ETSI TS 136 306 V13.4.0 (2017-02)

LTE;
Evolved Universal Terrestrial Radio Access (E-UTRA);
User Equipment (UE) radio access capabilities
(3GPP TS 36.306 version 13.4.0 Release 13)

Reference
RTS/TSGR-0236306vd40

Keywords
LTE

ETSI

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Sous-Préfecture de Grasse (06) N° 7803/88

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Contents

Foreword

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1 Scope

The present document defines the E-UTRA UE Radio Access Capability Parameters.

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.
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[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 36.323: "Evolved Universal Terrestrial Radio Access (E-UTRA) Packet Data Convergence Protocol (PDCP) specification".

[3] 3GPP TS 36.322: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Link Control (RLC) specification".

[4] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA) Medium Access Control (MAC) specification".

[5] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Resource Control (RRC) specification".

[6] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA) radio transmission and reception".

[7] IETF RFC 4995: "The RObust Header Compression (ROHC) Framework".

[8] IETF RFC 4996: "RObust Header Compression (ROHC): A Profile for TCP/IP (ROHC-TCP)".

[9] IETF RFC 3095: "RObust Header Compression (RoHC): Framework and four profiles: RTP, UDP, ESP and uncompressed".

[10] IETF RFC 3843: "RObust Header Compression (RoHC): A Compression Profile for IP".

[11] IETF RFC 4815: "RObust Header Compression (ROHC): Corrections and Clarifications to RFC 3095".

[12] IETF RFC 5225: "RObust Header Compression (ROHC) Version 2: Profiles for RTP, UDP, IP, ESP and UDP Lite".

[13] 3GPP TS 36.355: "Evolved Universal Terrestrial Radio Access (E-UTRA) LTE Positioning Protocol (LPP)".

[14] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); UE Procedures in Idle Mode".

[15] 3GPP TS 37.320: "Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2".

[16] 3GPP TS 36.133: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management".

[17] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation".

[18] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[19] 3GPP TS 23.216: "Single Radio Voice Call Continuity (SRVCC)".

[20] 3GPP TS 25.307: "Requirement on User Equipments (UEs) supporting a release-independent frequency band".

[21] 3GPP TS 24.312: "Access Network Discovery and Selection Function (ANDSF) Management Object (MO)".

[22] 3GPP TS 36.213: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures".

[23] 3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer - Measurements".

[24] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".

[25] 3GPP TS 36.314: "Evolved Universal Terrestrial Radio Access (E-UTRA); Layer 2-Measurements".

[26] 3GPP TS 36.212: "Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding".

[27] 3GPP TS 36.307: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements on User Equipments (UEs) supporting a release-independent frequency band".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

Fallback band combination: A band combination that would result from another band combination by releasing at least one SCell or uplink configuration of SCell. An intra-band non-contiguous band combination is not considered to be a fallback band combination of an intra-band contiguous band combination.

NB-IoT: NB-IoT allows access to network services via E-UTRA with a channel bandwidth limited to 200 kHz (corresponding to one PRB).

Primary Cell: The cell, operating on the primary frequency, in which the UE either performs the initial connection establishment procedure or initiates the connection re-establishment procedure, or the cell indicated as the primary cell in the handover procedure. In this specification, Primary Cell also refers to PSCell defined in TS 36.331 [5] unless explicitly stated otherwise.

Sidelink: UE to UE interface for sidelink communication and sidelink discovery. The Sidelink corresponds to the PC5 interface as defined in TS 23.303 [24].

Sidelink communication: AS functionality enabling ProSe Direct Communication as defined in TS 23.303 [24], between two or more nearby UEs, using E-UTRA technology but not traversing any network node.

Sidelink discovery: AS functionality enabling ProSe Direct Discovery as defined in TS 23.303 [24], using E-UTRA technology but not traversing any network node.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

1xRTT	CDMA2000 1x Radio Transmission Technology
ACK	Acknowledgement
ACDC	Application specific Congestion control for Data Communication
ANDSF	Access Network Discovery and Selection Function
BCCH	Broadcast Control Channel
CG	Cell Group
CRS	Cell-specific Rerefence Signal
CSG	Closed Subscriber Group
CSI	Channel State Information
DC	Dual Connectivity
DCI	Downlink Control Information
DL-SCH	Downlink Shared Channel
E-UTRA	Evolved Universal Terrestrial Radio Access
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
FDD	Frequency Division Duplex
GERAN	GSM/EDGE Radio Access Network
HARQ	Hybrid Automatic Repeat Request
HRPD	High Rate Packet Data
IRC	Interference Rejection Combining
MAC	Medium Access Control
MMSE	Minimum Mean Squared Error
MRO	Mobility Robustness Optimisation
NAICS	Network Assisted Interference Cancellation/Suppression
NB-IoT	Narrow Band Internet of Things
PCell	Primary Cell
PDCCH	Physical Downlink Control Channel
PDCP	Packet Data Convergence Protocol
PDSCH	Physical Downlink Shared Channel
PHR	Power Headroom Reporting
ProSe	Proximity-based Services
PUCCH	Physical Uplink Control Channel
PUSCH	Physical Uplink Shared Channel
RACH	Random Access CHannel
RAT	Radio Access Technology
RLC	Radio Link Control
ROHC	RObust Header Compression
RRC	Radio Resource Control
SC-PTM	Single Cell Point to Multipoint
SCC	Secondary Component Carrier
SCell	Secondary Cell
SI	System Information
SL	Sidelink
SL-DCH	Sidelink Discovery CHannel
SL-SCH	Sidelink Shared CHannel
SON	Self Organizing Networks
SR	Scheduling Request
SSAC	Service Specific Access Control
SSTD	SFN and Subframe Timing Difference
TDD	Time Division Duplex

TTI	Transmission Time Interval
UCI	Uplink Control Information
UE	User Equipment
UL-SCH	Uplink Shared Channel
UMTS	Universal Mobile Telecommunications System
UTRA	UMTS Terrestrial Radio Access
WLAN	Wireless Local Area Network

4 UE radio access capability parameters

The following subclauses define the UE radio access capability parameters and minimum capabilities for MBMS capable UE. Only parameters for which there is the possibility for UEs to signal different values are considered as UE radio access capability parameters. Therefore, mandatory features without capability parameters that are the same for all UEs are not listed here. Also capabilities which are optional or conditionally mandatory for UEs to implement but do not have UE radio access capability parameter are listed in this specification.

E-UTRAN needs to respect the signalled UE radio access capability parameters when configuring the UE and when scheduling the UE.

All parameters shown in italics are signalled and correspond to a field defined in TS 36.331 [5].

For optional features, the UE radio access capability parameter indicates whether the feature has been implemented and successfully tested. For mandatory features with the UE radio access capability parameter, the parameter indicates whether the feature has been successfully tested.

The mandatory features required to be supported by a UE are the same for all UE categories unless explicitly specified elsewhere in the specifications.

The following UE radio access capability parameters specified in Chapter 4 are applicable in NB-IoT:

- *ue-Category-NB* in NB-IoT (section 4.1C)
- *supportedROHC-Profiles-r13* (section 4.3.1.1A)
- *maxNumberROHC-ContextSessions-r13* (section 4.3.1.2A)
- *multiTone-r13* (section 4.3.4.55)
- *multiCarrier-r13* (section 4.3.4.56)
- *supportedBandList-r13* (section 4.3.5.1A)
- *multiNS-Pmax-r13* (section 4.3.5.16A)
- *powerClassNB-20dBm-r13* (section 4.3.5.1A.1)
- *accessStratumRelease-r13* (section 4.3.8.1A)
- *multipleDRB-r13* (section 4.3.8.5)
- *logicalChannelSR-ProhibitTimer* (section 4.3.19.2)

The UE radio access capabilities specified in Chapter 4 are not applicable in NB-IoT, unless they are listed above. The optional features without UE radio access capability parameters specified in Chapter 6 are not applicable in NB-IoT, except for System Information Block Type 16. The conditionally mandatory features specified in Chapter 7 are not applicable in NB-IoT.

4.1 ue-Category

The field *ue-Category* defines a combined uplink and downlink capability. The parameters set by the UE Category are defined in subclause 4.2. Tables 4.1-1 and 4.1-2 define the downlink and, respectively, uplink physical layer parameter values for each UE Category. A UE indicating category 6 or 7 shall also indicate category 4. A UE indicating category

8 shall also indicate category 5. A UE indicating category 9 shall also indicate category 6 and 4. A UE indicating category 10 shall also indicate category 7 and 4. A UE indicating category 11 shall also indicate category 9, 6 and 4. A UE indicating category 12 shall also indicate category 10, 7 and 4. Table 4.1-4 defines the minimum capability for the maximum number of bits of a MCH transport block received within a TTI for an MBMS capable UE capable of reception via MBSFN.

Table 4.1-1: Downlink physical layer parameter values set by the field *ue-Category*

UE Category	Maximum number of DL-SCH transport block bits received within a TTI (Note 1)	Maximum number of bits of a DL-SCH transport block received within a TTI	Total number of soft channel bits	Maximum number of supported layers for spatial multiplexing in DL
Category 1	10296	10296	250368	1
Category 2	51024	51024	1237248	2
Category 3	102048	75376	1237248	2
Category 4	150752	75376	1827072	2
Category 5	299552	149776	3667200	4
Category 6	301504	149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)	3654144	2 or 4
Category 7	301504	149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)	3654144	2 or 4
Category 8	2998560	299856	35982720	8
Category 9	452256	149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)	5481216	2 or 4
Category 10	452256	149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)	5481216	2 or 4
Category 11	603008	149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM)	7308288	2 or 4
Category 12	603008	149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM)	7308288	2 or 4
NOTE 1: In carrier aggregation operation, the DL-SCH processing capability can be shared by the UE with that of MCH received from a serving cell. If the total eNB scheduling for DL-SCH and an MCH in one serving cell at a given TTI is larger than the defined processing capability, the prioritization between DL-SCH and MCH is left up to UE implementation.				

Table 4.1-2: Uplink physical layer parameter values set by the field *ue-Category*

UE Category	Maximum number of UL-SCH transport block bits transmitted within a TTI	Maximum number of bits of an UL-SCH transport block transmitted within a TTI	Support for 64QAM in UL
Category 1	5160	5160	No
Category 2	25456	25456	No
Category 3	51024	51024	No
Category 4	51024	51024	No
Category 5	75376	75376	Yes
Category 6	51024	51024	No
Category 7	102048	51024	No
Category 8	1497760	149776	Yes
Category 9	51024	51024	No
Category 10	102048	51024	No
Category 11	51024	51024	No
Category 12	102048	51024	No

Table 4.1-3: Total layer 2 buffer sizes set by the field *ue-Category*

UE Category	Total layer 2 buffer size [bytes]	With support for split bearers
Category 1	150 000	230 000
Category 2	700 000	1 100 000
Category 3	1 400 000	2 300 000
Category 4	1 900 000	3 100 000
Category 5	3 500 000	5 900 000
Category 6	3 300 000	5 800 000
Category 7	3 800 000	6 200 000
Category 8	42 200 000	61 600 000
Category 9	4 800 000	7 200 000
Category 10	5 200 000	7 600 000
Category 11	6 200 000	11 000 000
Category 12	6 700 000	11 500 000

Table 4.1-4: Maximum number of bits of a MCH transport block received within a TTI set by the field *ue-Category* for an MBMS capable UE capable of reception via MBSFN

UE Category	Maximum number of bits of a MCH transport block received within a TTI
Category 1	10296
Category 2	51024
Category 3	75376
Category 4	75376
Category 5	75376
Category 6	75376
Category 7	75376
Category 8	75376
Category 9	75376
Category 10	75376
Category 11	75376 (64QAM) 97896 (256QAM)
Category 12	75376 (64QAM) 97896 (256QAM)

Table 4.1-5: Half-duplex FDD operation type set by the field *ue-Category* for a half-duplex FDD capable UE

UE Category	Half-duplex FDD operation type
Category 1	Type A
Category 2	Type A
Category 3	Type A
Category 4	Type A
Category 5	Type A
Category 6	Type A
Category 7	Type A
Category 8	Type A
Category 9	Type A
Category 10	Type A
Category 11	Type A
Category 12	Type A

4.1A ue-CategoryDL and ue-CategoryUL

The fields *ue-CategoryDL* and *ue-CategoryUL* define downlink/uplink capability respectively. The parameters set by the UE DL/UL Categories are defined in subclause 4.2. Tables 4.1A-1 and 4.1A-2 define the downlink and, respectively, uplink physical layer parameter values for each UE DL/UL Category. Table 4.1A-4 defines the minimum capability for the maximum number of bits of a MCH transport block received within a TTI for an MBMS capable UE capable of reception via MBSFN. Table 4.1A-6 defines the only combinations for UE UL and DL Categories that are allowed to be signalled with *ue-CategoryDL* and *ue-CategoryUL*. Table 4.1A-6 also defines which UE Categories a UE shall indicate in addition to the combinations for UE UL and DL Categories. A UE indicating DL category 13 may indicate category 9 or 10 in *ue-Category-v1170*.

Table 4.1A-1: Downlink physical layer parameter values set by the field *ue-CategoryDL*

UE DL Category	Maximum number of DL-SCH transport block bits received within a TTI (Note 1)	Maximum number of bits of a DL-SCH transport block received within a TTI	Total number of soft channel bits	Maximum number of supported layers for spatial multiplexing in DL
DL Category M1	1000	1000	25344	1
DL Category 0 (Note 2)	1000	1000	25344	1
DL Category 6	301504	149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)	3654144	2 or 4
DL Category 7	301504	149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)	3654144	2 or 4
DL Category 9	452256	149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)	5481216	2 or 4
DL Category 10	452256	149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)	5481216	2 or 4
DL Category 11	603008	149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM)	7308288	2 or 4
DL Category 12	603008	149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM)	7308288	2 or 4
DL Category 13	391632	195816 (4 layers, 256QAM) 97896 (2 layers, 256QAM)	3654144	2 or 4
DL Category 14	3916560	391656 (8 layers, 256QAM)	47431680	8
DL Category 15	749856-798800 (Note 3)	149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM)	9744384	2 or 4
DL Category 16	978960 -1051360 (Note 3)	149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM)	12789504	2 or 4
DL Category 17	25065984	391656 (8 layers, 256QAM)	303562752	8
DL Category 18	1174752-1206016 (Note 3)	[299856 (8 layers, 64QAM)	14616576	2 or 4 [or 8]

		391656 (8 layers, 256QAM)] 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM)		
DL Category 19	1566336 -1658272 (Note 3)	[299856 (8 layers, 64QAM) 391656 (8 layers, 256QAM)] 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM)	19488768	2 or 4 [or 8]

NOTE 1: In carrier aggregation operation, the DL-SCH processing capability can be shared by the UE with that of MCH received from a serving cell. If the total eNB scheduling for DL-SCH and an MCH in one serving cell at a given TTI is larger than the defined processing capability, the prioritization between DL-SCH and MCH is left up to UE implementation.

NOTE 2: Within one TTI, a UE indicating category 0 shall be able to receive up to 1000 bits for a transport block associated with C-RNTI/Semi-Persistent Scheduling C-RNTI/P-RNTI/SI-RNTI/RA-RNTI and up to 2216 bits for another transport block associated with P-RNTI/SI-RNTI/RA-RNTI.

NOTE 3: The UE indicating category x shall reach the value within the defined range indicated by 'Maximum number of DL-SCH transport block bits received within a TTI' of category x. The UE shall determine the required value within the defined range indicated by 'Maximum number of DL-SCH transport block bits received within a TTI' of the corresponding category, based on its capabilities (i.e. CA band combination, MIMO, Modulation scheme). If the UE capability of CA band combination, MIMO and modulation scheme supported can exceed the upper limit of the defined range, the UE shall support the maximum value of the defined range indicated by 'Maximum number of DL-SCH transport block bits received within a TTI' of the corresponding category.

Table 4.1A-2: Uplink physical layer parameter values set by the field *ue-CategoryUL*

UE UL Category	Maximum number of UL-SCH transport block bits transmitted within a TTI	Maximum number of bits of an UL-SCH transport block transmitted within a TTI	Support for 64QAM in UL
UL Category M1	1000	1000	No
UL Category 0	1000	1000	No
UL Category 3	51024	51024	No
UL Category 5	75376	75376	Yes
UL Category 7	102048	51024	No
UL Category 8	1497760	149776	Yes
UL Category 13	150752	75376	Yes
UL Category 14	9585664	149776	Yes
UL Category 15	226128	75376	Yes

Table 4.1A-3: Total layer 2 buffer sizes set by the fields *ue-CategoryDL and ue-CategoryUL*

UE DL Category	UE UL Category	Total layer 2 buffer size [bytes]	With support for split bearers
DL Category M1	UL Category M1	20 000	N/A
DL Category 0	UL Category 0	20 000	N/A
DL Category 6	UL Category 5	3 500 000	6 000 000
DL Category 7	UL Category 13	4 200 000	6 700 000
DL Category 9	UL Category 5	5 000 000	7 400 000
DL Category 10	UL Category 13	5 700 000	8 100 000
DL Category 11	UL Category 5	6 400 000	11 300 000
DL Category 12	UL Category 13	7 100 000	12 000 000
DL Category 12	UL Category 15	7 800 000	12 700 000
DL Category 13	UL Category 3	4 200 000	7 300 000
DL Category 13	UL Category 5	4 400 000	7 600 000
DL Category 13	UL Category 7	4 700 000	7 800 000
DL Category 13	UL Category 13	5 100 000	8 300 000
DL Category 14	UL Category 8	50 800 000	76 200 000
DL Category 15	UL Category 3	8 000 000	13 000 000
DL Category 15	UL Category 5	8 200 000	13 400 000
DL Category 15	UL Category 7	8 500 000	13 600 000
DL Category 15	UL Category 13	8 900 000	14 100 000
DL Category 16	UL Category 3	10 000 000	17 000 000
DL Category 16	UL Category 5	10 600 000	17 400 000
DL Category 16	UL Category 7	10 800 000	17 600 000
DL Category 16	UL Category 13	11 000 000	18 100 000
DL Category 16	UL Category 15	12 000 000	18 800 000
DL Category 17	UL Category 14	330 000 000	530 000 000
DL Category 18	UL Category 3	11 800 000	21 600 000
DL Category 18	UL Category 5	12 000 000	21 800 000
DL Category 18	UL Category 7	12 300 000	22 100 000
DL Category 18	UL Category 13	12 700 000	22 500 000
DL Category 18	UL Category 15	13 400 000	23 200 000
DL Category 19	UL Category 3	16 000 000	28 300 000
DL Category 19	UL Category 5	16 300 000	28 500 000
DL Category 19	UL Category 7	16 500 000	28 800 000
DL Category 19	UL Category 13	17 000 000	29 200 000
DL Category 19	UL Category 15	17 700 000	29 900 000

Table 4.1A-4: Maximum number of bits of a MCH transport block received within a TTI set by the field *ue-CategoryDL* for an MBMS capable UE capable of reception via MBSFN

UE DL Category	Maximum number of bits of a MCH transport block received within a TTI
DL Category M1	NA
DL Category 0	4584
DL Category 6	75376
DL Category 7	75376
DL Category 9	75376
DL Category 10	75376
DL Category 11	75376 (64QAM) 97896 (256QAM)
DL Category 12	75376 (64QAM) 97896 (256QAM)
DL Category 13	75376 (64QAM) 97896 (256QAM)
DL Category 14	75376 (64QAM) 97896 (256QAM)
DL Category 15	75376 (64QAM) 97896 (256QAM)
DL Category 16	75376 (64QAM) 97896 (256QAM)
DL Category 17	75376 (64QAM) 97896 (256QAM)
DL Category 18	75376 (64QAM) 97896 (256QAM)
DL Category 19	75376 (64QAM) 97896 (256QAM)

Table 4.1A-5: Half-duplex FDD operation type set by the field *ue-CategoryDL* for a half-duplex FDD capable UE

UE DL Category	Half-duplex FDD operation type
DL Category M1	Type B
DL Category 0	Type B
DL Category 6	Type A
DL Category 7	Type A
DL Category 9	Type A
DL Category 10	Type A
DL Category 11	Type A
DL Category 12	Type A
DL Category 13	Type A
DL Category 14	Type A
DL Category 15	Type A
DL Category 16	Type A
DL Category 17	Type A
DL Category 18	Type A
DL Category 19	Type A

Table 4.1A-6: supported DL/UL Categories combinations and maximum UE channel bandwidth set by the fields *ue-CategoryDL* and *ue-CategoryUL* and UE categories to be indicated

UE DL Category	UE UL Category	UE categories	Maximum UE channel bandwidth [MHz]
DL Category M1	UL Category M1	N/A	1.4
DL Category 0	UL Category 0	N/A	According to maximum channel bandwidth specified per band in TS 36.101 [6].
DL Category 6	UL Category 5	Category 6, 4	
DL Category 7	UL Category 13	Category 7, 4	
DL Category 9	UL Category 5	Category 9, 6, 4	
DL Category 10	UL Category 13	Category 10, 7, 4	
DL Category 11	UL Category 5	Category 11, 9, 6, 4	
DL Category 12	UL Category 13	Category 12, 10, 7, 4	
DL Category 12	UL Category 15	Category 12, 10, 7, 4 DL Category 12 and UL Category 13	
DL Category 13	UL Category 3	Category 6, 4, 9 (if supported)	
DL Category 13	UL Category 5	Category 6, 4, 9 (if supported)	
DL Category 13	UL Category 7	Category 7, 4, 10 (if supported)	
DL Category 13	UL Category 13	Category 7, 4, 10 (if supported)	
DL Category 14	UL Category 8	Category 8, 5	
DL Category 15	UL Category 3	Category 11, 9, 6, 4	
DL Category 15	UL Category 5	Category 11, 9, 6, 4 DL Category 11 and UL Category 5	
DL Category 15	UL Category 7	Category 12, 10, 7, 4	
DL Category 15	UL Category 13	Category 12, 10, 7, 4 DL Category 12 and UL Category 13	
DL Category 16	UL Category 3	Category 11, 9, 6, 4	
DL Category 16	UL Category 5	Category 11, 9, 6, 4 DL Category 11 and UL Category 5	
DL Category 16	UL Category 7	Category 12, 10, 7, 4	
DL Category 16	UL Category 13	Category 12, 10, 7, 4 DL Category 12 and UL Category 13	
DL Category 16	UL Category 15	Category 12, 10, 7, 4 DL Category 16,12 and UL Category 13	
DL Category 17	UL Category 14	Category 8, 5 DL Category 14 and UL Category 8	
DL Category 18	UL Category 3	Category 11, 9, 6, 4 DL Category 16 and UL Category 3	
DL Category 18	UL Category 5	Category 11, 9, 6, 4 DL Category 16, 11 and UL Category 5	
DL Category 18	UL Category 7	Category 12, 10, 7, 4 DL Category 16 and UL Category 7	
DL Category 18	UL Category 13	Category 12, 10, 7, 4 DL Category 16, 12 and UL Category 13	
DL Category 18	UL Category 15	Category 12, 10, 7, 4 DL Category 16,12 and UL Category 13	
DL Category 19	UL Category 3	Category 11, 9, 6, 4 DL Category 16 and UL Category 3	
DL Category 19	UL Category 5	Category 11, 9, 6, 4 DL Category 16, 11	

		and UL Category 5	
DL Category 19	UL Category 7	Category 12, 10, 7, 4 DL Category 16 and UL Category 7	
DL Category 19	UL Category 13	Category 12, 10, 7, 4 DL Category 16, 12 and UL Category 13	
DL Category 19	UL Category 15	Category 12, 10, 7, 4 DL Category 16,12 and UL Category 13	

4.1B ue-CategorySL-C and ue-CategorySL-D

The ue-CategorySL-C and ue-CategorySL-D define reception and transmission capabilities for sidelink communication and sidelink discovery respectively. The parameters set by the UE SL-C (sidelink communication) category and UE SL-D (sidelink discovery) category are defined in subclause 4.2A. Table 4.1B-1 defines physical layer parameter values for each SL-C Category. Table 4.1B-2 defines physical layer parameter values for each SL-D Category. If a UE of this release supports sidelink communication, the UE shall support SL-C Category 1. If a UE of this release supports sidelink discovery, the UE shall support SL-D Category 1.

Table 4.1B-1: Reception and transmission physical parameter values set by ue-CategorySL-C

UE SL-C Category	Maximum number of SL-SCH transport block bits received within a TTI	Maximum number of bits of a SL-SCH transport block received within a TTI	Maximum number of SL-SCH transport block bits transmitted within a TTI	Maximum number of bits of a SL-SCH transport block transmitted within a TTI	Maximum number of supported layers for spatial multiplexing in SL-C
SL-C Category 1	25456	25456	25456	25456	1

Table 4.1B-2: Reception and transmission physical parameter values set by ue-CategorySL-D

UE SL-D Category	Maximum number of SL-DCH transport block bits received within a TTI	Maximum number of bits of a SL-DCH transport block received within a TTI	Maximum number of SL-DCH transport block bits transmitted within a TTI	Maximum number of bits of a SL-DCH transport block transmitted within a TTI	Maximum number of supported layers for spatial multiplexing in SL-D
SL-D Category 1	11600	232	232	232	1

4.1C ue-Category-NB

The field *ue-Category-NB* defines a combined uplink and downlink capability in NB-IoT. The parameters set by the UE Category are defined in subclause 4.2. Tables 4.1C-1 and 4.1C-2 define the downlink and, respectively, uplink physical layer parameter values for each UE Category.

Table 4.1C-1: Downlink physical layer parameter values set by the field *ue-Category-NB*

UE Category	Maximum number of DL-SCH transport block bits received within a TTI	Maximum number of bits of a DL-SCH transport block received within a TTI	Total number of soft channel bits
Category NB1	680	680	2112

Table 4.1C-2: Uplink physical layer parameter values set by the field *ue-Category-NB*

UE Category	Maximum number of UL-SCH transport block bits transmitted within a TTI	Maximum number of bits of an UL-SCH transport block transmitted within a TTI
Category NB1	1000	1000

Table 4.1C-3: Total layer 2 buffer sizes set by the field *ue-Category-NB*

UE Category	Total layer 2 buffer size [bytes]
Category NB1	4000

Table 4.1C-5: Half-duplex FDD operation type set by the field *ue-Category-NB* for a half-duplex FDD capable UE

UE Category	Half-duplex FDD operation type
Category NB1	Type B

4.2 Parameters set by the field ue-Category and ue-CategoryDL / ue-CategoryUL

4.2.1 Transport channel parameters in downlink

4.2.1.1 Maximum number of DL-SCH transport block bits received within a TTI

Defines the maximum number of DL-SCH transport blocks bits that the UE is capable of receiving within a DL-SCH TTI.

This number does not include the bits of a DL-SCH transport block carrying BCCH in the same subframe.

4.2.1.2 Maximum number of bits of a DL-SCH transport block received within a TTI

Defines the maximum number of DL-SCH transport block bits that the UE is capable of receiving in a single transport block within a DL-SCH TTI per cell.

4.2.1.3 Total number of DL-SCH soft channel bits

Defines the total number of soft channel bits available for HARQ processing.

This number does not include the soft channel bits required by the dedicated broadcast HARQ process for the decoding of system information.

4.2.1.4 Maximum number of bits of a MCH transport block received within a TTI

Defines the maximum number of MCH transport block bits that the UE is capable of receiving within a MCH TTI.

4.2.2 Transport channel parameters in uplink

4.2.2.1 Maximum number of bits of an UL-SCH transport block transmitted within a TTI

Defines the maximum number of UL-SCH transport block bits that the UE is capable of transmitting in a single transport block within an UL-SCH TTI.

4.2.2.2 Maximum number of UL-SCH transport block bits transmitted within a TTI

Defines the maximum number of UL-SCH transport blocks bits that the UE is capable of transmitting within an UL-SCH TTI.

4.2.3 Physical channel parameters in downlink (DL)

4.2.3.1 Maximum number of supported layers for spatial multiplexing in DL

This field defines the maximum number of supported layers for spatial multiplexing per UE. The UE shall support the number of layers according to its Rel-8/9 category (Cat. 1-5) in all non-CA band combinations. Further requirements on the number of supported layers for spatial multiplexing are provided in section 4.3.5.2.

For each bandwidth class per band per band combination specified in *supportedBandCombination*, the UE provides the corresponding MIMO capability.

4.2.4 Physical channel parameters in uplink (UL)

4.2.4.1 Support for 64QAM in UL

Defines if 64QAM is supported in UL.

4.2.5 Total layer 2 buffer size

This parameter defines the total layer 2 buffer size. The total layer 2 buffer size is defined as the sum of the number of bytes that the UE is capable of storing in the RLC transmission windows and RLC reception and reordering windows for all radio bearers, and for UEs capable of split bearers, also in PDCP reordering windows for all split radio bearers.

4.2.6 Half-duplex FDD operation type

This parameter defines the type of half-duplex FDD operation for a half-duplex FDD capable UE. The half-duplex FDD operation type applies whenever the UE is in half-duplex FDD operation. The different types of half-duplex FDD operation are specified in TS 36.211 [17].

4.2.7 RF parameters

4.2.7.1 Maximum UE channel bandwidth

Defines the maximum channel bandwidth supported by the UE.

4.2A Parameters set by ue-CategorySL-C / ue-CategorySL-D

4.2A.1 Transport channel parameters in sidelink (SL)

4.2A.1.1 Maximum number of SL-SCH transport block bits received within a TTI

Defines the maximum number of SL-SCH transport block bits that the UE is capable of receiving within a SL-SCH TTI.

4.2A.1.2 Maximum number of bits of a SL-SCH transport block received within a TTI

Defines the maximum number of SL-SCH transport block bits that the UE is capable of receiving in a single transport block within a SL-SCH TTI.

4.2A.1.3 Maximum number of SL-DCH transport block bits received within a TTI

Defines the maximum number of SL-DCH transport block bits that the UE is capable of receiving within a SL-DCH TTI.

4.2A.1.4 Maximum number of bits of a SL-DCH transport block received within a TTI

Defines the maximum number of SL-DCH transport block bits that the UE is capable of receiving in a single transport block within a SL-DCH TTI.

4.2A.1.5 Maximum number of bits of a SL-SCH transport block transmitted within a TTI

Defines the maximum number of SL-SCH transport block bits that the UE is capable of transmitting in a single transport block within a SL-SCH TTI.

4.2A.1.6 Maximum number of SL-SCH transport block bits transmitted within a TTI

Defines the maximum number of SL-SCH transport block bits that the UE is capable of transmitting within a SL-SCH TTI.

4.2A.1.7 Maximum number of bits of a SL-DCH transport block transmitted within a TTI

Defines the maximum number of SL-DCH transport block bits that the UE is capable of transmitting in a single transport block within a SL-DCH TTI.

4.2A.1.8 Maximum number of SL-DCH transport block bits transmitted within a TTI

Defines the maximum number of SL-DCH transport block bits that the UE is capable of transmitting within a SL-DCH TTI.

4.2A.2 Physical channel parameters in sidelink (SL)

4.2A.2.1 Maximum number of supported layers for spatial multiplexing in SL-C

This field defines the maximum number of supported layers for spatial multiplexing per UE in sidelink communication.

4.2A.2.2 Maximum number of supported layers for spatial multiplexing in SL-D

This field defines the maximum number of supported layers for spatial multiplexing per UE in sidelink discovery.

4.3 Parameters independent of the field *ue-Category* and *ue-CategoryDL / ue-CategoryUL*

4.3.1 PDCP Parameters

4.3.1.1 supportedROHC-Profiles

This field defines which ROHC profiles from the list below are supported by the UE.

- 0x0000 ROHC uncompressed (RFC 4995)
- 0x0001 ROHC RTP (RFC 3095, RFC 4815)
- 0x0002 ROHC UDP (RFC 3095, RFC 4815)
- 0x0003 ROHC ESP (RFC 3095, RFC 4815)
- 0x0004 ROHC IP (RFC 3843, RFC 4815)
- 0x0006 ROHC TCP (RFC 4996)
- 0x0101 ROHCv2 RTP (RFC 5225)
- 0x0102 ROHCv2 UDP (RFC 5225)
- 0x0103 ROHCv2 ESP (RFC 5225)
- 0x0104 ROHCv2 IP (RFC 5225)

A UE that supports one or more of the listed ROHC profiles shall support ROHC profile 0x0000 ROHC uncompressed (RFC 4995).

'IMS capable UEs supporting voice' shall support ROHC profiles 0x0000, 0x0001, 0x0002 and be able to compress and decompress headers of PDCP SDUs at a PDCP SDU rate corresponding to supported IMS voice codecs.

4.3.1.1A supportedROHC-Profiles-r13

This field defines which ROHC profiles from the list below are supported by the UE:- 0x0000 ROHC uncompressed (RFC 4995)

- 0x0002 ROHC UDP (RFC 3095, RFC 4815)
- 0x0003 ROHC ESP (RFC 3095, RFC 4815)
- 0x0004 ROHC IP (RFC 3843, RFC 4815)
- 0x0006 ROHC TCP (RFC 4996)
- 0x0102 ROHCv2 UDP (RFC 5225)
- 0x0103 ROHCv2 ESP (RFC 5225)
- 0x0104 ROHCv2 IP (RFC 5225)

A UE that supports one or more of the listed ROHC profiles shall support ROHC profile 0x0000 ROHC uncompressed (RFC 4995). This field is only applicable if the UE supports User plane CIoT EPS Optimisation [5] and any *ue-Category-NB*.

4.3.1.2 maxNumberROHC-ContextSessions

This field defines the maximum number of header compression context sessions supported by the UE, excluding context sessions that leave all headers uncompressed.

4.3.1.2A maxNumberROHC-ContextSessions-r13

This field defines the maximum number of header compression context sessions supported by the UE, excluding context sessions that leave all headers uncompressed. This field is only applicable if the UE supports User plane CIoT EPS Optimisation [5] and any *ue-Category-NB*.

4.3.1.3 pdcp-SN-Extension

This field defines whether the UE supports 15 bit length of PDCP sequence number as specified in TS 36.323 [2]. It is mandatory for UEs supporting split bearers and UEs supporting 18 bit length of PDCP sequence number.

4.3.1.4 supportRohcContextContinue

This field defines whether the UE supports ROHC context continuation operation where the UE does not reset the current ROHC context upon handover.

4.3.1.5 pdcp-SN-Extension-18bits-r13

This field defines whether the UE supports 18 bit length of PDCP sequence number as specified in TS 36.323 [2].

4.3.2 RLC parameters

4.3.2.1 Void

4.3.2.2 extended-RLC-LI-Field-r12

This field defines whether the UE supports 15 bit RLC Length Indicator (LI) as specified in TS 36.322 [3].

4.3.2.3 extendedRLC-SN-SO-Field-r13

This field defines whether the UE supports 16 bit length of RLC sequence number and 16 bit length of RLC Segment Offset (SO) as specified in TS 36.322 [3]. It is mandatory for UEs supporting 16 bit length of MAC L field.

4.3.3 Void

4.3.4 Physical layer parameters

4.3.4.1 ue-TxAntennaSelectionSupported

This field defines whether the UE supports transmit antenna selection.

4.3.4.2 ue-SpecificRefSigsSupported

This field defines whether the UE supports PDSCH transmission mode 7 for FDD.

4.3.4.3 Void

4.3.4.4 enhancedDualLayerFDD

This field defines whether the UE supports enhanced dual layer (PDSCH transmission mode 8) for FDD.

4.3.4.5 enhancedDualLayerTDD

This field defines whether the UE supports enhanced dual layer (PDSCH transmission mode 8) for TDD. Enhanced dual layer shall be supported by UEs of this version of the specification supporting TDD.

4.3.4.6 supportedMIMO-CapabilityUL-r10

This field defines the maximum number of spatial multiplexing layers in the uplink direction for a certain band and bandwidth class in a supportedBandCombination supported by the UE.

4.3.4.7 supportedMIMO-CapabilityDL-r10

This field defines the maximum number of spatial multiplexing layers in the downlink direction for a certain band and bandwidth class in a supportedBandCombination supported by the UE. For bandwidth classes that include multiple component carriers (i.e. bandwidth classes B, C, D and so on), the field defines the maximum number of spatial multiplexing layers supported by the UE on all component carriers in the corresponding bandwidth class.

The support for more layers in *supportedMIMO-CapabilityDL* than given by the 'maximum number of supported layers for spatial multiplexing in DL' derived from the *ue-Category* (without suffix) in the *UE-EUTRA-Capability* IE is only applicable to transmission mode 9 and transmission mode 10.

4.3.4.8 two-AntennaPortsForPUCCH-r10

This field defines whether the UE supports transmit diversity for PUCCH formats 1/1a/1b/2/2a/2b, and if the UE supports PUCCH format 3, transmit diversity for PUCCH format 3.

4.3.4.9 tm9-With-8Tx-FDD-r10

This field defines whether the UE supports PDSCH transmission mode 9 with 8 CSI reference signal ports for FDD.

4.3.4.10 pmi-Disabling-r10

This field defines whether the UE supports PMI disabling.

4.3.4.11 crossCarrierScheduling-r10

This field defines whether the UE supports cross carrier scheduling operation for carrier aggregation, including (if the UE supports carrier aggregation in UL) the use of PCell as the pathloss reference for an SCell when *pathlossReference-r10* within *UplinkPowerControlDedicatedSCell-r10* is configured as "pCell". The UE supports PDCCH DCI formats with CIF if the UE indicates support for cross carrier scheduling.

NOTE: Regardless of whether the UE supports cross carrier scheduling operation or not, it is mandatory for a UE supporting carrier aggregation in UL to support the configuration where *pathlossReference-r10* within *UplinkPowerControlDedicatedSCell-r10* is set to 'sCell'.

4.3.4.12 simultaneousPUCCH-PUSCH-r10

This field defines whether the UE baseband supports simultaneous transmission of PUCCH and PUSCH, and is band agnostic. If the UE indicates support of baseband capability for simultaneous transmission of PUCCH and PUSCH using this field, and if the UE indicates support of RF capability for non-contiguous UL resource allocation within a component carrier for a particular E-UTRA radio frequency band, then the UE supports simultaneous transmission of PUCCH and PUSCH within each component carrier of the band. If the UE indicates support of baseband capability for simultaneous transmission of PUCCH and PUSCH using this field, and if the UE indicates support of carrier aggregation in UL, then the UE supports simultaneous transmission of PUCCH and PUSCH across any UL component carriers which the UE can aggregate. If the UE supports DC, this field is applicable within a CG. If the UE supports PUCCH on SCell, this field is applicable within a PUCCH group as defined in TS 36.213 [22].

4.3.4.13 multiClusterPUSCH-WithinCC-r10

This field defines whether the UE baseband supports multi-cluster PUSCH transmission within a component carrier (i.e. PUSCH resource allocation type 1), and is band agnostic. If the UE indicates support of baseband capability for multi-cluster PUSCH transmission within a component carrier using this field, and if the UE indicates support of RF capability for non-contiguous UL resource allocation within a component carrier for a particular E-UTRA radio frequency band, then the UE supports multi-cluster PUSCH transmission within each component carrier of the band.

NOTE: If the UE indicates support of carrier aggregation in UL, then the UE supports PUSCH transmissions over non-contiguous resource blocks across any UL component carriers which the UE can aggregate, regardless of whether or not the UE indicates support of baseband capability for multi-cluster PUSCH transmission within a component carrier using this field..

4.3.4.14 nonContiguousUL-RA-WithinCC-Info-r10

This field defines whether the UE RF supports non-contiguous UL resource allocations within a component carrier, and is signalled per E-UTRA radio frequency band which the UE supports.

4.3.4.15 crs-InterfHandl-r11

This field defines whether the UE supports CRS interference handling. It is mandatory for UEs of this release of the specification, except for Category 0 and M1 UEs.

4.3.4.16 Void

4.3.4.17 Void

4.3.4.18 ePDCCH-r11

This field defines whether the UE can receive DCI on UE specific search space on Enhanced PDCCH.

4.3.4.19 multiACK-CSI-Reporting-r11

This field defines whether the UE supports multi-cell HARQ ACK and periodic CSI reporting and SR on PUCCH format 3 if the UE supports FDD carrier aggregation with more than two DL component carriers or TDD carrier aggregation.

4.3.4.20 ss-CCH-InterfHandl-r11

This field defines whether the UE supports synchronisation signal and common channel interference handling if the UE supports *crs-InterfHandl-r11*. It is mandatory for UEs of this release of the specification to support this feature for TDD bands, except for Category 0 and M1 UEs.

4.3.4.21 tdd-SpecialSubframe-r11

This field defines whether the UE supports TDD special subframe as specified in TS 36.211 [17]. It is mandatory for UEs of this release of the specification.

4.3.4.22 txDiv-PUCCH1b-ChSelect-r11

This field defines whether the UE supports transmit diversity for PUCCH format 1b with channel selection if the UE supports carrier aggregation and *two-AntennaPortsForPUCCH-r10*.

4.3.4.23 ul-CoMP-r11

This field defines whether the UE supports UL Coordinated Multi-Point operation. It is mandatory for UEs of this release of the specification.

4.3.4.24 *tm5-FDD*

This field defines whether the UE supports PDSCH transmission mode 5 for FDD.

4.3.4.25 *tm5-TDD*

This field defines whether the UE supports PDSCH transmission mode 5 for TDD.

4.3.4.26 interBandTDD-CA-WithDifferentConfig-r11

This field defines whether the UE supports inter-band TDD carrier aggregation with different UL/DL configuration combinations. It is mandatory for UEs of this release of the specification if inter-band TDD carrier aggregation is supported.

4.3.4.27 e-HARQ-Pattern-FDD-r12

This field defines whether the UE supports enhanced HARQ pattern for TTI bundling operation for FDD.

4.3.4.28 tdd-FDD-CA-PCellDuplex-r12

The presence of this field indicates that the UE supports TDD/FDD CA in any supported band combination including at least one FDD band with *bandParametersUL* and at least one TDD band with *bandParametersUL*. The first bit is set to "1" if UE supports the TDD PCell. The second bit is set to "1" if UE supports FDD PCell. This field is included only if the UE supports band combination including at least one FDD band with *bandParametersUL* and at least one TDD band with *bandParametersUL*. If this field is included, the UE shall set at least one of the bits as "1". If this field is included with DC, then it is applicable within a CG, and the presence of this field indicates the capability of the UE to support TDD/FDD CA with at least one FDD band and at least one TDD band in the same CG, with the value indicating the support for TDD/FDD PCell (PSCell).

4.3.4.29 csi-SubframeSet-r12

This field defines whether the UE supports Rel-12 DL CSI subframe set configuration, Rel-12 DL CSI subframe set dependent CSI measurement/feedback, configuration of up to 2 CSI-IM resources for a CSI process with no more than 4 CSI-IM resources for all CSI processes of one frequency if the UE supports tm10, configuration of two ZP-CSI-RS for tm1-tm9, PDSCH RE mapping with two ZP-CSI-RS configurations, and EPDCCH RE mapping with two ZP-CSI-RS configurations if the UE supports EPDCCH. This field is only applicable for UEs supporting TDD.

4.3.4.30 phy-TDD-ReConfig-FDD-PCell-r12

This field defines whether the UE supports TDD UL/DL reconfiguration for TDD serving cell(s) via monitoring PDCCH with eIMTA-RNTI on a FDD PCell, and HARQ feedback according to UL and DL HARQ reference configurations.

4.3.4.31 phy-TDD-ReConfig-TDD-PCell-r12

This field defines whether the UE supports TDD UL/DL reconfiguration for TDD serving cell(s) via monitoring PDCCH with eIMTA-RNTI on a TDD PCell, and HARQ feedback according to UL and DL HARQ reference configurations.

4.3.4.32 pusch-SRS-PowerControl-SubframeSet-r12

This field defines whether the UE supports subframe set dependent UL power control for PUSCH and SRS. This field is only applicable for UEs supporting TDD.

4.3.4.33 enhanced-4TxCodebook-r12

This field defines whether the UE supports enhanced 4Tx codebook as specified in TS 36.211 [17].

4.3.4.34 pusch-FeedbackMode-r12

This field defines whether the UE supports PUSCH feedback mode 3-2 as specified in TS 36.213 [22].

4.3.4.35 naics-Capability-List-r12

This field indicates that the UE supports NAICS, i.e. receiving assistance information from serving cell and using it to cancel or suppress interference of a neighbouring cell for at least one band combination. For each entry of the list, the

NAICS capability for a band combination is indicated as a combination of *numberOfNAICSCapableCC* and *numberOfAggregatedPRB.*

4.3.4.36 noResourceRestrictionForTTIBundling-r12

This field defines whether the UE supports TTI bundling operation without resource allocation restriction. It is mandatory for UEs of this release of the specification except for Category M1 UEs.

4.3.4.37 Void

4.3.4.38 discoverySignalsInDeactSCell-r12

This field defines whether the UE supports the behaviour on DL signals and physical channels when SCell is deactivated and discovery signals measurement is configured as specified in TS 36.211 [17]. A UE that supports this feature shall also support carrier aggregation and *crs-DiscoverySignalsMeas-r12*.

4.3.4.39 ul-64QAM-r12

This field defines whether the UE supports UL 64QAM. A UE that supports 64QAM in UL shall support 64QAM in UL in all supported frequency bands.

4.3.4.40 supportedMIMO-CapabilityDL-r12

This field defines the maximum number of spatial multiplexing layers in the downlink direction supported by the UE on a single component carrier for bandwidth classes that include multiple component carriers (i.e. bandwidth classes B, C, D and so on).

The support for more layers in *supportedMIMO-CapabilityDL-12* than given by the 'maximum number of supported layers for spatial multiplexing in DL' derived from the *ue-Category* or *ue-CategoryDL* in the *UE-EUTRA-Capability* IE is only applicable to transmission mode 9 and transmission mode 10.

4.3.4.41 alternativeTBS-Indices-r12

This field defines whether alternative TBS indices for I_{TBS} 26 and 33 as specified in TS 36.213 [22] are supported by the UE which is capable of transmission mode 9 or 10. Support of the alternative TBS index for I_{TBS} 33 is applied for the UE supporting 256QAM in DL.

4.3.4.42 codebook-HARQ-ACK-r13

This field defines whether HARQ ACK codebook size based on the DAI-based solution and/or the number of configured CCs as specified in TS 36.213 [22] is supported by the UE. For both solutions, it is mandatory for UEs of this release of the specification if carrier aggregation with more than 5 DL component carriers is supported.

4.3.4.43 fdd-HARQ-TimingTDD-r13

This field defines whether FDD HARQ timing for TDD SCell when configured with TDD PCell as specified in TS 36.213 [22] is supported by the UE.

4.3.4.44 maxNumberUpdatedCSI-Proc-r13

This field defines the maximum number of CSI processes to be updated per UE for which aperiodic CSI is requested for CA with more than 5CCs as specified in TS 36.213 [22] which is supported by the UE.

4.3.4.45 pucch-Format4-r13

This field defines whether PUCCH format 4 as specified in TS 36.213 [22] is supported by the UE. It is mandatory for UEs of this release of the specification if TDD carrier aggregation with more than 5 DL component carriers is supported. It is mandatory for UEs of this release of the specification if FDD carrier aggregation with more than [FFS] DL component carriers is supported.

4.3.4.46 pucch-Format5-r13

This field defines whether PUCCH format 5 as specified in TS 36.213 [22] is supported by the UE.

4.3.4.47 pucch-SCell-r13

This field defines whether PUCCH transmission on SCell in CA is supported by the UE.

4.3.4.48 supportedBlindDecoding-r13

This field defines blind decoding capabilities supported by the UE as specified in TS 36.213 [22].

4.3.4.48.1 maxNumberDecoding-r13

This field defines the maximum number of blind decodes in the UE specific search space per UE in one subframe for CA with more than 5CCs as specified in TS 36.213 [22] which is supported by the UE. The number of blind decodes supported by the UE is the field value * 32. The UE indicating the maximum number of blind decodes in this field shall also support *pdcch-CandidateReduction-r13* and/or *skipMonitoringDCI-Format0-1A-r13*.

4.3.4.48.2 pdcch-CandidateReductions-r13

This field defines whether the UE supports PDCCH candidate reduction on UE specific search space as specified in TS 36.213 [22, 9.1.1].

4.3.4.48.3 skipMonitoringDCI-Format0-1A-r13

This field defines whether the UE supports blind decoding reduction on UE specific search space by not monitoring DCI Format 0 and 1A as specified in TS 36.213 [22, 9.1.1].

4.3.4.49 crs-InterfMitigationTM10-r13

The field defines whether the UE supports CRS interference mitigation in transmission mode 10. The UE supporting the *crs-InterfMitigationTM10-r13* capability shall also support the *crs-InterfHandl-r11* capability.

4.3.4.49a crs-InterfMitigationTM1toTM9-r13

The field defines whether the UE supports CRS interference mitigation (IM) while operating in the following transmission modes (TM): TM 1, TM 2, …, TM 8 and TM 9. The UE shall not include the field if it does not support CRS IM in TMs 1-9. If the field is present, the UE supports CRS-IM on at least one arbitrary downlink CC for up to *crs-InterfMitigationTM1toTM9-r13* downlink CC CA configuration. The UE signals *crs-InterfMitigationTM1toTM9-r13* value to indicate the maximum *crs-InterfMitigationTM1toTM9-r13* downlink CC CA configuration where UE may apply CRS IM. For example, the UE sets "*crs-InterfMitigationTM1toTM9-r13* = 3" to indicate that the UE supports CRS-IM on at least one DL CC for supported non-CA, 2DL CA and 3DL CA configurations. The UE supporting the *crs-InterfMitigationTM1toTM9-r13* capability shall also support the *crs-InterfHandl-r11* capability.

4.3.4.50 pdsch-CollisionHandling-r13

This field defines whether PDSCH collision handling as specified in TS 36.213 [22] is supported by the UE.

4.3.4.51 aperiodicCSI-Reporting-r13

This field defines whether the UE supports aperiodic CSI reporting with 3 bits of the CSI request field size as specified in TS 36.213 [22, 7.2.1] and/or aperiodic CSI reporting mode 1-0 and mode 1-1 as specified in TS 36.213 [22, 7.2.1].

4.3.4.52 crossCarrierScheduling-B5C-r13

This field defines whether the UE supports cross carrier scheduling beyond 5 DL component carriers. If supported, the UE shall also support *crossCarrierScheduling-r10*, i.e., cross carrier scheduling up to 5 DL component carriers.

4.3.4.53 spatialBundling-HARQ-ACK-r13

This field defines whether the UE supports HARQ-ACK spatial bundling on PUCCH or PUSCH as specified in TS 36.213 [22, 7.3.1 and 7.3.2].

4.3.4.54 uci-PUSCH-Ext-r13

This field defines whether the UE supports an extension of UCI delivering more than 22 HARQ-ACK bits on PUSCH as specified in TS 36.212 [26, 5.2.2.6] and TS 36.213 [22, 8.6.3]. It is mandatory for UEs of this release of the specification if TDD carrier aggregation with more than 5 DL component carriers is supported. It is mandatory for UEs of this release of the specification if FDD carrier aggregation with more than [FFS] DL component carriers is supported.

4.3.4.55 multiTone-r13

This field defines whether the UE supports UL multi-tone transmissions on NPUSCH. This field is only applicable for UEs of any *ue-Category-NB*. It is mandatory for UEs of this release of the specification.

4.3.4.56 multiCarrier-r13

This field defines whether the UE supports multi-carrier operation. This field is only applicable for UEs of any *ue-Category-NB*. It is mandatory for UEs of this release of the specification.

4.3.4.57 cch-InterfMitigation-RefRecTypeA-r13

This field defines whether the UE supports Type A downlink control channel interference mitigation receiver "LMMSE-IRC + CRS-IC" for PDCCH/PCFICH/PHICH/EPDCCH receive processing (Enhanced downlink control channel performance requirements Type A in the TS 36.101 [6]).

4.3.4.58 cch-InterfMitigation-RefRecTypeB-r13

This field defines whether the UE supports Type B downlink control channel interference mitigation receiver "E-LMMSE-IRC + CRS-IC" for PDCCH/PCFICH/PHICH receive processing in synchronous networks (Enhanced downlink control channel performance requirements Type B in the TS 36.101 [6]). The UE supporting the capability defined by *cch-InterfMitigation-RefRecTypeB-r13* shall also support the capability defined by *cch-InterfMitigation-RefRecTypeA-r13*.

4.3.4.59 cch-InterfMitigation-MaxNumCCs-r13

This field indicates that the UE supports downlink control channel interference mitigation on at least one arbitrary downlink CC for up to *cch-InterfMitigation-MaxNumCCs* downlink CC CA configuration.

4.3.5 RF parameters

4.3.5.1 supportedBandListEUTRA

This field defines which E-UTRA radio frequency bands [6] are supported by the UE. For each band, support for either only half duplex operation, or full duplex operation is indicated. For TDD, the half duplex indication is not applicable.

4.3.5.1.1 ue-PowerClass-N-r13, ue-PowerClass-5-r13

These fields define for each supported E-UTRA band whether the UE supports power UE Power Class 1, 2, 4 or 5 for the band, as specified in TS 36.101 [6] and TS 36.307 [27]. Absence of these fields means that the UE supports the default UE Power Class for the band, as specified in TS 36.101 [6].

4.3.5.1.2 intraFreq-CE-NeedForGaps-r13

This field defines for each supported E-UTRA band whether measurement gaps are required to perform intra-frequency measurements on the E-UTRA band for UE in CE Mode A or CE Mode B.

4.3.5.1A supportedBandList-r13

This field defines which NB-IoT radio frequency bands [6] are supported by the UE. This field is only applicable for UEs of any *ue-Category-NB*.

4.3.5.1A.1 powerClassNB-20dBm-r13

This field defines whether the UE supports power class 20dBm in NB-IoT for the band, as specified in TS 36.101 [6].

4.3.5.2 supportedBandCombination

This field defines the carrier aggregation, MIMO and MBMS reception capabilities (via MBSFN or SC-PTM) supported by the UE for configurations with inter-band, intra-band non-contiguous, intra-band contiguous carrier aggregation and without carrier aggregation. For each band in a band combination the UE provides the supported CA bandwidth classes and the corresponding MIMO capabilities for downlink. The UE also has to provide the supported uplink CA bandwidth class and the corresponding MIMO capability for at least one band in the band combination. Applicability of provisioning uplink CA bandwidth class for each band in the band combinations is defined in TS 36.101 [6]. A MIMO capability applies to all carriers of a bandwidth class of a band in a band combination. For bandwidth classes that include multiple component carriers (i.e. bandwidth classes B, C, D and so on), the UE may also indicate a separate MIMO capability that applies to each individual carrier of a bandwidth class of a band in a band combination.

In all non-CA band combinations the UE shall indicate a bandwidth class supporting the maximum channel bandwidth defined for the band.

In all non-CA band combinations the UE shall indicate at least the number of layers for spatial multiplexing according to the UE"s Rel-8/9 category (Cat. 1-5). If the UE provides a Rel-10 category (Cat. 6-8) it shall indicate at least the number of layers according to that category for at least one band combination. In all other band combinations a UE indicating a category 2 and higher shall indicate support for at least 2 layers for downlink spatial multiplexing for all bands. The indicated number of layers for spatial multiplexing may exceed the number of layers required according to the category indicated by the UE. The carrier aggregation and MIMO capabilities indicated for at least one band combination together with modulation scheme shall meet the processing requirements defined by the physical layer parameter values in the UE category (i.e., maximum number of DL-SCH/UL-SCH transport block bits received/transmitted within a TTI, maximum number of bits of a DL-SCH/UL-SCH transport block received/transmitted within a TTI, and total number of soft channel bits for downlink).

NOTE: If the UE reports a subset of supported band combinations based on *requestedFrequencyBands* and/or *skipFallbackCombinations* and/or *maximumCCsRetrieval*, reported band combination(s) may or may not meet the processing requirements defined by the physical layer parameter values in the UE category.

The UE that supports MBMS reception via MBSFN shall support MBMS reception via MBSFN on the PCell of MCG, and it may indicate support for MBMS reception via MBSFN on configured SCells (*mbms-SCell*) and for any cell that may be additionally configured as an SCell (*mbms-NonServingCell*) according to this field. The UE that supports MBMS reception via SC-PTM shall support MBMS reception via SC-PTM on the PCell of MCG, and it may indicate support for MBMS reception via SC-PTM on configured SCells (*scptm-SCell*) and for any cell that may be additionally configured as an SCell (*scptm-NonServingCell*) according to this field. The UE shall apply the system information acquisition and change monitoring procedure relevant for MBMS operation for these cells.

The UE indicating more than one frequency in the *MBMSInterestIndication* message as specified in TS 36.331 [5] shall support simultaneous reception of MBMS (via MBSFN or SC-PTM) on the indicated frequencies when the frequencies of the configured serving cells and the indicated frequencies belong to at least one band combination.

NOTE: For the purposes of determining whether the carrier aggregation and MIMO capabilities indicated for a band combination meets the processing requirements defined by the physical layer parameter values in the UE category as described above, the carrier aggregation and MIMO capabilities indicated for a band combination is considered to meet the processing requirements if the UE supports the maximum processing requirements defined by the UE category assuming 20MHz channel bandwidth is supported on all bands.

While PCell is not changed, the UE shall support release of any SCell(s) or any uplink configuration of SCell(s) without requiring reconfiguration of parameters related to UE radio access capabilities for the remaining serving cell(s) in the fallback band combination, except for release of an SCell from a contiguous CA band configuration that results in a non-contiguous CA band configuration.

4.3.5.2.1 supportedBandCombinationReduced-r13

This field is used to indicate the carrier aggregation, MIMO and MBMS reception capabilities supported by the UE as defined in 4.3.5.2 if requested by E-UTRAN as specified in TS 36.331 [5]. All descriptions in 4.3.5.2 are applied for this field unless explicitly stated otherwise. It is mandatory for UEs supporting carrier aggregation beyond 5 component carriers.

If a CA band combination beyond 5 component carriers is included in this field, the UE supports Activation/Deactivation MAC Control Element of four octets as specified in TS 36.321 [4]. If a CA band combination beyond 5 component carriers with uplink is included in this field, the UE supports Extended PHR MAC Control Element supporting 32 serving cells with configured uplink as specified in TS 36.321 [4].

If the fallback band combinations for a given band combination are omitted in this field (see TS 36.331 [5]), the UE shall for all the omitted fallback band combinations support the same UE radio access capabilities as for the superset band combination.

4.3.5.3 multipleTimingAdvance

This field defines whether multiple timing advances are supported for each band combination supported by the UE. It is mandatory for UEs of this release of the specification to support this capability for band combinations having an UL on multiple FDD bands as specified in TS 36.101 [6]. If the band combination comprised of more than one band entry (i.e., inter-band or intra-band non-contiguous band combination), the field indicates that different timing advances on different band entries are supported. If the band combination comprised of one band entry (i.e., intra-band contiguous band combination), the field indicates that different timing advances across component carriers of the band entry are supported.

4.3.5.4 simultaneousRx-Tx

This field defines whether the UE supports simultaneous reception and transmission for inter-band TDD band combination.

4.3.5.5 supportedCSI-Proc-r11

This field defines the maximum number of CSI processes supported on a component carrier within a band with PDSCH transmission mode 10. For bandwidth classes that include multiple component carriers (i.e. bandwidth classes B, C, D and so on), the field defines the maximum number of CSI processes supported by the UE on all component carriers in the corresponding band.

4.3.5.6 freqBandRetrieval-r11

This parameter defines whether the UE supports reception of *requestedFrequencyBands* as specified in TS 36.331 [5].

4.3.5.7 dl-256QAM-r12

This field defines whether the UE supports 256QAM in DL. This field is only applicable for UEs of category 11-12 and UEs of DL category 11 and onwards. It is mandatory for UEs of DL category 13-14 and 17 to support this feature. A UE that supports 256QAM in DL shall support 256QAM in DL in all supported frequency bands.

4.3.5.8 supportedNAICS-2CRS-AP-r12

This field defines a bitmap points to the entries of *naics-Capability-List-r12* to indicate NAICS 2 CRS AP capability for the band combination.

4.3.5.9 dc-Support-r12

This field defines whether synchronous DC and power control mode 1 is supported by the UE which is capable of *extendedMaxMeasId*, *multipleTimingAdvance* for a given band combination. If the band combination entry is comprised of a single band, DC is supported for the intra-band contiguous band combination. If the band combination entry is comprised of multiple bands, DC is supported for the inter-band or intra-band non-contiguous band combination.

4.3.5.9.1 asynchronous-r12

In addition to the UE capability indicated by *dc-Support*, this field defines whether asynchronous DC and power control mode 2 is supported by the UE which is capable of *simultaneousRx-Tx*. If the band combination is comprised of a single band entry for more than two carriers, the UE shall support any permutations of carriers to CGs. If the concerning band combination is comprised of more than two band entries, the carriers corresponding to a band entry shall belong to one cell group. For this band combination, the UE may indicate the supported carrier permutations to CGs.

4.3.5.9.2 supportedCellGrouping-r12

In addition to the UE capability indicated by *asynchronous*, this field defines for which mapping of serving cells to cell groups (i.e. MCG or SCG) the UE supports asynchronous DC.

4.3.5.10 modifiedMPR-Behavior-r10

This field defines whether the UE supports modified MPR/A-MPR behaviours as specified in TS 36.101 [6].

4.3.5.11 freqBandPriorityAdjustment-r12

This field defines whether the UE supports the prioritization of the frequency bands in multiBandInfoList over the band in freqBandIndicator as defined by freqBandIndicatorPriority-r12 in TS 36.331 [5].

4.3.5.12 commSupportedBandsPerBC-r12

This field indicates, for a particular band combination, the bands on which the UE supports simultaneous reception of EUTRA and sidelink communication. If the UE indicates support simultaneous transmission (using *commSimultaneousTx-r12*), this field also indicates, for a particular band combination, the bands on which the UE supports simultaneous transmission of EUTRA and sidelink communication. The first bit refers to the first band indicated by *commSupportedBands-r12*, with value 1 indicating sidelink is supported simultaneously.

4.3.5.13 supportedCSI-Proc-r12

This field defines the maximum number of CSI processes with PDSCH transmission mode 10 supported by the UE on a single component carrier for bandwidth classes that include multiple component carriers (i.e. bandwidth classes B, C, D and so on).

4.3.5.14 fourLayerTM3-TM4-r10

This field defines whether the UE supports 4-layer spatial multiplexing with transmission mode 3 and transmission mode 4.

4.3.5.15 fourLayerTM3-TM4-perCC-r12

This field defines whether the UE supports 4-layer spatial multiplexing with transmission mode 3 and transmission mode 4 on a single component carrier for bandwidth classes that include multiple component carriers (i.e. bandwidth classes B, C, D and so on).

4.3.5.16 multiNS-Pmax-r10

This field defines whether the UE supports the mechanisms defined for cells broadcasting *NS-PmaxList* as specified in TS 36.331 [5].

4.3.5.16A multiNS-Pmax-r13

This field defines whether the UE supports the mechanisms defined for NB-IoT cells broadcasting *NS-PmaxList* as specified in TS 36.331 [5].

4.3.5.17 differentFallbackSupported-r13

This field defines whether the UE supports the different capabilities for at least one fallback case of the concerning band combination.

4.3.5.18 maximumCCsRetrieval-r13

This field defines whether the UE supports reception of *requestedMaxCCsDL* and *requestedMaxCCsUL*.

4.3.5.19 skipFallbackCombinations-r13

This field defines whether the UE supports receiving reception of *skipFallbackCombinations* that requests UE to exclude fallback band combinations from capability signalling.

4.3.5.20 Void

4.3.5.21 reducedIntNonContComb-r13

This field defines whether the UE supports receiving *requestReducedIntNonContComb*. If the UE supports *reducedIntNonContComb-r13*, the UE only includes one intra-band non-contiguous CA band combination, and exclude the other intra-band non-contiguous CA band combinations for which the presence of uplink CA bandwidth class in the band combination entry is different. One band combination entry can also indicate support of any other possible permutations in the presence of uplink CA bandwidth class where a paired downlink CA bandwidth class is the same or where the number of UL CCs is smaller than the one of paired DL CCs expressed by the CA bandwidth class.

For example, if the UE supports *reducedIntNonContComb-r13*, the UE only needs to report "DL: CA_42C-42A, UL: 42A paired with DL 42C", in order to indicate also support of "DL: CA_42C-42A, UL: 42A paired with DL 42A", "DL: CA_42A-42C, UL: 42A paired with DL 42A" and "DL: CA_42A-42C, UL: 42A paired with DL 42C".

For these band combinations not included in the capability, RF parameters specified within *BandCombinationParameters* or *BandCombinationParametersCommon* (e.g., *supportedMIMO-CapabilityUL*, *multipleTimingAdvance* if supported) and measurement parameters specified within *BandCombinationListEUTRA* are the same as the ones for the band combination included in the UE capability.

4.3.5.22 additionalRx-Tx-PerformanceReq-r13

This field indicates whether the UE supports the additional Rx and Tx performance requirement for a given band combination as specified in TS 36.101 [6].

4.3.5.23 maxLayersMIMO-Indication-r12

This field defines whether the UE supports the network configuration of *maxLayersMIMO* as specified in TS 36.331 [5].

If the UE supports *fourLayerTM3-TM4* or *intraBandContiguousCC-InfoList*, UE supports the configuration of *maxLayersMIMO* for these two cases regardless of indicating *maxLayersMIMO-Indication*.

4.3.6 Measurement parameters

4.3.6.1 interFreqNeedForGaps and interRAT-NeedForGaps

These fields define for each supported E-UTRA band whether measurement gaps are required to perform inter-frequency measurements on each supported E-UTRA radio frequency band and inter-RAT measurements on each supported RAT/band combination. A UE also indicates for each band combination as in the supportedBandCombination whether measurement gaps are required to perform inter-frequency measurements on each supported E-UTRA radio frequency band and inter-RAT measurements on each supported RAT/band combination.

4.3.6.2 rsrqMeasWideband

This field defines whether the UE can perform RSRQ measurements in RRC_IDLE and RRC_CONNECTED with wider bandwidth as specified in TS 36.133 [16].

4.3.6.3 timerT312-r12

This field defines whether the UE supports T312 as specified in TS 36.331 [5].

4.3.6.4 alternativeTimeToTrigger-r12

This field defines whether the UE supports alternativeTimeToTrigger as specified in TS 36.331 [5].

4.3.6.5 benefitsFromInterruption-r11

This field indicates whether the UE power consumption could benefit from being allowed to cause interruptions to serving cells when performing measurements of deactivated SCell carriers for *measCycleSCell* of less than 640ms, as specified in TS 36.133 [16].

4.3.6.6 incMonEUTRA-r12

This field defines whether the UE supports increased number of E-UTRA carrier monitoring in RRC_IDLE and RRC_CONNECTED as specified in TS 36.133 [16], and whether the UE supports extended number of cell re-selection priorities for EUTRA frequencies in *RRCConnectionRelease*, as specified in TS 36.331 [5]. It is mandatory for UEs of this release of the specification, except for Category 0 UEs.

A UE that supports increased number of E-UTRA carrier monitoring shall also support extended number of measurement identities.

4.3.6.7 incMonUTRA-r12

This field defines whether the UE supports increased number of UTRA carrier monitoring in RRC_IDLE and RRC_CONNECTED as specified in TS 36.133 [16].

A UE that supports increased number of UTRA carrier monitoring shall also support extended number of measurement identities.

4.3.6.8 extendedMaxMeasId-r12

This field defines whether the UE supports extended number of measurement identities as defined by *maxMeasId-r12* in TS 36.331 [5].

It is mandatory for UEs of this release of the specification if *incMonEUTRA-r12* or *incMonUTRA-r12* or *dc-Support-r12* or *extendedMaxObjectId-r13* is supported.

4.3.6.9 crs-DiscoverySignalsMeas-r12

This field defines whether the UE supports CRS based discovery signals measurement as specified in TS 36.331 [5], and PDSCH/EPDCCH RE mapping with zero power CSI-RS configured for discovery signals.

4.3.6.10 csi-RS-DiscoverySignalsMeas-r12

This field defines whether the UE supports CSI-RS based discovery signals measurement as specified in TS 36.331 [5]. A UE that supports this feature shall also support *crs-DiscoverySignalsMeas-r12*.

4.3.6.11 extendedRSRQ-LowerRange-r12

This field defines whether the UE supports the extended RSRQ lower value range from -34dB to -19.5dB in measurement configuration and reporting as specified in TS 36.133 [16].

4.3.6.12 rsrq-OnAllSymbols-r12

This field defines whether the UE supports the RSRQ measurement on all OFDM symbols as specified in TS 36.214 [23] and also the extended RSRQ upper value range from -3dB to 2.5dB in measurement configuration and reporting as specified in TS 36.133 [16]. If the UE supports *rsrq-OnAllSymbols-r12* and *rsrqMeasWideband* it shall also support the RSRQ measurement on all OFDM symbols with wider bandwidth.

4.3.6.13 rs-SINR-Meas-r13

This field defines whether the UE can perform RS-SINR measurements in RRC_CONNECTED as specified in TS 36.214 [23].

4.3.6.14 whiteCellList-r13

This field defines whether the UE supports configuration and use of white-listed cells as specified in TS 36.331 [5].

4.3.6.15 extendedFreqPriorities-r13

This field defines whether the UE supports extended E-UTRA frequency priorities as specified in TS 36.331 [5] and indicated by *cellReselectionSubPriority* field.

4.3.6.16 extendedMaxObjectId-r13

This field defines whether the UE supports extended number of measurement object identities as defined by *maxObjectId-r13* in TS 36.331 [5]. The field is mandatory present for the UE supporting the configuration of *sCellToAddModListExt*. A UE indicating support of *extendedMaxObjectId-r13* shall also indicate the support of *extendedMaxMeasId-r12*.

4.3.6.17 ul-PDCP-Delay-r13

This parameter defines whether the UE supports UL PDCP Packet Delay per QCI measurement as specified in TS 36.314 [25]. A UE that supports the UL PDCP Delay measurement shall also support the measurement configuration and reporting as specified in TS 36.331 [5].

4.3.6.18 Void

4.3.6.19 rssi-AndChannelOccupancyReporting-r13

This field defines whether the UE supports measurement and reporting for RSSI and channel occupancy. This field is only applicable if the UE supports downlink LAA operation.

4.3.6.20 multiBandInfoReport-r13

This field defines whether the UE supports the acquisition and reporting of multi band information for *reportCGI* as specified in TS 36.331 [5].

4.3.7 Inter-RAT parameters

4.3.7.1 *utraFDD*

This parameter defines whether the UE supports UTRA FDD.

A UE that supports UTRAN FDD shall support inter-RAT PS handover to UTRAN.

4.3.7.2 supportedBandListUTRA-FDD

Only applicable if the UE supports UTRA FDD. This field defines which UTRA FDD radio frequency bands are supported by the UE.

4.3.7.3 utraTDD128

This parameter defines whether the UE supports UTRA TDD 1.28 Mcps.

A UE that supports UTRAN TDD 1.28 Mcps shall support inter-RAT PS handover to UTRAN.

4.3.7.4 supportedBandListUTRA-TDD128

Only applicable if the UE supports UTRA TDD 1.28 Mcps. This field defines which UTRA TDD 1.28 Mcps radio frequency bands are supported by the UE.

4.3.7.5 utraTDD384

This parameter defines whether the UE supports UTRA TDD 3.84 Mcps.

A UE that supports UTRAN TDD 3.84 Mcps shall support inter-RAT PS handover to UTRAN.

4.3.7.6 supportedBandListUTRA-TDD384

Only applicable if the UE supports UTRA TDD 3.84 Mcps. This field defines which UTRA TDD 3.84 Mcps radio frequency bands are supported by the UE.

4.3.7.7 utraTDD768

This parameter defines whether the UE supports UTRA TDD 7.68 Mcps.

A UE that supports UTRAN TDD 7.68 Mcps shall support inter-RAT PS handover to UTRAN.

4.3.7.8 supportedBandListUTRA-TDD768

Only applicable if the UE supports UTRA TDD 7.68 Mcps. This field defines which UTRA TDD 7.68 Mcps radio frequency bands are supported by the UE.

4.3.7.9 *geran*

This parameter defines whether the UE supports GERAN.

4.3.7.10 supportedBandListGERAN

Only applicable if the UE supports GERAN. This field defines which GERAN radio frequency bands are supported by the UE.

4.3.7.11 interRAT-PS-HO-ToGERAN

Only applicable if the UE supports GERAN. This field defines whether the UE supports inter-RAT PS handover to GERAN.

4.3.7.12 cdma2000-HRPD

This parameter defines whether the UE supports HRPD.

4.3.7.13 supportedBandListHRPD

Only applicable if the UE supports HRPD. This field defines which HRPD radio frequency bands are supported by the UE.

4.3.7.14 tx-ConfigHRPD

Only applicable if the UE supports HRPD. This field defines whether the UE supports single or dual transmitter. With dual transmitter, UE can transmit simultaneously on both E-UTRAN and HRPD.

4.3.7.15 rx-ConfigHRPD

Only applicable if the UE supports HRPD. This field defines whether the UE supports single or dual receiver. With dual receiver, UE can receive simultaneously on both E-UTRAN and HRPD.

4.3.7.16 cdma2000-1xRTT

This parameter defines whether the UE supports 1xRTT.

4.3.7.17 supportedBandList1XRTT

Only applicable if the UE supports 1xRTT. This field defines which 1xRTT radio frequency bands are supported by the UE.

4.3.7.18 tx-Config1XRTT

Only applicable if the UE supports 1xRTT. This field defines whether the UE supports single or dual transmitter. With dual transmitter, UE can transmit simultaneously on both E-UTRAN and 1xRTT.

4.3.7.19 rx-Config1XRTT

Only applicable if the UE supports 1xRTT. This field defines whether the UE supports single or dual receiver. With dual receiver, UE can receive simultaneously on both E-UTRAN and 1xRTT.

4.3.7.20 e-CSFB-1XRTT

Only applicable if the UE supports CDMA2000 1xRTT. This field defines whether the UE supports enhanced 1xRTT CS fallback.

4.3.7.21 e-CSFB-ConcPS-Mob1XRTT

Only applicable if the UE supports CDMA2000 1xRTT and CDMA2000 HRPD simultaneously. This field defines whether the UE supports concurrent enhanced CS fallback to CDMA2000 1xRTT and handover/redirection to CDMA2000 HRPD.

4.3.7.22 e-RedirectionUTRA

This parameter defines whether the UE supports use of UTRA system information provided by *RRCConnectionRelease* upon redirection.

4.3.7.23 e-RedirectionGERAN

This parameter defines whether the UE supports use of GERAN system information provided by *RRCConnectionRelease* upon redirection.

A UE that supports CS fallback to GERAN shall support e-Redirection to GERAN.

4.3.7.24 *dtm*

This parameter defines whether the UE supports Dual Transfer Mode (DTM) in GERAN.

4.3.7.25 e-CSFB-dual-1XRTT

Only applicable if the UE supports CDMA2000 1xRTT, dual transmitter (i.e. UE can transmit simultaneously on both E-UTRAN and 1xRTT) and dual receiver (i.e. UE can receive simultaneously on both E-UTRAN and 1xRTT). This field defines whether the UE supports dual receiver/transmitter enhanced 1xRTT CS fallback (dual Rx/Tx e1xCSFB).

4.3.7.26 e-RedirectionUTRA-TDD

This parameter defines whether the UE supports redirection to multiple carrier frequencies both with and without using UTRA TDD system information for cells on multiple carrier frequencies provided by *RRCConnectionRelease*.

4.3.7.27 cdma2000-NW-Sharing-r11

Only applicable if the UE supports CDMA2000 1xRTT or CDMA2000 HRPD. This parameter defines whether the UE supports per PLMN CDMA2000 interworking in E-UTRAN shared networks as specified in TS 36.331 [5].

4.3.7.28 *mfbi-UTRA*

This field is only applicable for a UE supporting UTRA FDD. It indicates if the UE supports the signalling requirements of multiple radio frequency bands in a UTRA FDD cell, as defined in TS 25.307 [20].

4.3.7.29 supportedBandListWLAN

This field defines which WLAN radio frequency bands are supported by the UE.

4.3.8 General parameters

4.3.8.1 accessStratumRelease

This field defines the release of the E-UTRA layer 1, 2, and 3 specifications supported by the UE e.g. Rel-8, Rel-9, etc.

4.3.8.1A accessStratumRelease-r13

This field defines the release of the E-UTRA layer 1, 2, and 3 specifications supported by the UE e.g. Rel-13, Rel-14, etc. This field is only applicable for UEs of any *ue-Category-NB*.

4.3.8.2 deviceType

This field defines whether the device does not benefit from NW-based battery consumption optimisation.

4.3.8.3 Void

4.3.8.4 Void

4.3.8.5 multipleDRB-r13

This field defines whether the UE supports multiple DRBs. This field is only applicable if the UE supports User plane CIoT EPS Optimisation [5] and any *ue-Category-NB*. If a UE of this release supports multiple DRBs, the UE shall support two simultaneous DRBs.

4.3.9 Void

4.3.10 CSG Proximity Indication parameters

4.3.10.1 intraFreqProximityIndication

This parameter defines whether the UE supports proximity indication for intra-frequency E-UTRAN cells whose CSG Identities are in the UE"s CSG Whitelist.

4.3.10.2 interFreqProximityIndication

This parameter defines whether the UE supports proximity indication for inter-frequency E-UTRAN cells whose CSG Identities are in the UE"s CSG Whitelist.

4.3.10.3 utran-ProximityIndication

This parameter defines whether the UE supports proximity indication for UTRAN cells whose CSG IDs are in the UE"s CSG Whitelist.

4.3.11 Neighbour cell SI acquisition parameters

4.3.11.1 intraFreqSI-AcquisitionForHO

This parameter defines whether the UE supports, upon configuration of *si-RequestForHO* by the network, acquisition of relevant information from a neighbouring intra-frequency cell by reading the SI of the neighbouring cell using autonomous gaps and reporting the acquired information to the network as specified in TS 36.331 [5].

4.3.11.2 interFreqSI-AcquisitionForHO

This parameter defines whether the UE supports, upon configuration of *si-RequestForHO* by the network, acquisition of relevant information from a neighbouring inter-frequency cell by reading the SI of the neighbouring cell using autonomous gaps and reporting the acquired information to the network as specified in TS 36.331 [5].

4.3.11.3 utran-SI-AcquisitionForHO

This parameter defines whether the UE supports, upon configuration of *si-RequestForHO* by the network, acquisition of relevant information from a neighbouring UMTS cell by reading the SI of the neighbouring cell using autonomous gaps and reporting the acquired information to the network as specified in TS 36.331 [5].

4.3.12 SON parameters

4.3.12.1 rach-Report

This parameter defines whether the UE supports delivery of *rachReport* upon request from the network.

4.3.13 UE-based network performance measurement parameters

4.3.13.1 loggedMeasurementsIdle

This parameter defines whether the UE supports logged measurements in RRC_IDLE upon request from the network. A UE that supports logged measurements in RRC_IDLE shall also support a minimum of 64kB memory for log storage.

4.3.13.2 standaloneGNSS-Location

This parameter defines whether the UE is equipped with a standalone GNSS receiver that may be used to provide detailed location information in RRC measurement report and logged measurements in RRC_IDLE.

4.3.13.3 Void

4.3.13.4 loggedMBSFNMeasurements-r12

This parameter defines whether the UE supports logged MBSFN measurement in RRC_IDLE and RRC_CONNECTED upon request from the network. A UE that supports logged MBSFN measurements shall also support a minimum of 64kB memory for log storage. A UE that supports logged MBSFN measurements shall also support logged measurements in RRC_IDLE upon request from the network.

4.3.14 IMS Voice parameters

4.3.14.1 voiceOver-PS-HS-UTRA-FDD

Only applicable if the UE supports UTRA FDD. This parameter defines whether the UE supports IMS Voice in UTRA FDD according to GSMA IR.58 profile.

4.3.14.2 voiceOver-PS-HS-UTRA-TDD128

Only applicable if the UE supports UTRA TDD 1.28Mcps. This parameter defines whether the UE supports IMS Voice in UTRA TDD 1.28Mcps.

4.3.14.3 srvcc-FromUTRA-FDD-ToGERAN

Only applicable if the UE supports UTRA FDD and GERAN. This parameter defines whether the UE supports SRVCC handover from UTRA FDD PS HS to GERAN CS.

4.3.14.4 srvcc-FromUTRA-FDD-ToUTRA-FDD

Only applicable if the UE supports UTRA FDD. This parameter defines whether the UE supports SRVCC handover from UTRA FDD PS HS to UTRA FDD CS.

4.3.14.5 srvcc-FromUTRA-TDD128-ToGERAN

Only applicable if the UE supports UTRA TDD 1.28Mcps and GERAN. This parameter defines whether the UE supports SRVCC handover from UTRA TDD 1.28Mcps PS HS to GERAN CS.

4.3.14.6 srvcc-FromUTRA-TDD128-ToUTRA-TDD128

Only applicable if the UE supports UTRA TDD 1.28Mcps. This parameter defines whether the UE supports SRVCC handover from UTRA TDD 1.28Mcps PS HS to UTRA TDD 1.28Mcps CS.

4.3.15 Other parameters

4.3.15.1 Void

4.3.15.2 inDeviceCoexInd-r11

This parameter defines whether the UE supports in-device coexistence indication as well as autonomous denial functionality as specified in TS 36.331 [5].

4.3.15.3 powerPrefInd-r11

This parameter defines whether the UE supports power preference indication as specified in TS 36.331 [5].

4.3.15.4 ue-Rx-TxTimeDiffMeasurements-r11

This parameter defines whether the UE supports Rx - Tx time difference measurements as specified in TS 36.331 [5] and TS 36.355 [13]. A TDD UE of this release of the specification that supports UE Rx-Tx time difference measurements, shall support to report UE Rx-Tx time difference measurement result including $N_{TAoffset}$ according to EUTRAN TDD Rx-Tx time difference measurement report mapping as specified in TS 36.133 [16].

4.3.15.5 Void

4.3.15.6 Void

4.3.15.7 Void

4.3.15.8 inDeviceCoexInd-UL-CA-r11

This parameter defines whether the UE supports UL CA related in-device coexistence indication as specified in TS 36.331 [5]. A UE that supports UL CA related in-device coexistence indication shall also support in-device coexistence indication.

4.3.16 Positioning parameters

4.3.16.1 otdoa-UE-assisted

This parameter defines whether the UE supports UE-assisted OTDOA positioning as specified in TS 36.355 [13].

4.3.16.2 interFreqRSTDmeasurement

This parameter defines whether the UE supports inter-frequency RSTD measurements for OTDOA positioning as specified in TS 36.355 [13].

4.3.17 MBMS parameters

4.3.17.1 mbms-SCell-r11

This parameter defines whether the UE in RRC_CONNECTED supports MBMS reception via MBSFN on a frequency indicated in an *MBMSInterestIndication* message, when an SCell is configured on that frequency (regardless of whether the SCell is activated or deactivated), as specified in TS 36.331 [5].

4.3.17.2 mbms-NonServingCell-r11

This parameter defines whether the UE in RRC_CONNECTED supports MBMS reception via MBSFN on a frequency indicated in an *MBMSInterestIndication* message, where (according to *supportedBandCombination* and to network synchronization properties) a serving cell may be additionally configured, as specified in TS 36.331 [5]. If this is supported, the UE shall also support MBMS reception via MBSFN on a frequency when an SCell is configured on that frequency (regardless of whether the SCell is activated or deactivated), as specified in TS 36.331 [5].

4.3.17.3 mbms-AsyncDC-r12

This parameter defines whether the UE in RRC_CONNECTED supports MBMS reception via MBSFN on a frequency indicated in an *MBMSInterestIndication* message, where according to *supportedBandCombination*, the carriers are configured or can be configured as serving cells in the MCG and the SCG which are not synchronized, specified in TS 36.331 [5]. In this release of specification, it is mandatory to support this according to *MBMSInterestIndication* and indicated *supportedBandCombination*.

4.3.18 RAN-assisted WLAN interworking parameters

4.3.18.1 wlan-IW-RAN-Rules-r12

This parameter defines whether the UE supports RAN-assisted WLAN interworking based on access network selection and traffic steering rules specified in TS 36.304 [14]. A UE that supports RAN-assisted WLAN interworking based on access network selection and traffic steering rules specified in TS 36.304 [14] shall support to receive, via system information and dedicated signalling, the RAN assistance parameters relevant for those rules.

4.3.18.2 wlan-IW-ANDSF-Policies-r12

This parameter defines whether the UE supports RAN-assisted WLAN interworking based on ANDSF policies specified in TS 24.312 [21]. A UE that supports RAN-assisted WLAN interworking based on ANDSF policies specified in TS 24.312 [21] shall support to receive, via system information and dedicated signalling, the RAN assistance parameters relevant for those policies.

4.3.18.3 *rclwi-r13*

This parameter defines whether the UE supports RCLWI as specified in TS 36.331 [5]. A UE that supports RCLWI shall also support WLAN measurements.

4.3.19 MAC parameters

4.3.19.1 longDRX-Command-r12

This field defines whether the UE supports Long DRX Command MAC Control Element as specified in TS 36.321 [4]. It is mandatory for UEs of this release of the specification.

4.3.19.2 logicalChannelSR-ProhibitTimer-r12

This field defines whether the UE supports the *logicalChannelSR-ProhibitTimer* as specified in TS 36.321 [4]. It is mandatory for UEs of any *ue-Category-NB* to support this feature.

4.3.19.3 extendedMAC-LengthField-r13

This field defines whether the UE supports 16 bit length of MAC L field as specified in TS 36.321 [4].

4.3.19.4 extendedLongDRX-r13

This field defines whether the UE supports the *longDRX-Cycle* values of 5120 and 10240 subframes as specified in TS 36.321 [4].

4.3.20 Dual Connectivity parameters

4.3.20.1 drb-TypeSplit-r12

This field defines whether the DRB type of Split bearer is supported by the UE which is capable of DC.

4.3.20.2 drb-TypeSCG-r12

This field defines whether the DRB type of SCG bearer is supported by the UE which is capable of DC.

4.3.20.3 pdcp-TransferSplitUL-r13

This field defines whether the PDCP data transfer toward both CGs for split bearer in UL as specified in TS 36.323 [2] is supported by the UE which is capable of DC. This field is only applicable for UEs supporting the DRB type of Split bearer.

4.3.20.4 ue-SSTD-Meas-r13

This field defines whether the SSTD measurement between the PCell and the PSCell is supported by the UE which is capable of DC.

4.3.21 Sidelink parameters

4.3.21.1 commSupportedBands-r12

This field indicates the bands on which the UE supports sidelink communication, as defined in TS 23.303 [24] and specified in TS 36.331 [5]. If a UE supports sidelink communication on at least one band, the UE shall support sidelink communication transmission based on UE autonomous resource selection, eNB scheduled resource allocation, ProSe Per Packet Priority (PPPP) handling and out of coverage sidelink discovery. If a UE supports sidelink communication, the UE shall support 16 sidelink processes for reception of SL-SCH.

4.3.21.2 commSimultaneousTx-r12

This parameter indicates whether the UE supports simultaneous transmission of EUTRA and sidelink communication (on different carriers) in all bands for which the UE indicated simultaneous sidelink and EUTRA support in a band combination (using *commSupportedBandsPerBC*).

4.3.21.3 discSupportedBands-r12

This field indicates the bands on which the UE supports sidelink discovery, as defined in TS 23.303 [24] and specified in TS 36.331 [5].

4.3.21.4 discScheduledResourceAlloc-r12

This parameter indicates whether UE supports transmission of discovery announcements based on network scheduled resource allocation. It is mandatory for UEs of this release of the specification to support this feature if sidelink discovery is supported on at least one band (indicated by *discSupportedBands-r12*).

4.3.21.5 disc-UE-SelectedResourceAlloc-r12

This parameter indicates whether UE supports transmission of discovery announcements based on UE autonomous resource selection. It is mandatory for UEs of this release of the specification to support this feature if sidelink discovery is supported on at least one band (indicated by *discSupportedBands-r12*).

4.3.21.6 disc-SLSS-r12

This parameter indicates whether the UE supports SideLink Synchronization Signal (SLSS) transmission and reception for sidelink discovery.

4.3.21.7 discSupportedProc-r12

This parameter indicates the number of processes supported by the UE for reception of sidelink discovery. This field shall be present if sidelink discovery is supported on at least one band (indicated by *discSupportedBands-r12*).

4.3.21.8 commMultipleTx-r13

This parameter indicates whether the UE supports multiple transmissions of sidelink communication to different destinations in one SC period. If *commMultipleTx-r13* is set to supported then the UE supports 8 transmitting sidelink processes.

4.3.21.9 discInterFreqTx-r13

This parameter indicates whether the UE supports sidelink discovery announcements either a) on the primary frequency only or b) on other frequencies also, regardless of the UE configuration (e.g. CA, DC). The UE may set

discInterFreqTx-r13 to supported when having a separate transmitter or if it can request sidelink discovery transmission gaps.

4.3.21.10 discPeriodicSLSS-r13

This parameter indicates whether the UE supports periodic Sidelink Synchronization Signal (SLSS) transmission and reception for sidelink discovery. It is mandatory for UEs to support this feature if sidelink PS discovery is supported and it is optional otherwise.

4.3.21.11 discSysInfoReporting-r13

This parameter indicates whether the UE supports reporting of System Information for inter-frequency/PLMN sidelink discovery.

4.3.22 SC-PTM parameters

4.3.22.1 scptm-ParallelReception-r13

This parameter defines whether UEs supporting SC-PTM support the parallel reception of DL-SCH transport block(s) associated with G-RNTI/SC-RNTI and DL-SCH transport block(s) associated with C-RNTI/Semi-Persistent Scheduling C-RNTI as well as the parallel reception of multiple DL-SCH transport blocks associated with G-RNTI/SC-RNTI in the same subframe. In SC-PTM operation, the DL-SCH processing capability is shared between the DL-SCH transport block(s) associated with G-RNTI/SC-RNTI and the DL-SCH transport block(s) associated with C-RNTI/Semi-Persistent Scheduling C-RNTI. A UE that supports *scptm-ParallelReception-r13* shall also support SC-PTM reception in RRC_CONNECTED and in RRC_IDLE according to SC-PTM procedures as specified in TS 36.331 [5], TS 36.321 [4] and TS 36.304 [14].

4.3.22.2 Void

4.3.22.3 scptm-SCell-r13

This parameter defines whether UEs supporting SC-PTM support in RRC_CONNECTED, MBMS reception via SC-PTM on a frequency indicated in an *MBMSInterestIndication* message, when an SCell is configured on that frequency (regardless of whether the SCell is activated or deactivated), as specified in TS 36.331 [5].

4.3.22.4 scptm-NonServingCell-r13

This parameter defines whether UEs supporting SC-PTM support in RRC_CONNECTED, MBMS reception via SC-PTM on a frequency indicated in an *MBMSInterestIndication* message, where (according to *supportedBandCombination* and to network synchronization properties) a serving cell may be additionally configured, as specified in TS 36.331 [5]. If this is supported, the UE shall also support MBMS reception via SC-PTM on a frequency when an SCell is configured on that frequency (regardless of whether the SCell is activated or deactivated), as specified in TS 36.331 [5].

4.3.22.5 scptm-AsyncDC-r13

This parameter defines whether the UE in RRC_CONNECTED supports MBMS reception via SC-PTM on a frequency indicated in an *MBMSInterestIndication* message, where according to *supportedBandCombination*, the carriers are configured or can be configured as serving cells in the MCG and the SCG which are not synchronized, specified in TS 36.331 [5]. In this release of specification, it is mandatory to support this according to *MBMSInterestIndication* and indicated *supportedBandCombination*.

4.3.23 LAA parameters

4.3.23.1 downlinkLAA-r13

This field defines whether the UE supports downlink LAA operation including identification of downlink transmissions on LAA cell(s) for full downlink subframes, decoding of common downlink control signalling on LAA cell(s), CSI feedback for LAA cell(s), RRM measurements on LAA cell(s) based on CRS-based DRS.

4.3.23.2 crossCarrierSchedulingLAA-DL-r13

This field defines whether the UE supports cross-carrier scheduling from a licensed carrier for LAA cell(s). This field is only applicable if the UE supports downlink LAA operation.

4.3.23.3 csi-RS-DRS-RRM-MeasurementsLAA-r13

This field defines whether the UE supports performing RRM measurements on LAA cell(s) based on CSI-RS-based DRS. This field is only applicable if the UE supports downlink LAA operation.

4.3.23.4 endingDwPTS-r13

This field defines whether the UE supports reception ending with a subframe occupied for a DwPTS-duration on LAA cell(s) as described in TS 36.211 [17] and TS 36.213 [22]. This field is only applicable if the UE supports downlink LAA operation.

4.3.23.5 secondSlotStartingPosition-r13

This field defines whether the UE supports reception of subframes with second slot starting position on LAA cell(s) as described in TS 36.211 [17] and TS 36.213 [22]. This field is only applicable if the UE supports downlink LAA operation.

4.3.23.6 tm9-LAA-r13

This field defines whether the UE supports tm9 operation on LAA cell(s). This field is only applicable if the UE supports downlink LAA operation.

4.3.23.7 tm10-LAA-r13

This field defines whether the UE supports tm10 operation on LAA cell(s). This field is only applicable if the UE supports downlink LAA operation.

4.3.24 LWIP parameters

4.3.24.1 lwip-r13

This field defines whether the UE supports LWIP operation. A UE which supports LWIP operation shall also support WLAN measurements.

4.3.25 LWA parameters

4.3.25.1 *lwa-r13*

This parameter defines whether the UE supports LWA as specified in TS 36.331 [5]. A UE that supports LWA shall also support WLAN measurements. A UE that supports LWA shall also support switched bearer operation.

4.3.25.2 lwa-SplitBearer-r13

Only applicable if the UE supports LWA. This parameter defines whether the UE supports split bearer operation in LWA, i.e. the capability to receive data transmission for the same DRB on both LTE and WLAN simultaneously.

4.3.25.3 lwa-BufferSize-r13

Only applicable if the UE supports LWA. This field indicates whether the UE supports the layer 2 buffer sizes corresponding to 'with support for split bearers' columns defined in Tables 4.1-3 and 4.1A-3.

4.3.25.4 wlan-MAC-Address-r13

Only applicable if the UE supports LWA. This parameter defines the WLAN MAC address of the UE.

4.3.26 Void

4.3.26.1 Void

4.3.27 Inter-RAT parameters WLAN

4.3.27.1 supportedBandListWLAN-r13

Only applicable if the UE supports WLAN. This field defines which WLAN frequency bands are supported by the UE.

4.3.28 EBF FD-MIMO parameters

4.3.28.1 beamformed-r13

Indicates the UE capabilities concerning beamformed EBF/ FD-MIMO operation (class B), see TS 36.213 [22, 7.2.5]. The capabilities comprise of a list of pairs of {k-Max, n-MaxList} values with the n^{th} entry indicating the values that the UE supports for each CSI process in case n CSI processes would be configured, with:

- k-Max: Indicating the maximum number of NZP CSI RS resource configurations supported
- n-Max: Indicating the maximum number of NZP CSI RS ports supported within a CSI process.

The capability parameters are provided separately per transmission mode (TM9, TM10). The capability parameters may also be provided per band combination. Furthermore, capability parameters may be provided per UE, which are applicable for band combinations for which the concerned capabilities are not signalled.

4.3.28.2 channelMeasRestriction-r13

Indicates whether the UE supports channel measurement restriction, see TS 36.213 [22, 7.2.3]. The capability parameter is provided separately per transmission mode (TM9, TM10).

4.3.28.3 csi-RS-EnhancementsTDD-r13

Indicates whether the UE supports CSI-RS enhancements applicable for TDD, see TS 36.211 [17, 6.10.5]. The capability parameter is provided separately per transmission mode (TM9, TM10).

4.3.28.4 dmrs-Enhancements-r13

Indicates whether the UE supports DMRS enhancements for the indicated transmission mode, see TS 36.213 [22, 7.1.5B] and TS 36.212 [26, 5.3.3.1.5C/ D].

The capability parameter is provided separately per transmission mode (TM9, TM10). The capability parameter may also be provided per band combination. Furthermore, a capability parameter may be provided per UE, which is applicable for band combinations for which the concerned capabilities are not signalled.

4.3.28.5 interferenceMeasRestriction-r13

Indicates whether the UE supports interference measurement restriction, see TS 36.213 [22, 7.2].

4.3.28.6 nonPrecoded-r13

Indicates the UE capabilities concerning non-precoded EBF/ FD-MIMO operation (class A) for band combinations for which the concerned capabilities are not signalled, see TS 36.213 [22, 7.2].

- config1: Indicates support of configuration 1.
- config2: Indicates support of configuration 2.
- config3: Indicates support of configuration 3.
- config4: Indicates support of configuration 4.

The capability parameters are provided separately per transmission mode (TM9, TM10). The capability parameters may also be provided per band combination. Furthermore, capability parameters may be provided per UE, which are applicable for band combinations for which the concerned capabilities are not signalled.

4.3.28.7 srs-Enhancements-r13

Indicates for a particular transmission mode whether the UE supports SRS enhancements, see TS 36.211 [17, 5.5.3].

4.3.28.8 srs-EnhancementsTDD-r13

Indicates for a particular transmission mode whether the UE supports TDD specific SRS enhancements, see TS 36.211 [17, 4.2 and 5.5.3].

4.3.29 CE parameters

4.3.29.1 ce-ModeA-r13

This field defines whether the UE supports operation in coverage enhancement mode A, as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.331 [5], and PRACH CE levels 0 and 1 at Random Access, as specified in TS 36.321 [4]. It is mandatory for UEs of DL category M1 and UL category M1.

4.3.29.2 ce-ModeB-r13

This field defines whether the UE supports operation in coverage enhancement mode B, as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.331 [5], and PRACH CE levels 2 and 3 at Random Access, as specified in TS 36.321 [4]. A UE indicating support of *ce-ModeB-r13* shall also indicate support of *ce-ModeA-r13*.

4.3.29.3 intraFreqA3-CE-ModeA-r13

This field defines whether the UE when operating in CE Mode A supports *eventA3* for intra-frequency neighbouring cells in normal coverage and CE Mode A, as specified in TS 36.331 [5] and TS 36.133 [16]. It is mandatory for UEs of this release if *ce-ModeA-r13* is supported.

4.3.29.4 intraFreqA3-CE-ModeB-r13

This field defines whether the UE when operating in CE Mode B supports *eventA3* for intra-frequency neighbouring cells in normal coverage, CE Mode A and CE Mode B, as specified in TS 36.331 [5] and TS 36.133 [16]. It is mandatory for UEs of this release if *ce-ModeB-r13* is supported.

4.3.29.5 intraFreqHO-CE-ModeA-r13

This field defines whether the UE when operating in CE Mode A supports intra-frequency handover to target cell in normal coverage and CE Mode A, as specified in TS 36.331 [5] and TS 36.133 [16]. It is mandatory for UEs of this release if *ce-ModeA-r13* is supported.

4.3.29.6 intraFreqHO-CE-ModeB-r13

This field defines whether the UE when operating in CE Mode B supports intra-frequency handover to target cell in normal coverage, CE Mode A or CE Mode B, as specified in TS 36.331 [5] and TS 36.133 [16]. It is mandatory for UEs of this release if *ce-ModeB-r13* is supported.

4.3.29.7 ue-CE-NeedULGaps-r13

This field defines whether the UE needs UL gaps during continuous uplink transmission in half-duplex FDD as specified in TS 36.331 [5] and TS 36.211 [17].

5 Void

6 Optional features without UE radio access capability parameters

The following subclauses list the optional UE features not having UE radio access capability.

NOTE: This chapter does not yet contain complete analysis of all features of this release of specification.

6.1 CSG features

It is optional for UE to support some parts of CSG cell and hybrid cell reselection features as specified in TS 36.331 [5, B.2].

6.2 PWS features

6.2.1 ETWS

It is optional for UE to support ETWS reception as specified in TS 36.331 [5].

6.2.2 CMAS

It is optional for UE to support CMAS reception as specified in TS 36.331 [5].

6.2.3 KPAS

It is optional for UE to support KPAS reception as specified in TS 36.331 [5]. The Korean Public Alert System (KPAS) uses the same AS mechanisms as defined for CMAS. Therefore a KPAS-capable UE shall support all behaviour that is included in TS 36.331 [5] and TS 36.304 [14] for a CMAS-capable UE.

6.2.4 EU-Alert

It is optional for UE to support EU-Alert reception as specified in TS 36.331 [5]. The Europearn Union Warning System EU-Alert uses the same AS mechanisms as defined for CMAS. Therefore a EU-Alert-capable UE shall support all behaviour that is included in TS 36.331 [5] and TS 36.304 [14] for a CMAS-capable UE.

6.3 MBMS features

It is optional for UE to support MBMS procedures as specified in TS 36.331 [5].

6.3.1 MBMS Service Continuity

It is optional for UE to support MBMS Service Continuity for UEs supporting MBMS as specified in TS 36.331 [5].

6.3.2 MBMS reception with 256QAM

It is optional for UE to support MBMS reception with 256QAM for UEs supporting MBMS.

6.4 Void

6.5 Positioning features

6.5.0 Void

6.5.1 Void

6.6 UE receiver features

6.6.1 MMSE with IRC receiver

It is optional for UE to support MMSE with IRC receiver for all PDSCH transmission modes except for transmission mode 9.

6.6.2 MMSE with IRC receiver for PDSCH transmission mode 9

It is optional for UE to support MMSE with IRC receiver for PDSCH transmission mode 9, if the UE supports MMSE with IRC receiver as described in subclause 6.6.1.

6.7 RRC Connection

6.7.1 RRC Connection Reject with deprioritisation

It is optional for UE to support *RRCConnectionReject with deprioritisationReq* as specified in TS 36.331 [5].

6.7.2 RRC Connection Establishment Failure Temporary Qoffset

It is optional for UE to support RRC Connection Establishment failure temporary Qoffset as specified in TS 36.331 [5].

6.8 Other features

6.8.1 System Information Block Type 16

It is optional for UE, including UEs of any *ue- Category-NB*, to support the reception of *SystemInformationBlockType16* as specified in TS 36.331 [5].

6.8.2 QCI1 indication in Radio Link Failure Report

It is optional for the UE to include *drb-EstablishedWithQCI-1* in *RLF-Report* as specified in TS 36.331 [5].

6.9 Void

6.10 SON features

6.10.1 Radio Link Failure Report for inter-RAT MRO

It is optional for UE to include *previousUTRA-CellId* and *selectedUTRA-CellId* in *RLF-Report* upon request from the network as specified in TS 36.331 [5].

6.11 Mobility state features

6.11.1 Mobility history information storage

It is optional for UE to support the storage of mobility history information and the reporting in *UEInformationResponse* message as specified in TS 36.331 [5].

6.12 Void

6.13 Sidelink features

6.13.1 Sidelink Relay UE operation

It is optional for UE to support sidelink relay UE operation as specified in TS 36.331 [5].

6.13.2 Sidelink Remote UE operation

It is optional for UE to support sidelink remote UE operation as specified in TS 36.331 [5].

6.13.3 Sidelink discovery gap

It is optional for UE to support sidelink discovery gaps as specified in TS 36.331 [5].

6.14 DRX features

6.14.1 Extended DRX in RRC_IDLE

It is optional for UE to support extended DRX cycle values up to and beyond 10.24 seconds and paging in extended DRX in RRC_IDLE as specified in TS 36.331 [5] and TS 36.304 [14].

6.15 Load balancing features

6.15.1 Redistribution in RRC_IDLE

It is optional for UE to support redistribution in RRC_IDLE as specified in TS 36.331 [5] and TS 36.304 [14].

7 Conditionally Mandatory features

7.1 Access control features

7.1.1 SSAC

It is mandatory to support Service Specific Access Control subject to common and per PLMN access barring parameters as specified in TS 36.331 [5, 5.3.3.10] for UEs which are IMS voice capable in LTE.

7.1.2 CSFB Access Barring Control

It is mandatory to support CSFB Access Barring Control subject to common and per PLMN access barring parameters as specified in TS 36.331 [5, 5.3.3.2] for UEs which are supporting CSFB to UTRA or GERAN.

7.1.3 Extended Access Barring

It is mandatory to support Extended Access Barring check as specified in TS 36.331 [5, 5.3.3.12] for UEs which are supporting an access subject to Extended Access Barring.

7.1.4 ACDC

It is mandatory to support barring check for ACDC subject to common and per PLMN barring parameters for ACDC as specified in TS 36.331 [5, 5.3.3.13] for UEs which are supporting an access subject to ACDC.

7.2 Emergency call features

7.2.1 IMS emergency call

It is mandatory to support IMS emergency call for UEs which are IMS voice capable in LTE.

7.3 MAC features

7.3.1 SR mask

It is mandatory to support configuration indicated by *logicalChannelSR-Mask* for UE which have set bit number 29 of *featureGroupIndicators* to '1' as specified in TS 36.331 [5].

7.3.2 Power Management Indicator in PHR

Power management indicator in PHR is mandatory to support for UE applying additional power backoff due to power management (as allowed by $P\text{-}MPR_c$ [6]).

7.4 Inter-RAT Mobility features

7.4.1 High Priority CSFB redirection

It is mandatory to support the *RRCConnectionRelease* indicating *'cs-FallbackHighPriority'* for UEs which are supporting CSFB to UTRA as specified in TS 36.331 [5].

7.4.2 GERAN A/Gb mode to E-UTRAN Inter RAT handover (PS Handover)

It is mandatory to support at least parameter values corresponding to ue-Category 1 for UEs which are supporting GERAN A/Gb mode to E-UTRAN Inter RAT handover (PS Handover) as specified in TS 23.401 [18].

7.4.3 SRVCC to E-UTRAN from GERAN

It is mandatory to support at least parameter values corresponding to ue-Category 1, and ROHC profiles for an 'IMS capable UE supporting voice' as specified in subclause 4.3.1.1, for UEs which are supporting SRVCC to E-UTRAN from GERAN as specified in TS 23.216 [19].

NOTE: Requirements on functionality covered by Feature Group Indicators are specified in TS 36.331 [5, B.1].

7.5 Delay Tolerant Access Features

7.5.1 extendedWaitTime

It is mandatory to support the *RRCConnectionRelease* with *extendedWaitTime* and *RRCConnectionReject* with *extendedWaitTime* for UEs which support Delay Tolerant Access as specified in TS 36.331 [5].

7.6 RRC Connection

7.6.1 Void

7.7 Physical layer features

7.7.1 Different UL/ DL configuration for TDD inter-band carrier aggregation

It is mandatory to support different UL/ DL configuration for UEs supporting inter-band TDD carrier aggregation band combinations and for UEs supporting inter-band TDD dual connectivity band combinations within cell group(s) including at least two TDD bands.

7.7.2 Full duplex for TDD and FDD carrier aggregation

UE of this version of the specification shall be able to support simultaneous reception and transmission on different bands for each band combination including at least one FDD band and at least one TDD band.

7.7.3 Simultaneous transmission of PUCCH and PUSCH across PUCCH groups

It is mandatory to support simultaneous transmission of PUCCH and PUSCH cross PUCCH groups if the UE indicates support for *pucch-SCell*.

7.8 Positioning features

7.8.1 OTDOA Inter-frequency RSTD measurement indication

It is mandatory to support delivery of *InterFreqRSTDMeasurementIndication* as specified in TS 36.331 [5, 5.5.7] for UEs indicating support for inter-frequency RSTD measurements for OTDOA as specified in TS 36.355 [13] and requiring measurement gaps for performing these measurements.

7.9 Void

7.9.1 Void

7.10 Other features

7.10.1 Logged MDT measurement suspension due to IDC interference

It is mandatory to support Logged MDT measurement suspension due to IDC interference for UEs which are supporting logged measurements in RRC_IDLE upon request from the network and in-device coexistence indication as well as autonomous denial functionality as specified in TS 36.331 [5].

Annex A (informative): Guideline on maximum number of DL PDCP SDUs per TTI

In order to help the dimensioning of the UE design, values for the maximum number of DL PDCP SDUs per TTI from Table A-1 may be used.

Note: Due to the need for the network buffer data for efficient scheduling, values for Category 1 and 2 are same. It is not expected that category 1 UE has to sustain the same rate of PDCP SDUs per TTI as category 2 for prolonged period of time.

Table A-1: Maximum values for DL PDCP SDUs per TTI

UE Category / ue-CategoryDL	Maximum number of PDCP SDUs per TTI
Category 1	10
Category 2	10
Category 3	20
Category 4	30
Category 5	50
Category 6 / DL Category 6	50
Category 7 / DL Category 7	50
Category 9 / DL Category 9	80
Category 10 / DL Category 10	80
Category 11 / DL Category 11	100
Category 12 / DL Category 12	100
DL Category 13	65
DL Category 15	130
DL Category 16	180
DL Category 18	200
DL Category 19	280

Annex B (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
11/2007	RP-38	RP-070916			Presented for approval at TSG RAN-38	0.2.0	1.0.0
12/2007		-			Approved at TSG RAN-38 and placed under change control	1.0.0	8.0.0
03/2008	RP-39	RP-080194	0001	1	CR to 36.306 with Update to E-UTRA UE capabilities	8.0.0	8.1.0
05/2008	RP-40	RP-080409	0002	1	Update to E-UTRA UE capabilities: CR 0002r1 to 36.306 with status after RAN2 #62	8.1.0	8.2.0
03/2009	RP-43	RP-090126	0007	-	CR to remove the sections on MBMS	8.2.0	8.3.0
	RP-43	RP-090126	0008	-	Final values for L2 buffer sizes	8.2.0	8.3.0
	RP-43	RP-090126	0009	-	Various Corrections	8.2.0	8.3.0
	RP-43	RP-090126	0010	-	CR to update uplink transmit diversity (UE transmit antenna selection)	8.2.0	8.3.0
	RP-43	RP-090126	0011	-	Downlink PDCP SDU limitation	8.2.0	8.3.0
	RP-43	RP-090126	0014	-	Thoughts on UE capability for RoHC	8.2.0	8.3.0
	RP-43	RP-090126	0015	1	Capturing USIMless UE to stage 3	8.2.0	8.3.0
06/2009	RP-44	RP-090511	0016	2	Support of inter-RAT PS handover to GERAN Editor Note Removal	8.3.0	8.4.0
	RP-44	RP-090511	0017	1	Clarification of Half Duplex in TDD	8.3.0	8.4.0
	RP-44	RP-090511	0018	-	Correcting the maximum number of bits received during one TTI	8.3.0	8.4.0
	RP-44	RP-090511	0019	-	Clarification of field names used in TS 36.331	8.3.0	8.4.0
	RP-44	RP-090511	0021	-	Clarification on disabling E-UTRA capabilities with a USIM	8.3.0	8.4.0
09/2009	RP-45	RP-090906	0023	-	Unit for "Total layer 2 buffer size"	8.4.0	8.5.0
12/2009	RP-46	-	-		Upgrade to the Release 9 - no technical change	8.5.0	9.0.0
03/2010	RP-47	RP-100308	0024	1	CR to 36.306 on Optionality of Rel-9 UE features	9.0.0	9.1.0
	RP-47	RP-100308	0025	-	Introduction of power-limited device indication in UE capability.	9.0.0	9.1.0
	RP-47	RP-100308	0026	-	UE capability for enhanced 1xRTT CS fallback	9.0.0	9.1.0
	RP-47	RP-100285	0028	1	Bounds to RoHC requirements for IMS capable UEs supporting voice	9.0.0	9.1.0
	RP-47	RP-100309	0029	1	CR to 36.306 on Redirection enhancements to UTRAN	9.0.0	9.1.0
	RP-47	RP-100188	0030	1	Redirection enhancements to GERAN	9.0.0	9.1.0
06/2010	RP-48	RP-100556	0031	1	Clarification regarding / alignment of REL-9 UE capabilities	9.1.0	9.2.0
	RP-48	RP-100531	0033	-	Correction on the definition of ue-SpecificRefSigsSupported	9.1.0	9.2.0
09/2010	RP-49	RP-100853	0035	-	Clarification of MBMS UE capability	9.2.0	9.3.0
12/2010	RP-50	RP-101268	0037	-	Inclusion of new UE categories in Rel-10	9.3.0	10.0.0
03/2011	RP-51	RP-110290	0038	-	Description of carrier aggregation and MIMO capabilities	10.0.0	10.1.0
	RP-51	RP-110290	0039	-	L2 buffer sizes for Rel-10 categories	10.0.0	10.1.0
	RP-51	RP-110280	0041	-	CR to 36.306 adding UE capability indicator for dual Rx/Tx e1xCSFB	10.0.0	10.1.0
	RP-51	RP-110288	0042	1	UE UL&DL MIMO Capabilities	10.0.0	10.1.0
	RP-51	RP-110282	0043	-	Counter proposal to R2-110795 on UE capabilities for MDT	10.0.0	10.1.0
06/2011	RP-52	RP-110828	0048	-	Clarification of optionality of UE features without capability	10.1.0	10.2.0
	RP-52	RP-110830	0051	-	Options for CSFB to GSM	10.1.0	10.2.0
	RP-52	RP-110840	0056	1	CR to 36.306 on UE capabilities for Rel-10 LTE features	10.1.0	10.2.0
	RP-52	RP-110701	0058	2	CA and MIMO Capabilities in LTE Rel-10	10.1.0	10.2.0
	RP-52	RP-110839	0062	-	Introduction of UE capability for enhanced redirection to UTRA TDD	10.1.0	10.2.0
	RP-52	RP-110834	0063	2	Clarification of "supportedMIMO-CapabilityDL"	10.1.0	10.2.0
	RP-52	RP-110627	0064	-	Correction of "total number of soft channel bits" for category 6 and 7	10.1.0	10.2.0
09/2011	RP-53	RP-111291	0065	-	The SON feature in optional features without UE radio access capability parameters	10.2.0	10.3.0
	RP-53	RP-111283	0067	-	AdditionalSpectrumEmissions in CA	10.2.0	10.3.0
	RP-53	RP-111278	0069	-	Correction to UE capability parameters for handover to CSG cell	10.2.0	10.3.0
12/2011	RP-54	RP-111716	0070	1	Corrections to enhancedDualLayerTDD	10.3.0	10.4.0
	RP-54	RP-111710	0072	-	Optionality of SR Masking	10.3.0	10.4.0
	RP-54	RP-111709	0074	1	Optionality of UE Rx-Tx time difference report	10.3.0	10.4.0
	RP-54	RP-111714	0077	-	Correction to the number of soft channel bits	10.3.0	10.4.0
03/2012	RP-55	RP-120321	0078	-	Clarification on physical layer parameter values requirement	10.4.0	10.5.0
	RP-55	RP-120326	0080	1	Clarification on number of PDCP SDUs for categories 6-7 UEs	10.4.0	10.5.0
	RP-55	RP-120326	0082	-	UE processing requirement in the presence of MCH transmission	10.4.0	10.5.0
06/2012	RP-56	RP-120813	0090	-	Korean Public Alert System (KPAS) in relation to CMAS	10.5.0	10.6.0
	RP-56	RP-120813	0093	1	EU-Alert in relation to CMAS	10.5.0	11.0.0
09/2012	RP-57	RP-121359	0100	-	Voice support Capabilities	11.0.0	11.1.0

	RP-57	RP-121375	0103	-	Introducing MBMS enhancements	11.0.0	11.1.0
	RP-57	RP-121395	0105	-	Clarification on spatial multiplexing requirement in supportedBandCombination	11.0.0	11.1.0
12/2012	RP-58	RP-121936	0120	-	Power Management Indicator in PHR	11.1.0	11.2.0
	RP-58	RP-121936	0124	1	Clarification on UL CA in supportedBandCombination	11.1.0	11.2.0
	RP-58	RP-122002	0125	2	Introduction of Rel-11 UE features	11.1.0	11.2.0
	RP-58	RP-121960	0132	-	Broadcast of Time Info by Using a New SIB	11.1.0	11.2.0
03/2013	RP-59	RP-130243	0133	2	DL COMP capability related correction	11.2.0	11.3.0
	RP-59	RP-130233	0135	-	MIMO capability related correction	11.2.0	11.3.0
	RP-59	RP-130241	0137	-	Correction to supported DL MIMO capability for TM10	11.2.0	11.3.0
	RP-59	RP-130240	0138	-	Optional support of RLF report for inter-RAT MRO	11.2.0	11.3.0
	RP-59	RP-130248	0140	1	Corrections to UE capabiliy naming and definition	11.2.0	11.3.0
	RP-59	RP-130233	0142	-	Clarification on cross carrier scheduling capability	11.2.0	11.3.0
	RP-59	RP-130226	0146	-	Introduction of PDSCH TM5 capabilities for FDD and TDD	11.2.0	11.3.0
09/2013	RP-61	RP-131315	0151	-	Remove TBD in max MCH TB size table	11.3.0	11.4.0
	RP-61	RP-131314	0157	-	Clarification of InterFreqRSTDMeasurementIndication procedure support	11.3.0	11.4.0
12/2013	RP-62	RP-131986	0160	-	Introduction of capability bit for UTRA MFBI	11.4.0	11.5.0
	RP-62	RP-132003	0161	1	Capturing mandatory/optional agreements on Rel-11 UE features	11.4.0	11.5.0
	RP-62	RP-131991	0163	-	Clarification on eRedirection to UMTS TDD with multiple UMTS TDD frequencies	11.4.0	11.5.0
	RP-62	RP-131984	0165	-	Addition of inter-frequency RSTD measurement capability indicator for OTDOA	11.4.0	11.5.0
	RP-62	RP-131789	0166	1	MBMS reception on any configured or configurable SCell	11.4.0	11.5.0
	RP-62	RP-131993	0167	-	Enabling SRVCC from GERAN without forwarding UE-EUTRA-Capability	11.4.0	11.5.0
03/2014	RP-63	RP-140364	0168	1	New UE categories for DL 450Mbps class	11.5.0	11.6.0
	RP-63	RP-140349	0170	-	SS and common channel interference handling	11.5.0	11.6.0
	RP-63	RP-140354	0176	1	IoT indication for inter-band TDD CA with different UL/DL configuration	11.5.0	11.6.0
	RP-63	RP-140353	0173	1	Corrections to UE capability and feature descriptions	11.6.0	12.0.0
06/2014	RP-64	RP-140887	0181	-	Support of the enhancement for TTI bundling for FDD	12.0.0	12.1.0
	RP-64	RP-140888	0185	3	Alternative 1: Introduction of FDD/TDD CA full duplex support to 36.306	12.0.0	12.1.0
	RP-64	RP-140892	0190	1	Extended RLC LI field	12.0.0	12.1.0
	RP-64	RP-140873	0194	1	Network-requested CA Band Combination Capability Signalling	12.0.0	12.1.0
	RP-64	RP-140892	0196	1	Introduction of RRC Connection Establishment failure temporary Qoffset handling	12.0.0	12.1.0
	RP-64	RP-141028	0198	3	eMBMS reception on SCell and Non-Serving Cell	12.0.0	12.1.0
09/2014	RP-65	RP-141498	0218	1	The PDCP SDU number limitation for Category 9-10 UE	12.1.0	12.2.0
	RP-65	RP-141505	0215	-	UE capabilities for Hetnet mobility in TS 36.306	12.1.0	12.2.0
	RP-65	RP-141499	0212	-	Introduction of UE eIMTA capabilities	12.1.0	12.2.0
	RP-65	RP-141493	0205	-	Corrections to UE capabilities and features	12.1.0	12.2.0
	RP-65	RP-141507	0209	-	Introduction of MBSFN MDT capability	12.1.0	12.2.0
	RP-65	RP-141506	0207	2	Introduction of Category 0 for low complexity UEs	12.1.0	12.2.0
12.2014	RP-66	RP-142129	0225	-	Clarification on DL parallel reception of category 0 UEs	12.2.0	12.3.0
	RP-66	RP-142125	0228	-	Optional features for Hetnet mobility in TS 36.306	12.2.0	12.3.0
	RP-66	RP-142123	0230	-	Corrections to eIMTA capabilities	12.2.0	12.3.0
	RP-66	RP-142140	0243	-	Introduction of extended RSRQ value range and new RSRQ definition	12.2.0	12.3.0
	RP-66	RP-142132	0232	-	Support of Discovery Signals in TS 36.306	12.2.0	12.3.0
	RP-66	RP-142140	0247	-	Prohibit timer for SR	12.2.0	12.3.0
	RP-66	RP-142128	0241	1	UE capability for IncMon	12.2.0	12.3.0
	RP-66	RP-142115	0227	1	Introduction of capability for serving cell interruptions	12.2.0	12.3.0
	RP-66	RP-142134	0239	-	Introduction of missing Rel-12 UE capabilities	12.2.0	12.3.0
	RP-66	RP-142130	0245	1	Optionality support of UE mandatory features for Category 0 UEs	12.2.0	12.3.0
	RP-66	RP-142135	0238	1	Introduction of Dual Connectivity	12.2.0	12.3.0
	RP-66	RP-142139	0237	2	NAICS Capability	12.2.0	12.3.0
	RP-66	RP-142124	0229	2	Mandatory support of TTI bundling without resource allocation restriction for LTE coverage enhancements for Rel-12	12.2.0	12.3.0
	RP-66	RP-141981	0248	-	UE capability signaling for WLAN/3GPP radio interworking	12.2.0	12.3.0
	RP-66	RP-142232	0233	2	Support of 256QAM in TS 36.306	12.2.0	12.3.0
03/2015	RP-67	RP-150378	0265	-	UE capability for modified MPR behavior	12.3.0	12.4.0
	RP-67	RP-150373	0257	-	Correction to UE capabilities for Low Complexity UEs	12.3.0	12.4.0
	RP-67	RP-150373	0259	-	Clarification of TDD DC capability	12.3.0	12.4.0
	RP-67	RP-150373	0258	-	Extended number of measurement identities capability	12.3.0	12.4.0
	RP-67	RP-150373	0253	-	Introduction of total L2 buffer sizes for UEs supporting split bearers *NOTE: Modifications on L2 buffer sizes with support for split bearers for Cat 13-15 in Table 4.1-3 were moved to Table 4.1A-3 due to the clash with CR0261R1.*	12.3.0	12.4.0
	RP-67	RP-150374	0267	-	Introduction of ProSe	12.3.0	12.4.0

	RP-67	RP-150376	0266	1	Change related to configuration of the priority for frequency bands in mFBI	12.3.0	12.4.0
	RP-67	RP-150379	0261	1	Introduction of UL64QAM based on split of DL and UL categories	12.3.0	12.4.0
06/2015	RP-68	RP-150921	0269	-	Dual Connectivity L2 buffer size for category combinations with UL64QAM	12.4.0	12.5.0
	RP-68	RP-150917	0272	1	Corrections on MIMO capabilities	12.4.0	12.5.0
	RP-68	RP-150923	0277	-	Clarification on UL 64QAM capability	12.4.0	12.5.0
	RP-68	RP-150917	0276	-	UE support of CA fallback configurations	12.4.0	12.5.0
	RP-68	RP-150921	0283	1	Corrections on requirements of sidelink reception in TS 36.306	12.4.0	12.5.0
	RP-68	RP-150951	0280	1	Introduction of new DL UE categories 15&16	12.4.0	12.5.0
09/2015	RP-69	RP-151438	0287	-	Remove support of additionalSpectrumEmissionPCell	12.5.0	12.6.0
	RP-69	RP-151442	0288	-	Capturing PCell support for FDD-TDD CA	12.5.0	12.6.0
	RP-69	RP-151442	0292	-	Clarification of the maximum number of bits of a single DL-SCH transport block for DL Category 16	12.5.0	12.6.0
	RP-69	RP-151442	0293	-	Capturing mandatory/optional features of Rel-12 UEs	12.5.0	12.6.0
	RP-69	RP-151439	0298	-	CR for IDC signalling enhancement for UL CA	12.5.0	12.6.0
	RP-69	RP-151441	0289	1	Corrections on UE sidelink capabilities in TS 36.306	12.5.0	12.6.0
	RP-69	RP-151467	0290	2	Additional MIMO/CSI capability for intra-band contiguous CA	12.5.0	12.6.0
	RP-69	RP-151597	0296	3	Capability for 4-layer MIMO with TM3 and TM4	12.5.0	12.6.0
12/2015	RP-70	RP-152053	0309	-	Definitions of sidelink terminologies in TS 36.306	12.6.0	12.7.0
	RP-70	RP-152055	0310	-	Correction on categories in supportedBandCombination	12.6.0	12.7.0
	RP-70	RP-152048	0303	1	Clarification on support of extended wait time	12.6.0	12.7.0
	RP-70	RP-152053	0312	1	Clarification on tdd-FDD-CA-PCellDuplex	12.6.0	12.7.0
	RP-70	RP-152049	0299	2	Alternative new maximum transport block sizes for DL 64QAM and 256QAM in TM9/10	12.6.0	12.7.0
	RP-70	RP-152048	0318	-	Enabling multiple NS and P-Max operation per cell	12.6.0	12.7.0
	RP-70	RP-152055	0315	1	Correction on capability rsrq-OnAllSymbols	12.6.0	12.7.0
	RP-70	RP-152053	0313	1	Clarification on Pcell support	12.6.0	12.7.0
12/2015	RP-70	RP-152074	0301	1	Introduction of DC enhancement	12.7.0	13.0.0
	RP-70	RP-152078	0319	-	Introduction of Licensed-Assisted Access using LTE	12.7.0	13.0.0
	RP-70	RP-152075	0308	1	Introduction of RS-SINR measurements	12.7.0	13.0.0
	RP-70	RP-152080	0304	1	Introduction of SC-PTM	12.7.0	13.0.0
	RP-70	RP-152066	0314	-	Introduction of Application specific Congestion control for Data Communication in LTE	12.7.0	13.0.0
	RP-70	RP-152084	0311	1	White-list of cells for EUTRA measurement reporting	12.7.0	13.0.0
	RP-70	RP-152071	0305	2	Introduction of CA enhancement	12.7.0	13.0.0
	RP-70	RP-152076	0322	-	Introducing extended DRX	12.7.0	13.0.0
03/2016	RP-71	RP-160470	0323	1	Capture the UE capability for the extension of the MeasObjectId to 64	13.0.0	13.1.0
	RP-71	RP-160470	0330	-	Miscellaneous corrections to TS 36.306	13.0.0	13.1.0
	RP-71	RP-160460	0333	1	MDT enhancements support	13.0.0	13.1.0
	RP-71	RP-160460	0334	1	The introduction of UE capability concerning extended E-UTRA frequency priorities	13.0.0	13.1.0
	RP-71	RP-160459	0335	3	Introduction of LWIP UE capabilities	13.0.0	13.1.0
	RP-71	RP-160457	0337	2	Introducing LWA and RCLWI UE capabilities	13.0.0	13.1.0
	RP-71	RP-160460	0338	1	Leftover UE capabilities for LAA	13.0.0	13.1.0
	RP-71	RP-160470	0339	1	Minor corrections for CA enhancements	13.0.0	13.1.0
	RP-71	RP-160462	0341	1	Reference errors for inter-RAT capabilities	13.0.0	13.1.0
	RP-71	RP-160453	0342	1	UE capabilities for LC and CE	13.0.0	13.1.0
	RP-71	RP-160454	0343	2	Introduction of eD2D Capability	13.0.0	13.1.0
	RP-71	RP-160464	0344	2	Modification of network requested CA band combination retrieval for intra-band non-contiguous CA	13.0.0	13.1.0
	RP-71	RP-160467	0346	1	Correction on capability phy-TDD-ReConfig-FDD(TDD)-Pcell	13.0.0	13.1.0
	RP-71	RP-160470	0347	1	ANR in case of MFBI	13.0.0	13.1.0
	RP-71	RP-160455	0348	-	36.306 CR on TM10 CRS-IM UE capability report signalling introduction	13.0.0	13.1.0
	RP-71	RP-160470	0349	-	Introduction of capability on PDSCH collision handling	13.0.0	13.1.0
	RP-71	RP-160470	0350	1	Corrections on SC-PTM	13.0.0	13.1.0
	RP-71	RP-160470	0351	-	SC-PTM reception on non-Pcell	13.0.0	13.1.0
	RP-71	RP-160460	0352	1	Additional Layer 1 capabilities for Rel-13 CA enhancements	13.0.0	13.1.0
06/2016	RP-72	RP-161080	1321	-	Correction to WLAN measurement support for LWIP	13.1.0	13.2.0
	RP-72	RP-161080	1322	-	Introducing EBF/FD-MIMO capabilities	13.1.0	13.2.0
	RP-72	RP-161080	1315	-	Clarifications on LWA capability	13.1.0	13.2.0
	RP-72	RP-161080	1326	-	MBMS reception via MBSFN or SC-PTM	13.1.0	13.2.0
	RP-72	RP-161080	1329	-	Corrections on capability linking for measurement object extension	13.1.0	13.2.0
	RP-72	RP-161080	1327	2	Capturing a new capability signalling format for Rel-13 CA enhancements	13.1.0	13.2.0
	RP-72	RP-161080	1330	-	Correction on the value of maxmum channel bandwidth	13.1.0	13.2.0
	RP-72	RP-161080	1334	2	UE capabilities for eMTC	13.1.0	13.2.0
	RP-72	RP-161080	1333	1	UE Power Class in UE capability signaling	13.1.0	13.2.0
	RP-72	RP-161080	1314	2	Miscellaneous corrections to TS 36.306	13.1.0	13.2.0

	RP-72	RP-161080	1323	1	Clarification on eD2D capability	13.1.0	13.2.0
	RP-72	RP-161076	1317	-	Clarification on maximum number of DL-SCH transport block bits for DL Category 15 and 16	13.1.0	13.2.0
	RP-72	RP-161076	1318	-	UE capability of an additional Rx and Tx requirement for a CA band combination	13.1.0	13.2.0
	RP-72	RP-161081	1328	2	Introduction of NB-IoT UE capabilities	13.1.0	13.2.0
	RP-72	RP-161076	1320	2	Definition of a fallback band combination	13.1.0	13.2.0
09/2016	RP-73	RP-161761	1338	1	Support of CAT 9/10 and CAT 13	13.2.0	13.3.0
	RP-73	RP-161760	1346	2	Introduction of 1.2Gbps and 1.6Gbps UE categories in Rel-13	13.2.0	13.3.0
	RP-73	RP-161826	1347	2	Continuous uplink transmission in eMTC	13.2.0	13.3.0
	RP-73	RP-161751	1350	1	Indication of the maxLayersMIMO	13.2.0	13.3.0
	RP-73	RP-161759	1352	1	Supporting new UE Rx – Tx time difference mapping table	13.2.0	13.3.0
	RP-73	RP-161761	1353	-	Introducing UE capability of Rel 13 CCH IM	13.2.0	13.3.0
	RP-73	RP-161761	1354	-	Introducing UE capability of CRS-IM for TM 1-9	13.2.0	13.3.0
12/2016	RP-74	RP-162318	1363	1	Miscellaneous corrections to TS 36.306	13.3.0	13.4.0
	RP-74	RP-162318	1366	-	Clarification on UE power class 2 indication	13.3.0	13.4.0
	RP-74	RP-162317	1368	-	Correction on simultaneous transmission of PUCCH and PUSCH for B5C	13.3.0	13.4.0
	RP-74	RP-162317	1372	-	Definition of cch-InterfMitigation-MaxNumCCs	13.3.0	13.4.0
	RP-74	RP-162310	1376	1	Clarification on UE category requirement	13.3.0	13.4.0
	RP-74	RP-162314	1392	-	Correction on channel bandwidth definition for NB-IoT	13.3.0	13.4.0
	RP-74	RP-162554	1398	1	Introduction of new UL UE category 15 for 225Mbps	13.3.0	13.4.0

Note: In CR0313R1 " Clarification on Pcell support " for TS 36.306 v12.7.0 of RP-152053 which was approved by RAN #70 wrong CR number, 1313 used in CR coversheet due to a misallocation.

History

Document history		
V13.0.0	January 2016	Publication
V13.1.0	April 2016	Publication
V13.2.0	August 2016	Publication
V13.3.0	January 2017	Publication
V13.4.0	February 2017	Publication