TSG RAN Working Group 1 meeting #16

TSGR1#16(00)1314

revision of R1-00-1300

revision of R1-00-1278

Pusan, Korea
October 10 – 13, 2000

Agenda item: AH99

Source: Mitsubishi Electric (Trium R&D)

Title: CR 25.926, clarification on TTI simultaneousness in UE radio access capability

Document for: Decision&Discussion

Introduction

In paper [2] the notion of time instant was introduced for the parameter "maximum sum of number of bits of all transport block…". However a transport block cannot be received at a time instant but needs some TTI to be received. In order to correct, while keeping the parameter at a reasonable length, this we use the phrase "*around* a time instant" instead of "*at* a time instant". The exact meaning of "*around*" is given in the parameter definition.

Furthermore, the term "being received" assumes that what matters is the dynamic behaviour, not the semi-static configuration. So we replaced "being" by "that can be", with the same intention as that of [2] when the notion of arbitrary time instant was introduced to stress that dynamic behaviour is not considered.

Furthermore the notion of time instant was used for the number of bits parameter, but not for the number of blocks. We believe that the problem corrected by [2] also concern the number of blocks as there is a per block overhead.

Furthermore, the wording "convolutionally coded transport block" is not very good as it sounds as if the bits are counted at the output of the channel encoder and not at the L1/L2 interface.

Finally, it was clarified that "simultaneous transport channels" includes null be rate transport channels.

Reference

[1] 25.926 v.3.2.0. 3rd Generation Partnership Project; Technical Specification Group Radio Access Network;UE Radio Access Capabilities; source RAN WG1.

[2] R1-00-1122 CR 25.926-xxx: Correction of Transport Channel Parameter, source Ericsson

[3] R1-00-1278 CR 25.926-xxxx, clarification on TTI simultaneousness in UE radio access capability, source Mitsubishi Electric

3GPP TSG RAN WG1#16
Pusan, Korea

Document R1-00-1314
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.926	CR	XXX	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ? *? CR number as allocated by MCC support team*

For submission to: RAN#10 *list expected approval meeting # here ?*

for approval [X]
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: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

Source: Mitsubishi Electric (Trium R&D) **Date:** 2000-10

Subject: Clarification on the TTI simultaneousness in the transport channel parameters

Work item:

Category: *(only one category Shall be marked With an X)*

F	Correction	[X]
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	[X]
Release 00	[ ]

Reason for change:

?? The term "number of bits of convolutionally coded transport blocks" was unclear, the reference point for this number of bits is the L1/L2 interface, but the wording could be interpreted as if it was the output of the channel coder. Same for turbo coding.

?? A transport block cannot be received "at an instant", it needs a TTI to be received. Same problem with "transmit" instead of "received"

?? The parameter on the "maximum number of transport blocks…" was still with the "ending within the same 10ms interval" and not with the arbitrary time instant wording. So we made the same correction as was made for the "maximum number of bit of all transport blocks…"

?? "being received" or "being transmitted" assumes that the dimensioning is based on the dynamic behaviour, and not on the semi-static configuration, such as the TFCS. So "being" was replaced by "that can be"

?? It was clarified that simultaneous transport channels include also transport channels that are currently at null bit rate

Clauses affected: 4.5 4.5.1; 4.5.2; 5.1

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:

4.5 PHY parameters

In the following

"that can be received" (resp. "transmitted") means that, for all the simultaneous CCTrCHs, we consider all the TFCs within the respective TFCSs of the CCTrCHs over all simultaneous transport channels received (resp. transmitted) on the CCTrCHs by the UE.

"Arbitrary time instant" means that the relevant time instants are those corresponding to the highest value of the considered expression

"Around" in "around an arbitrary time instant" is shorter for "in TTIs intersected by an arbitratry time instant" where "intersected" has a different meaning in the downlink and in the uplink.

In the downlink "TTIs intersected by a time instant " means that we consider all the TTIs within which the considered time instant is included, where the beginning instant of each TTI is not included in it and the ending instant is included in it as illustrated on figure 4.1 below.

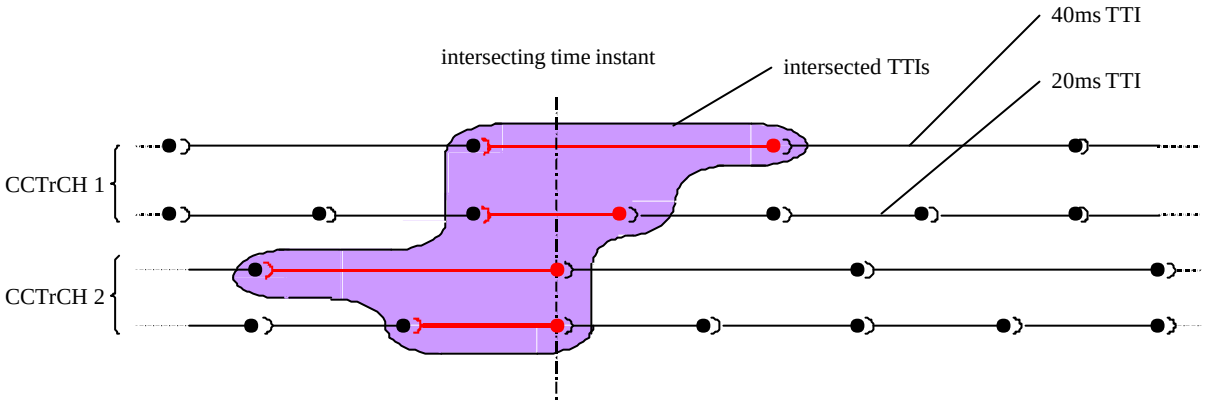

Figure 4.1. time instant intersecting TTIs for the UE in DL

In the uplink " TTIs intersected a time instant " means that the considered all the TTIs within which the considered time instant is included, where the beginning instant of each TTI is included in it and the ending instant is not included as illustrated on figure 4.2 below.

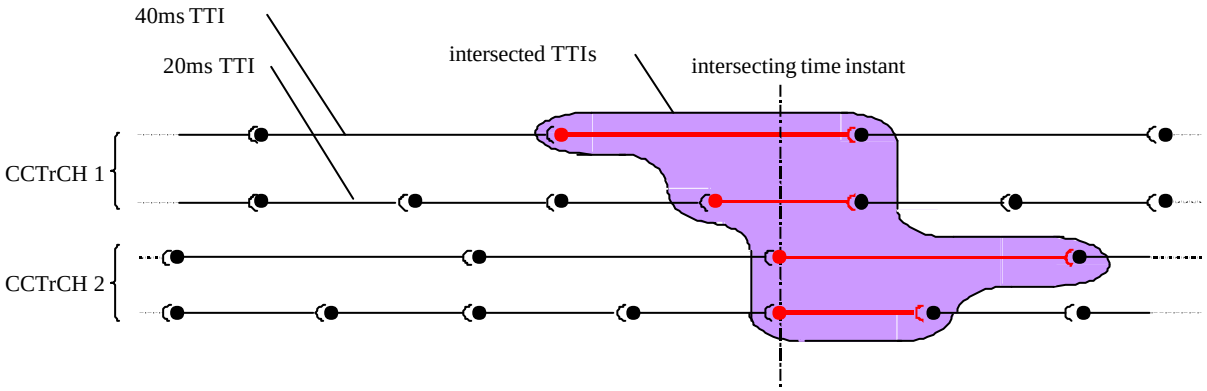

Figure 4.2. time instant intersecting TTIs for the UE in UL

NOTE : For explanatory purpose there are 2 CCTrCHs represented on figure 4.2. regardless of restrictions in release 99.

4.5.1 Transport channel parameters in downlink

Maximum sum of number of bits of all transport blocks that can be received around an arbitrary time instant ~~Maximum sum of number of bits of all transport blocks being received 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 an inclusive upper bound to the value of :

? ~~?max(Ni)~~ $\sum_i M_i \cdot A_i$

where ~~Ni~~
M_i is defined as the number of transport blocks for transport channel #i
A_i is defined as transport block size of transport channel #i, i.e. the number of bits in transport blocks ~~#i~~,
M_i and A_i are taken for the active transport format in the TTI intersected by the considered arbitrary time instant
and the sum is over all simultaneous transport ~~blocks~~ channels, e.g. DCH, FACH, PCH and/or DSCH, ~~being~~ where simultaneous means that they are received in TTIs intersected by ~~at~~ the considered ~~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, over all convolutionally coded transport channels, of number of bits of all transport blocks that can be received around 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~~ is carried out only on the number of bits of transport blocks corresponding to convolutionally coded transport ~~blocks~~channels .

Maximum sum, over all turbo coded transport channels, of number of bits of all transport blocks that can be received around an arbitrary time instant ~~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~~ is carried out only on the number of bits of transport blocks corresponding to turbo coded transport ~~blocks~~channels .

Maximum number of simultaneous transport channels

This is defined as the maximum number of Transport Channels that ~~should be possible to~~can be processed simultaneously, not taking into account the ~~rate~~ active transport format of each Transport Channel, even if it corresponds to a null bit rate.

Simultaneous means that the transport channels are received in TTIs intersected by a same time instant (cf. Figure 4.1).

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 that can be transmitted around an arbitrary time instant~~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 around the considered time instant on DCH, FACH, PCH and DSCH transport channels are included in the parameter.

Relates to processing requirements for CRC in downlink.

This parameter is defined as an inclusive upper bound to the value of :

$$? \quad ? \; M_i$$

Where M_i stands for the number of transport blocks for transport channel i for the active transport format in the considered respective TTIs.

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 that can be transmitted around an arbitrary time instant ~~Maximum sum of number of bits of all transport blocks being transmitted 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 an inclusive upper bound to the value of:

$$? \quad ?M_i ? A_i ?$$

where
M_i is defined as the number of transport blocks for transport channel #i
A_i is defined as transport block size of transport channel #i, i.e. the number of bits in transport blocks
M_i and A_i are taken for the active transport format in the TTI intersected by the considered arbitrary time instant.~~? ? (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.~~

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, over all convolutionally coded transport channels, of number of bits of all transport blocks that can be transmitted around an arbitrary time instant ~~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~~ is carried out only on the number of bits of transport blocks corresponding to convolutionally coded transport ~~blocks~~channels.

Maximum sum, over all turbo coded transport channels, of number of bits of all transport blocks that can be transmitted around an arbitrary time instant ~~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~~ is carried out only on the number of bits of transport blocks corresponding turbo coded transport ~~blocks~~channels.

Maximum number of simultaneous transport channels

Transport channels with an active transport format corresponding to a null bit rate shall be included in the 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.

Simultaneous means that the transport channels are transmitted in TTIs intersected by a same time instant (cf Figure 4.2).

Maximum number of simultaneous CCTrCH

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

Maximum total number of transport blocks that can be transmitted around an arbitrary time instant~~Maximum total number of transport blocks transmitted within TTIs that start at the same time~~

Relates to processing requirements for CRC in uplink.

This parameter is defined as an inclusive upper bound to the value of :

? $\sum_i M_i$

Where M_i stands for the number of transport blocks for transport channel i for the active transport format in the considered respective TTIs.

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.

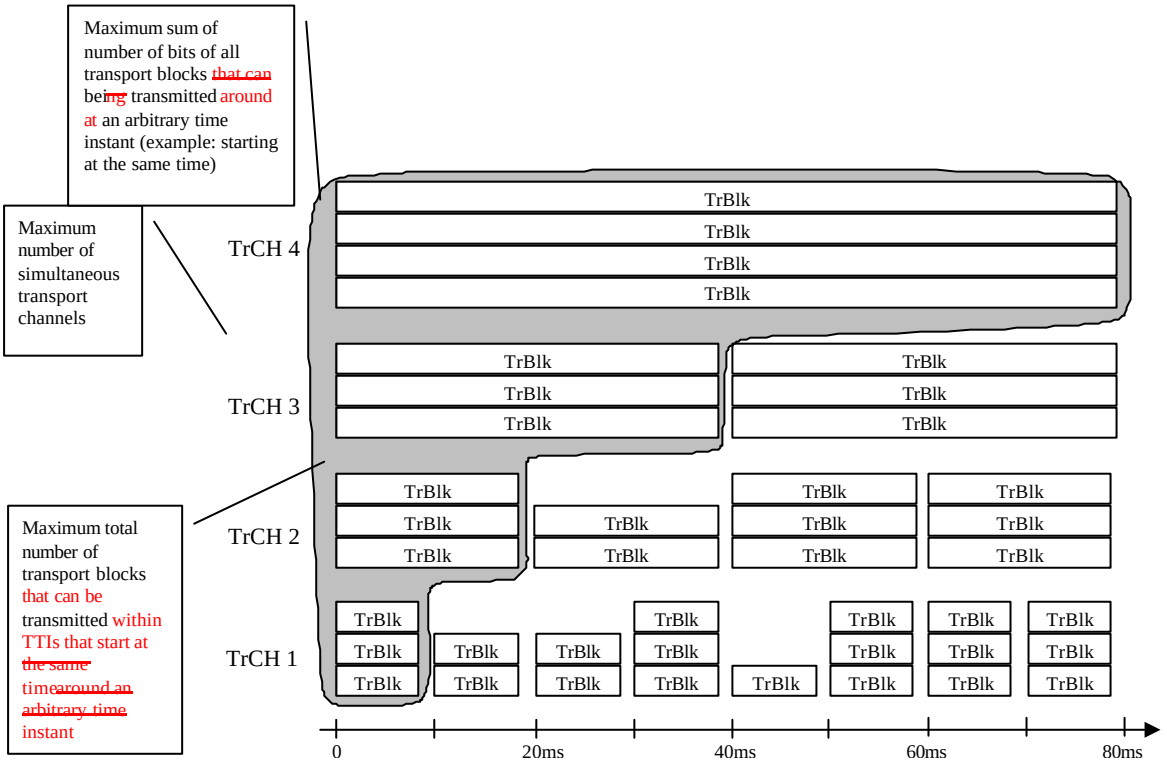

Figure 4.~~1~~3: UE transport channel processing limitations in uplink

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

5.1 Value ranges

Table 5.11: 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 that can be being received at around an arbitrary time instant (see Note 1)	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960 81920, 163840
		Maximum sum , over all convolutionally coded transport channels, of number of bits of all convolutionally coded transport blocks that can being received at around an arbitrary time instant (see Note 1)	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960 81920, 163840
		Maximum sum , over all turbo coded transport channels, of number of bits of all turbo coded transport blocks that can being received at around an arbitrary time instant (see Note 1)	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 that can be received around an arbitrary time instant (see Note 1)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 that can be being transmitted aroundat an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960 81920, 163840
		Maximum sum , over all convolutionally coded transport channels, of number of bits of all convolutionally coded transport blocks being that can be transmitted at around an arbitrary time instant (see Note 1)	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960 81920, 163840
		Maximum sum , over all turbo coded transport channels, of number of bits of all turbo coded transport blocks being that can be transmitted at around an arbitrary time instant (see Note 1)	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 that can be transmitted around an arbitrary time instant (see Note 1)within TTIs that start at the same time	2, 4, 8, 16, 32, 48, 64, 96, 128, 256, 512

		UE radio access capability parameter	Value range
		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	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
		Maximum number of physical channels per timeslot	1..16
	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

	UE radio access capability parameter	Value range
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)

NOTE 1: The exact meaning of the phrase "around an arbitrary time instant" has a different meaning for downlink and for uplink and is given in section 4.5