	3	4	6	6
Maximum number of physical channels per subframe	5	8	12	18	43	77	77
Minimum SF	16	16	16	16	1/16 NOTE 1	1/16 NOTE 1	1
Support of PDSCH	No	Yes/No NOTE 1	Yes	Yes	Yes	Yes	Yes
Support of HS-PDSCH	No	No	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1
Maximum number of physical channels per timeslot	5	8	11	14	14	14	14
Support of 8PSK	No	No	No	No	No	No	Yes

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

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 3.84/7.68 Mcps TDD (2) For 1.28 Mcps TDD.

The reference combinations for HS-DSCH capabilities are shown in tables 5.2.2.2, 5.2.2.3 and 5.2.2.4.

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
FDD HS-DSCH category	Category 1	Category 5	Category 7	Category 9

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

Reference combination	0.5 Mbps class	1.1 Mbps class	1.6 Mbps class	2.2 Mbps class	2.8 Mbps class
1.28 Mcps TDD HS-DSCH Category	Category 1	Category 4	Category 7	Category 10	Category 13

Table 5.2.2.3-a: 1.28 Mcps TDD UE radio access capability parameter combinations, DL HS-DSCH parameters (Multi-frequency HS-DSCH operation mode only)

Reference combination	14 Mbps class	11.2 Mbps class	8.4 Mbps class	7.0 Mbps class	5.6 Mbps class	4.2 Mbps class
1.28 Mcps TDD HS-DSCH Category	**Category 1**	**Category 4**	**Category 7**	**Category 10**	**Category 13**	**Category 10**

Table 5.2.2.4: 3.84 Mcps TDD UE radio access capability parameter combinations, DL HS-DSCH parameters

Reference combination	1.2 Mbps class	2.4 Mbps class	3.6 Mbps class	7.3 Mbps class	10.2 Mbps class
3.84Mcps TDD HS-DSCH category	Category 1	Category 3	Category 5	Category 8	Category 9

Table 5.2.2.4a: 7.68 Mcps TDD UE radio access capability parameter combinations, DL HS-DSCH parameters

Reference combination	1.2 Mbps class	2.4 Mbps class	3.6 Mbps class	7.3 Mbps class	10.6 Mbps class
7.68Mcps TDD HS-DSCH category	Category 1	Category 3	Category 5	Category 9	Category 11

The reference combinations for E-DCH capabilities are shown in tables 5.2.2.5, 5.2.2.6 and 5.2.2.7.

Table 5.2.2.5: FDD UE radio access capability parameter combinations, UL E-DCH parameters

Reference combination	0.7296 Mbps class	1.4592 Mbps class	2 Mbps class	2.9185 Mbps class	5.76 Mbps class
FDD E-DCH category	Category 1	Categories 2 and 3	Category 5	Category 4	Category 6

Table 5.2.2.6: 3.84Mcps TDD UE radio access capability parameter combinations, UL E-DCH parameters

Reference combination	1.2 Mbps class	2.4 Mbps class	3.6 Mbps class	5.3 Mbps class	9.2 Mbps class
3.84Mcps TDD E-DCH category	Category 1	Category 2	Category 3	Category 4	Category 6

Table 5.2.2.7: 7.68Mcps TDD UE radio access capability parameter combinations, UL E-DCH parameters

Reference combination	1.2 Mbps class	2.4 Mbps class	3.6 Mbps class	5.3 Mbps class	10.6 Mbps class
7.68Mcps TDD E-DCH category	Category 1	Category 2	Category 3	Category 4	Category 6

Table 5.2.2.8: 1.28Mcps TDD UE radio access capability parameter combinations, UL E-DCH parameters

Reference combination	0.5 Mbps class	0.8 Mbps class	1.1 Mbps class	1.6 Mbps class	2.2 Mbps class
1.28Mcps TDD E-DCH category	Category 1	Category 2	Category 3	Category 4	Category 5 and 6

5.2.3 Combinations of UE Radio Access Parameters for UL

Table 5.2.3.1: UE radio access capability parameter combinations, UL parameters

Reference combination of UE Radio Access capability parameters in UL	12 kbps class	32 kbps class	64 kbps class	128 kbps class	384 kbps class	768 kbps class
Transport channel parameters						
Maximum sum of number of bits of all transport blocks being transmitted at an arbitrary time instant	640	640(FDD) 1280 (TDD)	3840	3840	6400	10240
Maximum sum of number of bits of all convolutionally coded transport blocks being transmitted at an arbitrary time instant	640	640	640	640	640	640
Maximum sum of number of bits of all turbo coded transport blocks being transmitted at an arbitrary time instant	NA	NA(FDD) 1280 (TDD)	3840	3840	6400	10240
Maximum number of simultaneous transport channels	4	4	8	8	8	8
Maximum number of simultaneous CCTrCH(TDD only)	1 NOTE 3	1 NOTE 3	2 NOTE 3	2 NOTE 3	2 NOTE 3	2 NOTE 3
Maximum total number of transport blocks transmitted within TTIs that start at the same time	4	4	8	8	16	32
Maximum number of TFC	16	16	32	48	64	128
Maximum number of TF	32	32	32	32	32	64
Support for turbo encoding	No	No (FDD) Yes (TDD)	Yes	Yes	Yes	Yes
Physical channel parameters (FDD)						
Maximum number of DPDCH bits transmitted per 10 ms	600	1200	2400	4800	9600	19200
Support of E-DPDCH	No	No	Yes/No	Yes/No	Yes/No	Yes/No
Physical channel parameters (TDD 3.84 Mcps)						
Maximum Number of timeslots per frame	1	1	2	3	7	9
Maximum number of physical channels per timeslot	1	1	1	1	1	2
Minimum SF	8	4	2	2	2	2
Support of PUSCH	No	Yes/No NOTE 1	Yes	Yes	Yes	Yes
Support of E-PUCH	No	Yes/No	Yes	Yes	Yes	Yes
Physical channel parameters (TDD 7.68 Mcps)						
Maximum Number of timeslots per frame	1	1	2	3	7	9
Maximum number of physical channels per timeslot	1	1	1	1	1	2
Minimum SF	16	8	4	4	4	4
Support of PUSCH	No	Yes/No NOTE 1	Yes	Yes	Yes	Yes
Support of E-PUCH	No	Yes/No	Yes	Yes	Yes	Yes
Physical channel parameters (TDD 1.28 Mcps)						
Maximum Number of timeslots per subframe	1	1	2	3	5	5
Maximum number of physical channels per timeslot	1	2/1 NOTE 1	2	2	2	2
Minimum SF	8	4	2	2	2	2
Support of PUSCH	No	Yes/No	Yes	Yes	Yes	Yes

Reference combination of UE Radio Access capability parameters in UL	12 kbps class	32 kbps class	64 kbps class	128 kbps class	384 kbps class	768 kbps class
		NOTE 1				
Support of 8PSK	No	No	No	No	No	No
Support of E-PUCH	No	Yes/No	Yes	Yes	Yes	Yes

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

NOTE 3: This number does not contain the RACH CCTrCH.

Annex A (informative): Change history

Change history TR 25.926							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
03/2000	RP-07	RP-000052	-	-	Approved at TSG-RAN #7 and placed under Change Control	-	3.0.0
06/2000	RP-08	RP-000229	003	4	Updated Ad Hoc changes	3.0.0	3.1.0
	RP-08	RP-000229	008		CPCH note to the parameter definitions	3.0.0	3.1.0
09/2000	RP-09	RP-000368	010	1	TDD DL Physical Channel Capability per Timeslot	3.1.0	3.2.0
	RP-09	RP-000368	012		Change to UE Capability definition	3.1.0	3.2.0
	RP-09	RP-000368	013		Physical parameter changes	3.1.0	3.2.0
12/2000	RP-10	RP-000578	014		Removal of example RABs	3.2.0	25.306 3.0.0
	RP-10	RP-000578	015	2	Correction on parameter "Maximum total number of transport blocks…"	3.2.0	25.306 3.0.0
	RP-10	RP-000578	016		Change to UE multi-RAT capability	3.2.0	25.306 3.0.0
	RP-10	RP-000578	017		Change from TR 25.926 to TS 25.306	3.2.0	25.306 3.0.0

Change history TS 25.306							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
03/2001	RP-11	RP-010024	001		Downlink rate matching limitation	3.0.0	3.1.0
	RP-11	RP-010024	005		Miscellaneous corrections and editorial clean-up	3.0.0	3.1.0
	RP-11	RP-010024	007		Maximum number of AM entity	3.0.0	3.1.0
	RP-11	RP-010024	008	1	Clarification of maximum number of TF	3.0.0	3.1.0
	RP-11	RP-010024	010	1	Removal of the RLC PU concept	3.0.0	3.1.0
	RP-11	RP-010039	003	1	1.28 Mcps TDD	3.1.0	4.0.0
	RP-11	RP-010043	006	1	DSCH related updates for UE capabilities for the UE Radio Access Capability parameter combinations	3.1.0	4.0.0
	RP-11	RP-010039	011	1	Addition of ROHC	3.1.0	4.0.0
06/2001	RP-12	RP-010307	013		Clarification on the number of CCTrCHs to be received simultaneously by the UE	4.0.0	4.1.0
	RP-12	RP-010321	009	6	Modified UE Capability for CPCH	4.0.0	4.1.0
09/2001	RP-13	RP-010540	017		Maximum number of simultaneous transport channels	4.1.0	4.2.0
	RP-13	RP-010540	019		Clarification of FDD physical channel parameters	4.1.0	4.2.0
	RP-13	RP-010540	021		Support of dedicated pilots for channel estimation	4.1.0	4.2.0
	RP-13	RP-010540	023		Correction of UE capabilities regarding Rx-Tx time difference type 2 measurements	4.1.0	4.2.0
12/2001	RP-14	RP-010758	026		Correction on UL parameter "Maximum number of DPDCH bits per 10 ms"	4.2.0	4.3.0
03/2002	RP-15	RP-020228	035		Clarification on ICS version within UE radio access capabilities	4.3.0	4.4.0
	RP-15	RP-020242	037	1	Clarification of Maximum number of TFC in the TFCS	4.3.0	4.4.0
	RP-15	RP-020237	039		Support of UP measurement reporting in CELL_PCH/URA_PCH	4.3.0	4.4.0
	RP-15	RP-020094	029	2	HSDPA UE capabilities	4.4.0	5.0.0
06/2002	RP-16	RP-020325	044		Security Capabilities	5.0.0	5.1.0
	RP-16	RP-020439	040	1	Corrections in HSDPA UE capabilities	5.0.0	5.1.0
	RP-16	RP-020341	041		HSDPA TDD UE capabilities	5.0.0	5.1.0
	RP-16	RP-020341	045		DPCH capabilities with simultaneous HSDPA configuration	5.0.0	5.1.0
	RP-16	RP-020345	046		RFC 3095 context relocation	5.0.0	5.1.0
	RP-17	RP-020555	047		Introduction of HS-PDSCH capability definition and QPSK-only UE categories	5.1.0	5.2.0
	RP-17	RP-020555	048		Mandatory Support of dedicated pilots for channel estimation	5.1.0	5.2.0
12/2002	RP-18	RP-020717	054	1	UE capability for RLC window size	5.2.0	5.3.0
	RP-18	RP-020857	051		UE capability for RFC3095 operation	5.2.0	5.3.0
	RP-18	RP-020733	049	3	HSDPA L2 buffer sizes	5.2.0	5.3.0
	RP-18	RP-020733	056		Correction to Access Stratum release indicator	5.2.0	5.3.0
	RP-18	RP-020733	057		Dedicated pilot bits for HS-DSCH	5.2.0	5.3.0
03/2003	RP-19	RP-030113	061		Network Assisted Cell Change from UTRAN to GERAN	5.3.0	5.4.0
	RP-19	RP-030113	062		Modification to the number of soft channel bits required for HS-DSCH (TDD)	5.3.0	5.4.0
06/2003	RP-20	RP-030291	067		Extension of 32 kbps UE capability class	5.4.0	5.5.0
	RP-20	RP-030301	068		Correction of maximum transport block sizes for UE categories	5.4.0	5.5.0
	RP-20	RP-030301	069		SF1 corrections for TDD	5.4.0	5.5.0

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09/2003	RP-21	RP-030493	072		Addition of memory unit in UE Radio Access Capabilities tables	5.5.0	5.6.0
	RP-21	RP-030482	075		Correction of Maximum hc context space capability	5.5.0	5.6.0
	RP-21	RP-030482	078		UE positioning support in the UE	5.5.0	5.6.0
12/2003	RP-22	RP-030623	082		Removal of reference combinations for HS-DSCH capabilities	5.6.0	5.7.0
	RP-22	RP-030614	085		Definition of minimum UE capability class	5.6.0	5.7.0
	RP-22	RP-030614	088		TDD Radio Access Parameters for UL 32kbs class UE's	5.6.0	5.7.0
	RP-22	RP-030623	089		Correction to HSDPA capability	5.6.0	5.7.0
	RP-22	-	-		Upgrade to Release 6 - no technical change	5.7.0	6.0.0
03/2004	RP-23	RP-040102	093		Simultaneous Reception of S-CCPCH and HS-DSCH	6.0.0	6.1.0
	RP-23	RP-040102	095		Correction to memory check in the UE	6.0.0	6.1.0
06/2004	RP-24	RP-040223	096		Correction to memory handling in the UE	6.1.0	6.2.0
12/2004	RP-26	RP-040479	098		Alignment of MaxHcContextSpace	6.2.0	6.3.0
03/2005	RP-27	RP-050065	101		Support of DSCH	6.3.0	6.4.0
	RP-27	RP-050067	103		Lossless DL RLC PDU size change	6.3.0	6.4.0
	RP-27	RP-050154	104	2	Inclusion of UE capabilities for Enhanced Uplink	6.3.0	6.4.0
	RP-27	RP-050083	105		Support of ROHC mandatory	6.3.0	6.4.0
04/2005					Inclusion of RP-27 change history in this table.	6.4.0	6.4.1
06/2005	RP-28	RP-050314	0107		Introduction of MBMS capability Part A and B	6.4.1	6.5.0
	RP-28	RP-050305	0109		Feature Clean Up: Removal of 80 ms TTI for DCH for all other cases but when the UE supports SF512	6.4.1	6.5.0
	RP-28	RP-050308	0111		Feature Clean-up: Removal of DSCH (FDD)	6.4.1	6.5.0
	RP-28	RP-050309	0113		Feature Clean Up: Removal of CPCH	6.4.1	6.5.0
	RP-28	RP-050310	0115		Feature Clean Up: Removal of dedicated pilot as sole phase reference	6.4.1	6.5.0
	RP-28	RP-050311	0117		Feature Clean Up: Removal of DRAC	6.4.1	6.5.0
	RP-28	RP-050327	0118		E-DCH L2 Buffer sizes	6.4.1	6.5.0
	RP-28	RP-050317	0119		RLC LI Optimization for VoiP	6.4.1	6.5.0
09/2005	RP-29	RP-050480	0120		Removal RLC-SDU alignment capability	6.5.0	6.6.0
	RP-29	RP-050480	0121		Feature Clean Up: Removal of DRAC	6.5.0	6.6.0
	RP-29	RP-050480	0122		Adding the UE capability for FDD Radio frequency bands	6.5.0	6.6.0
	RP-29	RP-050475	0123		F-DPCH support for HS-DSCH supporting Ues	6.5.0	6.6.0
	RP-29	RP-050468	0124		Introduction of MBMS capability for TDD	6.5.0	6.6.0
	RP-29	RP-050468	0125		Correction of UE capability for MBMS	6.5.0	6.6.0
	RP-29	RP-050470	0126		Correction on table 5.1g (FDD E-DCH physical layer categories)	6.5.0	6.6.0
	RP-29	RP-050470	0127		E-DCH L2 Buffer sizes	6.5.0	6.6.0
	RP-29	RP-050469	0128		Removal of fixed position for S-CCPCHs carrying MBMS channels	6.5.0	6.6.0
	RP-29	RP-50461	0130		Correction of TB size and soft channel bits number for 1.28 Mcps TDD	6.5.0	6.6.0
	RP-29	RP-050484	0131		Introduction of battery-limited device indication in UE capability	6.5.0	6.6.0
	RP-29	RP-050480	0132		Introduction of REL-6 Access Stratum release indicator	6.5.0	6.6.0
12/2005	RP-30	RP-050796	0133		Tx/Rx frequency separation capability (FDD)	6.6.0	6.7.0
	RP-30	RP-050784	0134		Feature cleanup and other leftovers	6.6.0	6.7.0
	RP-30	RP-050790	0135	1	E-DCH L2 Buffer sizes	6.6.0	6.7.0
	RP-30	RP-050861	0136	1	Introduction of Support of Handover to GAN	6.6.0	6.7.0
03/2006	RP-31	RP-060090	0138		Correction to number of RLC AM instances for HS	6.7.0	6.8.0
	RP-31	RP-060093	0141	1	Inter-RAT PS Handover capability	6.7.0	6.8.0
	RP-31	RP-060098	0139		7.68 Mpcs TDD Option (Release 7)	6.8.0	7.0.0
	RP-31	RP-060099	0140		Introduction of REL-7 access stratum release indicator	6.8.0	7.0.0
09/2006	RP-33	RP-060614	0144		Introduction of SIB 11bis	7.0.0	7.1.0
	RP-33	RP-060586	0145		Introduction of 3.84 Mcps and 7.68 McpsTDD E-DCH	7.0.0	7.1.0
12/2006	RP-34	RP-060713	0146	1	Introduction of the new security algorithms UEA2 and UIA2	7.1.0	7.2.0
03/2007	RP-35	RP-070151	0147		TTI values for MCCH RB configuration	7.2.0	7.3.0
	RP-35	RP-070150	0150		Correction of the HS-DSCH physical layger categories of 1.28Mcps TDD	7.2.0	7.3.0
	RP-35	RP-070157	0152		Introduction of 1.28 Mcps TDD E-DCH	7.2.0	7.3.0
	RP-35	RP-070161	0153	2	Introducing MIMO in UE Capability specification	7.2.0	7.3.0
	RP-35	RP-070163	0155		Introduction of 64QAM downlink in 25.306	7.2.0	7.3.0
06/2007	RP-36	RP-070402	0151	2	Introducing 16QAM uplink support	7.3.0	7.4.0
	RP-36	RP-070395	0156		Introduction of GAN PS handover	7.3.0	7.4.0
	RP-36	RP-070406	0158		Support of RFC 3095 (ROHC) Compression	7.3.0	7.4.0
	RP-36	RP-070400	0159		MBMS FDD and TDD Physical Layer Improvements	7.3.0	7.4.0
	RP-36	RP-070398	0160		GANSS support to UE capabilities	7.3.0	7.4.0
	RP-36	RP-070403	0161		UE capabilities for HS-DSCH reception in CELL_PCH, URA_PCH and CELL_FACH states	7.3.0	7.4.0
09/2007	RP-37	RP-070670	0163	1	Introduction of HS-DSCH category for combined MIMO and DL64QAM	7.4.0	7.5.0
	RP-37	RP-070670	0164		Code rate limitation for UE HSDPA Categories 13 and 15	7.4.0	7.5.0
	RP-37	RP-070625	0166		MBMS UE Capability for mapping MTCH/MSCH to legacy S-CCPCH	7.4.0	7.5.0
	RP-37	RP-070670	0167		HSPA+ L2 Buffering	7.4.0	7.5.0

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	RP-37	RP-070634	0168	1	UE capabilities for Rel-7, with 'improved L2' optional	7.4.0	7.5.0
	RP-37	RP-070627	0171	2	Specification of HS-SCCH less memory requirement	7.4.0	7.5.0
	RP-37	RP-070650	0173		Introduction of the Multi-Carrier HS-DSCH physical layer categories for 1.28Mcps TDD	7.4.0	7.5.0
	RP-37	RP-070764	0174		For the creation of RRC Rel-8	7.4.0	8.0.0
12/2007	RP-38	RP-070900	0176	1	Correction to memory requirement for HS-SCCH less operation	8.0.0	8.1.0
	RP-38	RP-070903	0178		Introduction of an additional UE category for 1.28Mcps TDD E-DCH	8.0.0	8.1.0
	RP-38	RP-070901	0180		Clarification on MIMO and 64QAM UE categories	8.0.0	8.1.0
	RP-38	RP-070902	0182		More improvement on dedicated carrier for 1.28 Mcps TDD MBMS	8.0.0	8.1.0
	RP-38	RP-070900	0184		UE capability for E-DCH transmission time restriction and UE DRX in CPC	8.0.0	8.1.0
	RP-38	RP-070905	0186		Correction to Control Information transmission with two logical channels	8.0.0	8.1.0
	RP-38	RP-070910	0187		Introduction of CS voice over HSPA	8.0.0	8.1.0
	RP-38	RP-070907	0188		Introduction of HS-DSCH category for combined MIMO and DL64QAM	8.0.0	8.1.0
03/2008	RP-39	RP-080185	0190	-	Clarification of uplink multicode capability for 1.28Mcps TDD	8.1.0	8.2.0
	RP-39	RP-080188	0192	-	Code rate limitations for HS-DSCH UE cat 13 and 15	8.1.0	8.2.0
05/2008	RP-40	RP-080417	0193	1	Introduction of 64QAM in UE capability specification for LCR TDD	8.2.0	8.3.0
09/2008	RP-41	RP-080682	0195	-	Ki restriction for UE HS-DSCH categories 13 and 15	8.3.0	8.4.0
	RP-41	RP-080694	0196	1	Introduction of E-UTRA support	8.3.0	8.4.0
12/2008	RP-42	RP-081024	0200	-	Introduction of additional UE categories for 1.28Mcps TDD 64QAM DL	8.4.0	8.5.0
	RP-42	RP-081022	0201	2	Introduction of support of “Enhanced Uplink for CELL_FACH State in FDD” and “Improved L2 for uplink”	8.4.0	8.5.0
	RP-42	RP-081030	0202	2	Addition of UE categories for dual cell HSDPA	8.4.0	8.5.0
	RP-42	RP-081029	0203	-	UE positioning capabilities for support of additional navigation satellite systems	8.4.0	8.5.0
	RP-42	RP-081102	0206	1	25.306 CR Introduction of UE Measurement Capability on frequency adjacent to intra-frequency	8.4.0	8.5.0
	RP-42	RP-081033	0207	-	Introduction of optional features in Release 8	8.4.0	8.5.0
	RP-42	RP-081127	0208	2	Support for 3.84 Mcps MBSFN IMB operation	8.4.0	8.5.0

History

Document history		
V8.0.0	January 2008	Publication
V8.1.0	January 2008	Publication
V8.2.0	April 2008	Publication
V8.3.0	July 2008	Publication
V8.4.0	October 2008	Publication
V8.5.0	January 2009	Publication