

**TSG-RAN Meeting #9
Oahu, HI, USA, 20 – 22 September 2000**

RP-000368

Title: Agreed CRs to TR 25.926

Source: TSG-RAN WG2

Agenda item: 5.2.3

Doc-1st-	Status-	Spec	CR	Rev	Subject	Cat	Version	Versio
R2-001456	agreed	25.926	010	1	TDD DL Physical Channel Capability per Timeslot	F	3.1.0	3.2.0
R2-001522	agreed	25.926	012		Change to UE Capability definition	F	3.1.0	3.2.0
R2-001821	agreed	25.926	013		Physical parameter changes	F	3.1.0	3.2.0

CHANGE REQUEST

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25.926 CR 010r1

Current Version: **3.1.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **TSG-RAN #9**

list expected approval meeting # here
↑

For approval

For information

Strategic

Non-strategic

(for SMG use only)

(for SMG use only)

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: <ftp://ftp.3gpp.org/Information/CR-Form-v2.doc>

Proposed change affects:

(at least one should be marked with an X)

(U)SIM

ME

UTRAN / Radio

Core Network

Source: TSG-RAN WG2

Date: 20/06/00

Subject: TDD DL Physical Channel Capability per Timeslot

Work item:

Category:

(only one category)

Shall be marked

With an X)

F Correction

A Corresponds to a correction in an earlier release

B Addition of feature

C Functional modification of feature

D Editorial modification

Release:

Phase 2

Release 96

Release 97

Release 98

Release 99

Release 00

Reason for change:

UE classifications need to specify support for the number of downlink physical channels per timeslot.

Clauses affected:

4.5.5, 5.1 & 5.2.2

Other specs

Affected:

Other 3G core specifications

Other GSM core specifications

MS test specifications

BSS test specifications

O&M specifications

→ List of CRs:

→ List of CRs:

→ List of CRs:

→ List of CRs:

→ List of CRs:

Other

comments:

4.5.5 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.

Maximum number of physical channels per timeslot

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

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		Header compression algorithm supported	Yes/No
RLC parameters		Total RLC AM buffer size	2,10,50,100,150,500,1000 kBytes
		Maximum number of AM entities	3,4,5,6,8,16,32
PHY parameters	Transport channel parameters in downlink	Maximum sum of number of bits of all transport blocks received in TTIs that end within the same arbitrary interval of length $T < 10$ ms	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 received in TTIs that end within the same arbitrary interval of length $T < 10$ ms	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 received in TTIs that end within the same arbitrary interval of length $T < 10$ ms	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum number of simultaneous transport channels	4, 8, 16, 32
		Maximum number of simultaneous CCTrCH	1, 2, 3, 4, 5, 6, 7, 8
		Maximum total number of transport blocks received within TTIs that end within the same 10 ms interval	4, 8, 16, 32, 48, 64, 96, 128, 256, 512
		Maximum number of TFC in the TFCS	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 transmitted in TTIs that start at the same time
	Maximum sum of number of bits of all convolutionally coded transport blocks transmitted in TTIs that start at the same time		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 transmitted in TTIs that start at the same time		640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
	Maximum number of simultaneous transport channels		2, 4, 8, 16, 32
	Maximum number of simultaneous CCTrCH of DCH type (TDD only)		1, 2, 3, 4, 5, 6, 7, 8
	Maximum total number of transport blocks transmitted within TTIs that start at the same time		2, 4, 8, 16, 32, 48, 64, 96, 128, 256, 512
	Maximum number of TFC in the TFCS		4, 8, 16, 32, 48, 64, 96, 128, 256, 512, 1024
	Maximum number of TF		32, 64, 128, 256, 512, 1024
	Support for turbo encoding		Yes/No
	FDD Physical channel parameters in downlink		Maximum number of DPCH/PDSCH codes to be simultaneously received
		Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH)	600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 48000, 57600, 67200, 76800
		Support for SF 512	Yes/No
		Support of PDSCH	Yes/No
		Simultaneous reception of SCCPCH and DPCH	Yes/No

		UE radio access capability parameter	Value range
		Simultaneous reception of SCCPCH, DPCH and PDSCH	Yes/No
		Maximum number of simultaneous S-CCPCH radio links	1 NOTE: Only the value 1 is part of R99
	FDD Physical channel parameters in uplink	Maximum number of DPDCH bits transmitted per 10 ms	600, 1200, 2400, 4800, 960, 19200, 28800, 38400, 48000, 57600
		Support of PCPCH	Yes/No
	TDD 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
		<u>Maximum number of physical channels per timeslot</u>	<u>1..16</u>
	TDD 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
	RF parameters	FDD RF parameters	UE power class (25.101 subclause 6.2.1)
Tx/Rx frequency separation (25.101 subclause 5.3) . NOTE: Not applicable if UE is not operating in frequency band a			190 MHz 174.8-205.2 MHz 134.8-245.2 MHz
RF parameters	TDD RF parameters	UE power class (25.102)	2,3 NOTE: Only power classes 2 and 3 are part of R99
		Radio frequency bands (25.102)	a), b), c), a+b), a+c), a+b+c)
		Chip rate capability (25.102)	3.84, 1.28
Multi-mode related parameters		Support of UTRA FDD/TDD	FDD, TDD, FDD+TDD
Multi-RAT related parameters		Support of GSM	Yes/No
		Support of multi-carrier	Yes/No
LCS related parameters		Standalone location method(s) supported	Yes/No
		Network assisted GPS support	Network based / UE based / Both/ None
		GPS reference time capable	Yes/No
		Support for IPDL	Yes/No
		Support for OTDOA UE based method	Yes/No
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)

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	32kbps class	64kbps class	128kbps class	384kbps class	768kbps class	2048kbps class
Transport channel parameters						
Maximum sum of number of bits of all transport blocks received in TTIs that end within the same arbitrary interval of length $T < 10$ ms	640	3840	3840	6400	10240	20480
Maximum sum of number of bits of all convolutionally coded transport blocks received in TTIs that end within the same arbitrary interval of length $T < 10$ ms	640	640	640	640	640	640
Maximum sum of number of bits of all turbo coded transport blocks received in TTIs that end within the same arbitrary interval of length $T < 10$ ms	NA	3840	3840	6400	10240	20480
Maximum number of simultaneous transport channels	8	8	8	8	8	16
Maximum number of simultaneous CTRCH (FDD)	1	2/1 NOTE 2	2/1 NOTE 2	2/1 NOTE 2	2	2
Maximum number of simultaneous CTRCH (TDD)	2	3	3	3	4	4
Maximum total number of transport blocks received within TTIs that end at the same time	8	8	16	32	64	96
Maximum number of TFC in the TFCS	32	48	96	128	256	1024
Maximum number of TF	32	64	64	64	128	256
Support for turbo decoding	No	Yes	Yes	Yes	Yes	Yes
Physical channel parameters (FDD)						
Maximum number of DPCH/PDSCH codes to be simultaneously received	1	2/1 NOTE 2	2/1 NOTE 2	3	3	3
Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH).	1200	3600/2400 NOTE 2	7200/4800 NOTE 2	19200	28800	57600
Support for SF 512	No	No	No	No	No	No
Support of PDSCH	No	Yes/No NOTE 1	Yes/No NOTE 1	No/Yes NOTE 1	Yes	Yes
Maximum number of simultaneous S-CCPCH radio links	1	1	1	1	1	1
Physical channel parameters (TDD)						
Maximum number of timeslots per frame	1	2	4	5	10	12
Maximum number of physical channels per frame	8	9	14	28	64	136
Minimum SF	16	16	16	1/16 NOTE 1	1/16 NOTE 1	1/16 NOTE 1
Support of PDSCH	Yes/No NOTE 1	Yes	Yes	Yes	Yes	Yes
<u>Maximum number of physical channels per timeslot</u>	<u>8</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>13</u>

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

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

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25.926 CR 012

Current Version: **3.1.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **TSG-RAN #9**
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↑

for approval
for information

strategic
non-strategic *(for SMG use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: <ftp://ftp.3gpp.org/Information/CR-Form-v2.doc>

Proposed change affects: (U)SIM ME UTRAN / Radio Core Network
(at least one should be marked with an X)

Source: TSG-RAN WG2 **Date:** 6th July 2000

Subject: Change to UE capability definition

Work item:

Category:
(only one category shall be marked with an X)

F Correction	<input checked="" type="checkbox"/>	Release: Phase 2	<input type="checkbox"/>
A Corresponds to a correction in an earlier release	<input type="checkbox"/>	Release 96	<input type="checkbox"/>
B Addition of feature	<input type="checkbox"/>	Release 97	<input type="checkbox"/>
C Functional modification of feature	<input type="checkbox"/>	Release 98	<input type="checkbox"/>
D Editorial modification	<input type="checkbox"/>	Release 99	<input checked="" type="checkbox"/>
		Release 00	<input type="checkbox"/>

Reason for change: The definition of the UE capability parameter ‘number of physical channel bits per 10ms’ is corrected in response to a liaison statement received from RAN WG1

Clauses affected: 4.5.3

Other specs affected:

Other 3G core specifications	<input type="checkbox"/>	→ List of CRs:
Other GSM core specifications	<input type="checkbox"/>	→ List of CRs:
MS test specifications	<input type="checkbox"/>	→ List of CRs:
BSS test specifications	<input type="checkbox"/>	→ List of CRs:
O&M specifications	<input type="checkbox"/>	→ List of CRs:

Other comments:

<----- double-click here for help and instructions on how to create a CR.

4.5.3 FDD Physical channel parameters in downlink

Maximum number of DPCH/PDSCH 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, PDSCH, 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 for normal, un-compressed mode.

The parameter also indicates the capability of the UE to support compressed mode by spreading factor reduction. For parameter values up to and including 9600 bits, the UE shall also be able to support compressed mode by SF reduction when operating, in normal mode, at any value up to the reported capability, this value. For parameter values greater than 9600 bits, the UE shall be able to support compressed mode by spreading factor reduction when operating, in normal mode, at any value up to half the reported capability or 9600bits, whichever is greater.

Support for SF 512

Spreading factor 512 should not be mandatory for all UEs.

The corresponding configuration parameter is *Spreading factor* which is part of *Downlink DPCH info*.

Support of PDSCH

Support of PDSCH is only required for some RAB realisations, and is therefore a UE capability.

The corresponding configuration parameter is *Downlink transport channel type*, which is part of *RB mapping info*.

Simultaneous reception of SCCPCH and DPCH

Simultaneous reception of SCCPCH and DPCH, i.e. simultaneous reception of FACH and DCH is required for e.g. DRAC procedure, but it should not be mandatory for all UEs (e.g. speech only UEs).

There is no specific configuration parameter.

Simultaneous reception of SCCPCH, DPCH and PDSCH

Simultaneous reception of SCCPCH, DPCH and PDSCH, i.e. simultaneous reception of FACH, DCH and DSCH is required for e.g. simultaneous use of DSCH and the DRAC procedure, but it should not be mandatory for all UEs (e.g. speech only UEs). The PDSCH part of this capability is only relevant if the UE supports PDSCH, as covered by the capability "Support of PDSCH".

There is no specific configuration parameter.

Maximum number of simultaneous S-CCPCH radio links

Defines the maximum number of radio links on which the UE is capable of receiving S-CCPCH simultaneously.

4.5.4 FDD physical channel parameters in uplink

Maximum number of DPDCH bits per 10 ms

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.

The number of DPDCH channel bits indicates the capability for normal, un-compressed mode. The UE shall also be able to support compressed mode by SF reduction when operating at this value.

Support of PCPCH

Support of PCPCH is only required for some RAB realisations, and is therefore a UE capability.

There is no specific configuration parameter.

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25.926 CR 013

Current Version: **3.1.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **TSG-RAN #9**
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for approval
for information

strategic (for SMG use only)
non-strategic

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: <http://ftp.3gpp.org/Information/CR-Form-v2.doc>

Proposed change affects:

(at least one should be marked with an X)

(U)SIM ME UTRAN / Radio Core Network

Source:

TSG-RAN WG2

Date:

2000-08-24

Subject:

Physical parameter changes

Work item:

Category:

(only one category shall be marked with an X)

F Correction
A Corresponds to a correction in an earlier release
B Addition of feature
C Functional modification of feature
D Editorial modification

Release:

Phase 2
Release 96
Release 97
Release 98
Release 99
Release 00

Reason for change:

Proposal:
- Correct definition of Transport Channel Parameters "Maximum sum of number of bits"

Clauses affected:

4.5.1, 4.5.2, 5.1, 5.2.2, 5.2.3

Other specs affected:

Other 3G core specifications → List of CRs:
Other GSM core specifications → List of CRs:
MS test specifications → List of CRs:
BSS test specifications → List of CRs:
O&M specifications → List of CRs:

Other comments:



help.doc

<----- double-click here for help and instructions on how to create a CR.

4.5 PHY parameters

4.5.1 Transport channel parameters in downlink

Maximum sum of number of bits of all transport blocks being received in TTIs that end within the same arbitrary interval of length $T < 10$ ms at an arbitrary time instant

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

This parameter is defined as:

$$\sum_i(N_i)$$

where N_i is defined as the number of bits in transport block #i, and the sum is over all transport blocks being received in TTIs that end within the same 10 ms interval 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.

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 received in TTIs that end within the same arbitrary interval of length $T < 10$ ms at an arbitrary time instant.

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

Maximum sum of number of bits of all turbo coded transport blocks being received in TTIs that end within the same arbitrary interval of length $T < 10$ ms at an arbitrary time instant.

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

Maximum number of simultaneous transport channels

This is defined as the maximum number of Transport Channels that should be possible to process simultaneously, not taking into account the rate of each Transport Channel.

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

CCTrCH should be interpreted as CCTrCH of any type, i.e. 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.

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.

Maximum number of TFC in the TFCS

The maximum number of TFC in a TFCS sets the size of the TFCI to TFCS mapping table to be handled by the UE.

Maximum number of TF

The maximum total number of downlink transport formats the UE can store.

Support for turbo decoding

Defines whether turbo decoding is supported or not.

The UTRAN configuration parameter is *Type of channel coding* which is part of the Transport format set (TFS) of each transport channel.

4.5.2 Transport channel parameters in uplink

Maximum sum of number of bits of all transport blocks being transmitted in TTIs that start at the same time at an arbitrary time instant

NOTE: "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:

$$\sum_i(N_i)$$

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

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 in TTIs that start at the same time at an arbitrary time instant

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

Maximum sum of number of bits of all turbo coded transport blocks being transmitted at an arbitrary time instant in TTIs that start at the same time

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

Maximum number of simultaneous transport channels

The number of simultaneous transport channels affects how the total memory space and processing capacity can be shared among the transport channels.

UTRAN shall not set up more simultaneous transport channels than the UE capability allows for.

Maximum number of simultaneous CCTrCH

TDD only. For FDD there is always only one CCTrCH at a time.

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

Relates to processing requirements for CRC in uplink.

A UE does not need to support the TFC within the TFCS for which the sum of *Number of Transport Blocks* is larger than what the UE capability allows for.

Maximum number of TFC in the TFCS

The maximum number of TFC in a TFCS sets the size of the TFCI to TFCS mapping table to be handled by the UE.

Maximum number of TF

The maximum total number of uplink transport formats the UE can store.

Support for turbo encoding

Defines whether turbo encoding is supported or not.

The UTRAN configuration parameter is *Type of channel coding* which is part of the Transport format set (TFS) of each transport channel.

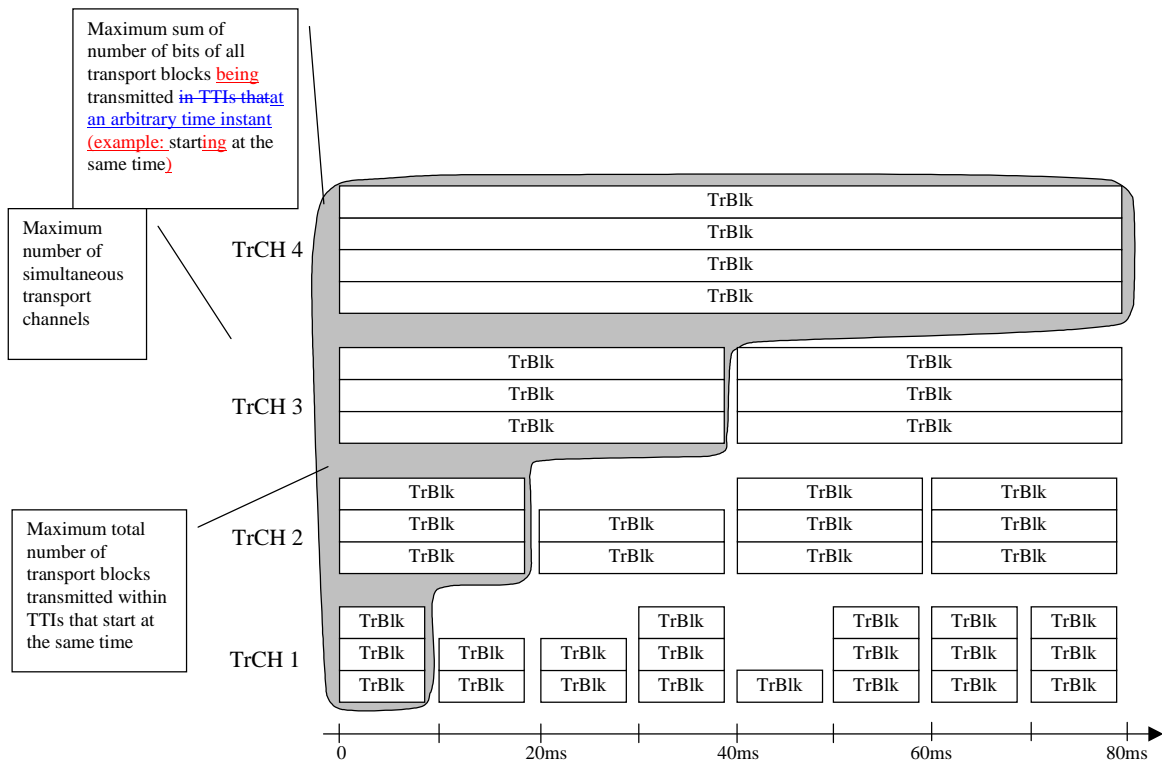


Figure 4.1: UE transport channel processing limitations in uplink

NOTE: When CPCH is supported, then simultaneous DPCCH & SCCPCH reception is needed.

4.5.3 FDD Physical channel parameters in downlink

Maximum number of DPCH/PDSCH 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, PDSCH, 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 for normal, un-compressed mode. The UE shall also be able to support compressed mode by SF reduction when operating at this value.

Support for SF 512

Spreading factor 512 should not be mandatory for all UEs.

The corresponding configuration parameter is *Spreading factor* which is part of *Downlink DPCH info*.

Support of PDSCH

Support of PDSCH is only required for some RAB realisations, and is therefore a UE capability.

The corresponding configuration parameter is *Downlink transport channel type*, which is part of *RB mapping info*.

Simultaneous reception of SCCPCH and DPCH

Simultaneous reception of SCCPCH and DPCH, i.e. simultaneous reception of FACH and DCH is required for e.g. DRAC procedure, but it should not be mandatory for all UEs (e.g. speech only UEs).

There is no specific configuration parameter.

Simultaneous reception of SCCPCH, DPCH and PDSCH

Simultaneous reception of SCCPCH, DPCH and PDSCH, i.e. simultaneous reception of FACH, DCH and DSCH is required for e.g. simultaneous use of DSCH and the DRAC procedure, but it should not be mandatory for all UEs (e.g. speech only UEs). The PDSCH part of this capability is only relevant if the UE supports PDSCH, as covered by the capability "Support of PDSCH".

There is no specific configuration parameter.

Maximum number of simultaneous S-CCPCH radio links

Defines the maximum number of radio links on which the UE is capable of receiving S-CCPCH simultaneously.

4.5.4 FDD physical channel parameters in uplink

Maximum number of DPDCH bits per 10 ms

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.

The number of DPDCH channel bits indicates the capability for normal, un-compressed mode. The UE shall also be able to support compressed mode by SF reduction when operating at this value.

Support of PCPCH

Support of PCPCH is only required for some RAB realisations, and is therefore a UE capability.

There is no specific configuration parameter.

4.5.5 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.

4.5.6 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.

4.5.7 RF parameters

UE power class

The value is fixed per UE and is not related to any configuration parameter.

Radio frequency bands

Defines the uplink and downlink frequency bands supported by the UE.

Configuration parameters are *UTRA RF Channel numbers* for uplink and downlink, which are part of *Frequency info*.

Tx/Rx frequency separation

Defines the uplink/downlink frequency separations supported by the UE.

Configuration parameters are *UTRA RF Channel numbers* for uplink and downlink, which are part of *Frequency info*.

Chip rate capability

Chip rates supported by the UE.

Corresponding configuration parameter is *chip rate*, which is part of *Frequency info*.

4.6 Multi-mode related parameters

Support of UTRA FDD/TDD

Defines whether UTRA FDD and/or TDD are 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 no explicit configuration parameter.

Support of multi-carrier

Defines whether multi-carrier is supported or not.

There is no explicit configuration parameter.

4.8 LCS 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).

OTDOA UE based method 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".

GPS reference time capable

Defines if a UE has the capability to measure GPS reference time as defined in 25.215.

Support for IPDL

Defines if a UE has the capability to use IPDL to enhance its "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.

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		Header compression algorithm supported	Yes/No
RLC parameters		Total RLC AM buffer size	2,10,50,100,150,500,1000 kBytes
		Maximum number of AM entities	3,4,5,6,8,16,32
PHY parameters	Transport channel parameters in downlink	Maximum sum of number of bits of all transport blocks <u>being received in TTIs that end within the same arbitrary interval of length $T < 10$ ms at an arbitrary time instant</u>	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 <u>being received in TTIs that end within the same arbitrary interval of length $T < 10$ ms at an arbitrary time instant</u>	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 <u>being received in TTIs that end within the same arbitrary interval of length $T < 10$ ms at an arbitrary time instant</u>	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum number of simultaneous transport channels	4, 8, 16, 32
		Maximum number of simultaneous CCTrCH	1, 2, 3, 4, 5, 6, 7, 8
		Maximum total number of transport blocks received within TTIs that end within the same 10 ms interval	4, 8, 16, 32, 48, 64, 96, 128, 256, 512
		Maximum number of TFC in the TFCS	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 <u>being transmitted in TTIs that start at the same time at an arbitrary time instant</u>
	Maximum sum of number of bits of all convolutionally coded transport blocks <u>being transmitted in TTIs that start at the same time at an arbitrary time instant</u>		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 <u>being transmitted in TTIs that start at the same time at an arbitrary time instant</u>		640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
	Maximum number of simultaneous transport channels		2, 4, 8, 16, 32
	Maximum number of simultaneous CCTrCH of DCH type (TDD only)		1, 2, 3, 4, 5, 6, 7, 8
	Maximum total number of transport blocks transmitted within TTIs that start at the same time		2, 4, 8, 16, 32, 48, 64, 96, 128, 256, 512
	Maximum number of TFC in the TFCS		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

		UE radio access capability parameter	Value range
	FDD Physical channel parameters in downlink	Maximum number of DPCH/PDSCH codes to be simultaneously received	1, 2, 3, 4, 5, 6, 7, 8
		Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH)	600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 48000, 57600, 67200, 76800
		Support for SF 512	Yes/No
		Support of PDSCH	Yes/No
		Simultaneous reception of SCCPCH and DPCH	Yes/No
		Simultaneous reception of SCCPCH, DPCH and PDSCH	Yes/No
		Maximum number of simultaneous S-CCPCH radio links	1 NOTE: Only the value 1 is part of R99
	FDD Physical channel parameters in uplink	Maximum number of DPDCH bits transmitted per 10 ms	600, 1200, 2400, 4800, 960, 19200, 28800, 38400, 48000, 57600
		Support of PCPCH	Yes/No
	TDD physical channel parameters in downlink	Maximum number of timeslots per frame	1..14
		Maximum number of physical channels per frame	1,2,3,..,224
		Minimum SF	16, 1
		Support of PDSCH	Yes/No
	TDD 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	
RF parameters	FDD RF parameters	UE power class (25.101 subclause 6.2.1)	3, 4 NOTE: Only power classes 3 and 4 are part of R99
		Tx/Rx frequency separation (25.101 subclause 5.3) . NOTE: Not applicable if UE is not operating in frequency band a	190 MHz 174.8-205.2 MHz 134.8-245.2 MHz
RF parameters	TDD RF parameters	UE power class (25.102)	2,3 NOTE: Only power classes 2 and 3 are part of R99
		Radio frequency bands (25.102)	a), b), c), a+b), a+c), a+b+c)
		Chip rate capability (25.102)	3.84,1.28
Multi-mode related parameters		Support of UTRA FDD/TDD	FDD, TDD, FDD+TDD
Multi-RAT related parameters		Support of GSM	Yes/No
		Support of multi-carrier	Yes/No
LCS related parameters		Standalone location method(s) supported	Yes/No
		Network assisted GPS support	Network based / UE based / Both/ None
		GPS reference time capable	Yes/No
		Support for IPDL	Yes/No
		Support for OTDOA UE based method	Yes/No
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)

5.2 Reference UE radio access capability combinations

Based on required UE radio access capabilities to support reference RABs as defined in clause 6, 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. Subclause 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.

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: It is FFS whether measurement-related capabilities need to be 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	32kbps class	64kbps class	128kbps class	384kbps class	768kbps class	2048kbps class
PDCP parameters						
Header compression algorithm supported	No	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1
RLC parameters						
Total RLC AM buffer size (kbytes)	10	10	50	50	100	500
Maximum number of AM entities	4	4	5	6	8	8
Multi-mode related parameters						
Support of UTRA FDD/TDD	FDD / FDD+TDD / TDD NOTE 1					
Multi-RAT related parameters						
Support of GSM	Yes/No NOTE 1					
Support of multi-carrier	Yes/No NOTE 1					
LCS related parameters						
Standalone location method(s) supported	Yes/No NOTE 1					
Network assisted GPS support	Network based / UE based / Both/ None NOTE 1					
GPS reference time capable	Yes/No NOTE 1					
Support for IPDL	Yes/No NOTE 1					
Support for OTDOA UE based method	Yes/No NOTE 1					
RF parameters for FDD						
UE power class	3 / 4 NOTE 1					
Tx/Rx frequency separation	190 MHz					
RF parameters for TDD						
Radio frequency bands	A / b / c / a+b / a+c / b+c / a+b+c NOTE 1					
Chip rate capability	1.28 / 3.84 Mchip/sec 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	32kbps class	64kbps class	128kbps class	384kbps class	768kbps class	2048kbps class
Transport channel parameters						
Maximum sum of number of bits of all transport blocks received in TTIs that end within the same arbitrary interval of length $T < 10$ ms at an arbitrary time instant	640	3840	3840	6400	10240	20480
Maximum sum of number of bits of all convolutionally coded transport blocks being received in TTIs that end within the same arbitrary interval of length $T < 10$ ms at an arbitrary time instant	640	640	640	640	640	640
Maximum sum of number of bits of all turbo coded transport blocks being received in TTIs that end within the same arbitrary interval of length $T < 10$ ms at an arbitrary time instant	NA	3840	3840	6400	10240	20480
Maximum number of simultaneous transport channels	8	8	8	8	8	16
Maximum number of simultaneous CCTrCH (FDD)	1	2/1 NOTE 2	2/1 NOTE 2	2/1 NOTE 2	2	2
Maximum number of simultaneous CCTrCH (TDD)	2	3	3	3	4	4
Maximum total number of transport blocks received within TTIs that end at the same time	8	8	16	32	64	96
Maximum number of TFC in the TFCS	32	48	96	128	256	1024
Maximum number of TF	32	64	64	64	128	256
Support for turbo decoding	No	Yes	Yes	Yes	Yes	Yes
Physical channel parameters (FDD)						
Maximum number of DPCH/PDSCH codes to be simultaneously received	1	2/1 NOTE 2	2/1 NOTE 2	3	3	3
Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH).	1200	3600/2400 NOTE2	7200/4800 NOTE2	19200	28800	57600
Support for SF 512	No	No	No	No	No	No
Support of PDSCH	No	Yes/No NOTE 1	Yes/No NOTE 1	No/Yes NOTE 1	Yes	Yes
Maximum number of simultaneous S-CCPCH radio links	1	1	1	1	1	1
Physical channel parameters (TDD)						
Maximum number of timeslots per frame	1	2	4	5	10	12
Maximum number of physical channels per frame	8	9	14	28	64	136
Minimum SF	16	16	16	1/16 NOTE 1	1/16 NOTE 1	1/16 NOTE 1
Support of PDSCH	Yes/No NOTE 1	Yes	Yes	Yes	Yes	Yes

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

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

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	32kbps class	64kbps class	128kbps class	384kbps class	768kbps class
Transport channel parameters					
Maximum sum of number of bits of all transport blocks <u>being transmitted in TTIs that start at the same time at an arbitrary time instant</u>	640	3840	3840	6400	10240
Maximum sum of number of bits of all convolutionally coded transport blocks <u>being transmitted at an arbitrary time instant in TTIs that start at the same time</u>	640	640	640	640	640
Maximum sum of number of bits of all turbo coded transport blocks <u>being transmitted at an arbitrary time instant in TTIs that start at the same time</u>	NA	3840	3840	6400	10240
Maximum number of simultaneous transport channels	4	8	8	8	8
Maximum number of simultaneous CCTrCH(TDD only)	1	2	2	2	2
Maximum total number of transport blocks transmitted within TTIs that start at the same time	4	8	8	16	32
Maximum number of TFC in the TFCS	16	32	48	64	128
Maximum number of TF	32	32	32	32	64
Support for turbo encoding	No	Yes	Yes	Yes	Yes
Physical channel parameters (FDD)					
Maximum number of DPDCH bits transmitted per 10 ms	1200	2400	4800	9600	19200
Simultaneous reception of SCCPCH and DPCH NOTE 2	No	No	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1
Simultaneous reception of SCCPCH, DPCH and PDSCH NOTE 2	No	No	No	No	No
Support of PCPCH	No	No	No	No	No
Physical channel parameters (TDD)					
Maximum Number of timeslots per frame	1	2	3	7	9
Maximum number of physical channels per timeslot	1	1	1	1	2
Minimum SF	8	2	2	2	2
Support of PUSCH	Yes/No NOTE 1	Yes	Yes	Yes	Yes

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

NOTE 2: The downlink parameters 'Simultaneous reception of SCCPCH and DPCH' and 'Simultaneous reception of SCCPCH, DPCH and PDSCH' are included in the combinations for uplink as their requirements relate to the uplink data rate. Simultaneous reception of SCCPCH and DPCH is required for the DRAC procedure that is intended for controlling uplink transmissions. In release 99, this is limited to 1 SCCPCH

