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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

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.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP 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 5795: "The RObust Header Compression (ROHC) Framework".
- [8] IETF RFC 6846: "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".
- [28] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".
- [29] 3GPP TS 23.285: "Technical Specification Group Services and System Aspects; Architecture enhancements for V2X services".
- [30] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRAN); Overall description; Stage 2".
- [31] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description".
- [32] 3GPP TS 38.306 "NR; UE Radio Access Capabilities".
- [33] 3GPP TS 38.101-1: "NR User Equipment (UE) radio transmission and reception Part 1: Range 1 Standalone".
- [34] 3GPP TS 38.101-2: "NR User Equipment (UE) radio transmission and reception Part 2: Range 2 Standalone".
- [35] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".
- [36] 3GPP TS 38.215: "NR; Physical layer measurements".
- [37] 3GPP TS 38.133: "NR; Requirements for support of radio resource management".
- [38] 3GPP TS 37.340: "Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Multi-connectivity".
- [39] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".
- [40] 3GPP TS 38.323: "NR; Packet Data Convergence Protocol (PDCP) specification".
- [41] 3GPP TS 38.314: "NR; Layer 2 Measurements".

[42] 3GPP TS 23.287: "Technical Specification Group Services and System Aspects; Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services".

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 (parent band combination) by releasing at least one SCell or uplink configuration of SCell. A fallback band combination supports the same channel bandwidths for each carrier as its parent band combination. 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, V2X 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. In this version, the terminology "sidelink communication" without "V2X" prefix only concerns PS unless specifically stated otherwise.

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.

V2X sidelink communication: AS functionality enabling V2X Communication as defined in TS 23.285 [29], between nearby UEs, 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 |
| ANR | Automatic Neighbour Relation |
| BCCH | Broadcast Control Channel |
| CAS | Cell Acquisition Subframes |
| CFI | Control Format Indicator |
| CG | Cell Group |
| CRS | Cell-specific Reference Signal |
| CSG | Closed Subscriber Group |

| | |
|---------|--|
| CSI | Channel State Information |
| DC | Dual Connectivity |
| DCI | Downlink Control Information |
| DL-SCH | Downlink Shared Channel |
| EHC | Ethernet Header Compression |
| 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 |
| HSDN | High Speed Dedicated Network |
| IRC | Interference Rejection Combining |
| MAC | Medium Access Control |
| MMSE | Minimum Mean Squared Error |
| MO-EDT | Mobile Originated Early Data Transmission |
| MRO | Mobility Robustness Optimisation |
| MT-EDT | Mobile Terminated Early Data Transmission |
| MTSI | Multimedia Telephony Service for IMS |
| MUST | MultiUser Superposition Transmission |
| NAICS | Network Assisted Interference Cancellation/Suppression |
| NB-IoT | Narrow Band Internet of Things |
| OS | OFDM Symbol |
| 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 |
| PUR | Preconfigured Uplink Resource |
| PUSCH | Physical Uplink Shared Channel |
| QoE | Quality of Experience |
| RACH | Random Access CHannel |
| RAI | Release Assistance Indication |
| RAT | Radio Access Technology |
| RLC | Radio Link Control |
| RLF | Radio Link Failure |
| 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 |
| SPT | Short Processing Time |
| SR | Scheduling Request |
| SSAC | Service Specific Access Control |
| SSTD | SFN and Subframe Timing Difference |
| STTI | Short TTI |
| TDD | Time Division Duplex |
| TTI | Transmission Time Interval |
| UCI | Uplink Control Information |
| UDC | Uplink Data Compression |
| UE | User Equipment |
| UL-SCH | Uplink Shared Channel |
| UMTS | Universal Mobile Telecommunications System |
| UTRA | UMTS Terrestrial Radio Access |
| V2X | Vehicle-to-Everything |

WLAN Wireless Local Area Network

4 UE radio access capability parameters

The following clauses 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.

Unless otherwise stated, the requirements on the maximum number of transport block bits are applicable for a TTI length of 1 ms. For other TTI lengths, the requirements shall be scaled according to clause 7.1.7 or 11.1 in TS 36.213 [22] in order to get the corresponding requirement.

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

- *ue-Category-NB* in NB-IoT (clause 4.1C)
- *supportedROHC-Profiles-r13* (clause 4.3.1.1A)
- *maxNumberROHC-ContextSessions-r13* (clause 4.3.1.2A)
- *rlc-UM-r15* (clause 4.3.2.5)
- *multiTone-r13* (clause 4.3.4.55)
- *multiCarrier-r13* (clause 4.3.4.56)
- *twoHARQ-Processes-r14* (clause 4.3.4.62)
- *multiCarrier-NPRACH-r14* (clause 4.3.4.75)
- *multiCarrierPaging-r14* (clause 4.3.4.76)
- *interferenceRandomisation-r14* (clause 4.3.4.80)
- *wakeUpSignal-r15* (clause 4.3.4.113)
- *wakeUpSignalMinGap-eDRX-r15* (clause 4.3.4.114)
- *mixedOperationMode-r15* (clause 4.3.4.115)
- *sr-WithHARQ-ACK-r15* (clause 4.3.4.117)
- *sr-WithoutHARQ-ACK-r15* (clause 4.3.4.118)
- *nprach-Format2-r15* (clause 4.3.4.119)
- *multiCarrierPagingTDD-r15* (clause 4.3.4.134)
- *additionalTransmissionSIB1-r15* (clause 4.3.4.137)
- *npusch-3dot75kHz-SCS-TDD-r15* (clause 4.3.4.177)

- *npusch-MultiTB-r16* (clause 4.3.4.182)
- *npdsch-MultiTB-r16* (clause 4.3.4.183)
- *npusch-MultiTB-Interleaving-r16* (clause 4.3.4.192)
- *npdsch-MultiTB-Interleaving-r16* (clause 4.3.4.193)
- *multiTB-HARQ-AckBundling-r16* (clause 4.3.4.194)
- *groupWakeUpSignal-r16* (clause 4.3.4.195)
- *groupWakeUpSignalAlternation-r16* (clause 4.3.4.196)
- *subframeResourceResvUL-r16* (clause 4.3.4.197)
- *subframeResourceResvDL-r16* (clause 4.3.4.198)
- *slotSymbolResourceResvUL-r16* (clause 4.3.4.199)
- *slotSymbolResourceResvDL-r16* (clause 4.3.4.200)
- *npdsch-16QAM-r17* (clause 4.3.4.222)
- *npusch-16QAM-r17* (clause 4.3.4.223)
- *supportedBandList-r13* (clause 4.3.5.1A)
- *multiNS-Pmax-r13* (clause 4.3.5.16A)
- *powerClassNB-20dBm-r13* (clause 4.3.5.1A.1)
- *powerClassNB-14dBm-r14* (clause 4.3.5.1A.2)
- *dl-ChannelQualityReporting-r16* (clause 4.3.6.37)
- *connModeMeasIntraFreq-r17* (clause 4.3.6.49)
- *connModeMeasInterFreq-r17* (clause 4.3.6.50)
- *accessStratumRelease-r13* (clause 4.3.8.1A)
- *multipleDRB-r13* (clause 4.3.8.5)
- *earlyData-UP-r15* (clause 4.3.8.7)
- *earlySecurityReactivation-r16* (clause 4.3.8.11)
- *coverageBasedPaging-r17* (clause 4.3.8.16)
- *anr-Report-r16* (clause 4.3.12.2)
- *rach-Report-r16* (clause 4.3.12.3)
- *logicalChannelSR-ProhibitTimer* (clause 4.3.19.2)
- *dataInactMon-r14* (clause 4.3.19.9)
- *rai-Support-r14* (clause 4.3.19.10)
- *earlyContentionResolution-r14* (clause 4.3.19.14)
- *sr-SPS-BSR-r15* (clause 4.3.19.15)
- *rai-SupportEnh-r16* (clause 4.3.19.22)
- *earlyData-UP-5GC-r16* (clause 4.3.36.9)
- *pur-CP-EPC-r16* (clause 4.3.37.1)

- *pur-UP-EPC-r16* (clause 4.3.37.2)
- *pur-CP-5GC-r16* (clause 4.3.37.3)
- *pur-UP-5GC-r16* (clause 4.3.37.4)
- *pur-CP-L1Ack-r16* (clause 4.3.37.5)
- *pur-NRSRP-Validation-r16* (clause 4.3.37.6)
- *ntn-Connectivity-EPC-r17* (clause 4.3.38.1)
- *ntn-TA-Report-r17* (clause 4.3.38.2)
- *ntn-PUR-TimerEnhancement-r17* (clause 4.3.38.3)

The UE radio access capabilities specified in clause 4 are not applicable in NB-IoT, unless they are listed above.

Editor's Note: Whether all the capabilities listed above for NB-IoT are also applicable for NTN Access or separate indication is needed for sub-set of capabilities to be updated here.

The following optional features without UE radio access capability parameters specified in clause 6 are applicable in NB-IoT:

- RRC Connection Re-establishment for the Control Plane CIoT EPS Optimization (clause 6.7.5)
- System Information Block Type 16 (clause 6.8.1)
- Enhanced random access power control (clause 6.8.3)
- MT-EDT for Control Plane CIoT EPS Optimisation (clause 6.8.10)
- MT-EDT for User Plane CIoT EPS Optimisation (clause 6.8.11)
- EDT for Control Plane CIoT EPS Optimization (clause 6.8.4)
- Enhanced PHR (clause 6.8.6)
- Carrier specific NRSRP thresholds for NPRACH resource selection (clause 6.8.15)
- Radio Link Failure Report for NB-IoT (clause 6.10.2)
- SC-PTM in Idle mode (clause 6.16.1)
- Multiple TB scheduling for SC-PTM in Idle mode for NB-IoT (clause 6.16.2)
- Relaxed monitoring (clause 6.17.1)
- DL channel quality reporting in Msg3 for the anchor carrier (clause 6.17.2)
- Serving cell idle mode measurements reporting (clause 6.17.3)
- NSSS-Based RRM measurements (clause 6.17.4)
- NPBCH-Based RRM measurements (clause 6.17.5)
- RRM measurements on non-anchor paging carriers (clause 6.17.6)
- NRS presence on non-anchor paging carriers (clause 6.17.7)
- DL channel quality reporting in Msg3 for non-anchor carrier (clause 6.17.8)
- Assistance information for inter-RAT cell selection to/from NB-IoT (clause 6.17.9)
- RRC Connection Re-establishment for the Control Plane CIoT 5GS Optimisation (clause 6.18.3)
- NB-IoT/5GC (clause 6.18.4)
- MO-EDT for Control Plane CIoT 5GS Optimisation (clause 6.18.5)

- AS RAI (clause 6.18.6)
- Cell Reselection Measurements Triggering based on Service Time (clause 6.19.1)

The optional features without UE radio access capability parameters specified in clause 6 are not applicable in NB-IoT, unless they are listed above.

Editor's Note: Whether all the capabilities listed above for NB-IoT are also applicable for NTN Access or separate indication is needed for sub-set of capabilities to be updated here.

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 clause 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 clause 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. For a BL UE, Table 4.1A-7 defines the only combinations for UE UL and DL Categories that are allowed to be signalled with *ue-CategoryDL* and *ue-CategoryUL*, and 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*. A UE indicating Category M2 shall also indicate Category M1.

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 (Note 4) | 1000 or 1736 | 1000 or 1736 | 25344 or 43008 | 1 |
| DL Category M2 | 4008 | 4008 | 73152 | 1 |
| DL Category 0 (Note 2) | 1000 | 1000 | 25344 | 1 |
| DL Category 1bis | 10296 | 10296 | 250368 | 1 |
| DL Category 4 | 150752 | 75376 | 1827072 | 2 |
| 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 | 749856-807744 (Note 3) | 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) | 9744384 | 2 or 4 |
| DL Category 16 | 978960 -1051360 (Note 3) | 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) | 12789504 | 2 or 4 |
| DL Category 17 | 25065984 | 391656 (8 layers, 256QAM) | 303562752 | 8 |

| | | | | |
|----------------|------------------------------|---|----------|-------------|
| DL Category 18 | 1174752-1211616 (Note 3) | 299856 (8 layers, 64QAM) 391656 (8 layers, 256QAM) 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) | 14616576 | 2 or 4 or 8 |
| DL Category 19 | 1566336 -1658272 (Note 3) | 299856 (8 layers, 64QAM) 391656 (8 layers, 256QAM) 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) | 19488768 | 2 or 4 or 8 |

| | | | | |
|----------------|-------------------------------|--|----------|-------------|
| DL Category 20 | 1948064 - 2019360 (Note 3) | 299856 (8 layers, 64QAM) 391656 (8 layers, 256QAM), 502624 (8 layers, 1024QAM) 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 251640 (4 layers, 1024QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 125808 (2 layers, 1024QAM) | 24360960 | 2 or 4 or 8 |
| DL Category 21 | 1348960 - 1413120 (Note 3) | 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) | 17052672 | 2 or 4 |

| | | | | |
|----------------|-------------------|--|----------|-------------|
| DL Category 22 | 2349504 – 2562784 | <p>299856 (8 layers, 64QAM) 391656 (8 layers, 256QAM) 502624 (8 layers, 1024QAM) 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 251640 (4 layers, 1024QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 125808 (2 layers, 1024QAM)</p> | 29233152 | 2 or 4 or 8 |
| DL Category 23 | 2695968 – 2869920 | <p>299856 (8 layers, 64QAM) 391656 (8 layers, 256QAM) 502624 (8 layers, 1024QAM) 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 251640 (4 layers, 1024QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 125808 (2 layers, 1024QAM)</p> | 34105344 | 2 or 4 or 8 |

| | | | | |
|----------------|-------------------|--|----------|-------------|
| DL Category 24 | 2936880 – 3028608 | <p>299856 (8 layers, 64QAM) 391656 (8 layers, 256QAM) 502624 (8 layers, 1024QAM) 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 251640 (4 layers, 1024QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 125808 (2 layers, 1024QAM)</p> | 36541440 | 2 or 4 or 8 |
| DL Category 25 | 3132672 – 3316544 | <p>299856 (8 layers, 64QAM) 391656 (8 layers, 256QAM) 502624 (8 layers, 1024QAM) 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 251640 (4 layers, 1024QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 125808 (2 layers, 1024QAM)</p> | 38977536 | 2 or 4 or 8 |

| | | | | |
|--|------------------|---|----------|-------------|
| DL Category 26 | 3422400– 3531888 | 299856 (8 layers, 64QAM) 391656 (8 layers, 256QAM) 502624 (8 layers, 1024QAM) 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 201936 (4 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 251640 (4 layers, 1024QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is not supported) 100752 (2 layers, 256QAM, if <i>alternativeTBS-Index-r14</i> is supported) 125808 (2 layers, 1024QAM) | 42631680 | 2 or 4 or 8 |
| <p>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.</p> <p>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.</p> <p>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.</p> <p>NOTE 4: The UE supports "Maximum number of DL-SCH transport block bits received within a TTI" and "Maximum number of bits of a DL-SCH transport block received within a TTI" of 1736 bits and "Total number of soft channel bits" of 43008 bits if the UE indicates support of <i>ce-PDSCH-MaxTBS-r17</i>. Otherwise the UE supports "Maximum number of DL-SCH transport block bits received within a TTI" and "Maximum number of bits of a DL-SCH transport block received within a TTI" of 1000 bits and "Total number of soft channel bits" of 25344 bits.</p> | | | | |

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 | Support for 256QAM in UL |
|--|--|--|-------------------------|--------------------------|
| UL Category M1 (Note 1) | 1000 or 2984 | 1000 or 2984 | No | No |
| UL Category M2 | 6968 | 6968 | No | No |
| UL Category 0 | 1000 | 1000 | No | No |
| UL Category 1bis | 5160 | 5160 | No | No |
| UL Category 3 | 51024 | 51024 | No | No |
| UL Category 5 | 75376 | 75376 | Yes | No |
| UL Category 7 | 102048 | 51024 | No | No |
| UL Category 8 | 1497760 | 149776 | Yes | No |
| UL Category 13 | 150752 | 75376 | Yes | No |
| UL Category 14 | 9585664 | 149776 | Yes | No |
| UL Category 15 | 226128 | 75376 | Yes | No |
| UL Category 16 | 105528 | 105528 | Yes | Yes |
| UL Category 17 | 2119360 | 211936 | Yes | Yes |
| UL Category 18 | 211056 | 105528 | Yes | Yes |
| UL Category 19 | 13563904 | 211936 | Yes | Yes |
| UL Category 20 | 316584 | 105528 | Yes | Yes |
| UL Category 21 | 301504 | 75376 | Yes | No |
| UL Category 22 | 422112 | 105528 | Yes | Yes |
| UL Category 23 | 527640 | 105528 | Yes | Yes |
| UL Category 24 | 633168 | 105528 | Yes | Yes |
| UL Category 25 | 738696 | 105528 | Yes | Yes |
| UL Category 26 | 844224 | 105528 | Yes | Yes |
| NOTE 1: The UE supports "Maximum number of UL-SCH transport block bits transmitted within a TTI" and "Maximum number of bits of an UL-SCH transport block transmitted within a TTI" of 2984 bits if the UE indicates support of <i>ce-PUSCH-NB-MaxTBS-r14</i> . Otherwise the UE supports 1000 bits. | | | | |

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 [bytes] |
|-------------------------|------------------|-----------------------------------|--|
| DL Category M1 (Note 1) | UL Category M1 | 20 000 or 40 000 | N/A |
| DL Category M2 | UL Category M2 | 100 000 | N/A |
| DL Category 0 | UL Category 0 | 20 000 | N/A |
| DL Category 1bis | UL Category 1bis | 150 000 | 230 000 |
| DL Category 4 | UL Category 5 | 2 200 000 | 3 300 000 |
| DL Category 6 | UL Category 5 | 3 500 000 | 6 000 000 |
| DL Category 6 | UL Category 16 | 3 800 000 | 6 300 000 |
| DL Category 7 | UL Category 13 | 4 200 000 | 6 700 000 |
| DL Category 7 | UL Category 18 | 4 800 000 | 7 300 000 |
| DL Category 9 | UL Category 5 | 5 000 000 | 7 400 000 |
| DL Category 9 | UL Category 16 | 5 200 000 | 7 700 000 |
| DL Category 10 | UL Category 13 | 5 700 000 | 8 100 000 |
| DL Category 10 | UL Category 18 | 6 200 000 | 8 700 000 |
| DL Category 11 | UL Category 5 | 6 400 000 | 11 300 000 |
| DL Category 11 | UL Category 16 | 6 600 000 | 11 500 000 |
| DL Category 12 | UL Category 13 | 7 100 000 | 12 000 000 |
| DL Category 12 | UL Category 15 | 7 700 000 | 12 600 000 |
| DL Category 12 | UL Category 18 | 7 600 000 | 12 500 000 |
| DL Category 12 | UL Category 20 | 8 600 000 | 13 500 000 |
| 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 13 | UL Category 16 | 4 700 000 | 7 800 000 |
| DL Category 13 | UL Category 18 | 5 700 000 | 8 800 000 |
| DL Category 14 | UL Category 8 | 50 800 000 | 76 200 000 |
| DL Category 14 | UL Category 17 | 56 600 000 | 82 000 000 |
| 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 15 | UL Category 16 | 8 500 000 | 13 700 000 |
| DL Category 15 | UL Category 18 | 9 500 000 | 14 700 000 |
| 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 16 | UL Category 16 | 8 500 000 | 13 700 000 |
| DL Category 16 | UL Category 18 | 11 800 000 | 18 700 000 |
| DL Category 16 | UL Category 20 | 12 800 000 | 19 700 000 |
| DL Category 17 | UL Category 14 | 330 000 000 | 530 000 000 |
| DL Category 17 | UL Category 19 | 360 000 000 | 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 18 | UL Category 16 | 12 300 000 | 22 100 000 |
| DL Category 18 | UL Category 18 | 13 300 000 | 23 100 000 |
| DL Category 18 | UL Category 20 | 14 300 000 | 24 100 000 |
| 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 |
| DL Category 19 | UL Category 16 | 16 500 000 | 28 800 000 |
| DL Category 19 | UL Category 18 | 17 500 000 | 29 800 000 |
| DL Category 19 | UL Category 20 | 18 500 000 | 30 800 000 |
| DL Category 19 | UL Category 21 | 18 400 000 | 30 600 000 |
| DL Category 20 | UL Category 3 | 19 400 000 | 35 800 000 |

| | | | |
|--|----------------|------------|------------|
| DL Category 20 | UL Category 5 | 19 600 000 | 36 000 000 |
| DL Category 20 | UL Category 7 | 19 900 000 | 36 300 000 |
| DL Category 20 | UL Category 13 | 20 300 000 | 36 800 000 |
| DL Category 20 | UL Category 15 | 21 100 000 | 37 500 000 |
| DL Category 20 | UL Category 16 | 19 900 000 | 36 300 000 |
| DL Category 20 | UL Category 18 | 20 900 000 | 37 300 000 |
| DL Category 20 | UL Category 20 | 21 900 000 | 38 300 000 |
| DL Category 20 | UL Category 21 | 21 800 000 | 38 200 000 |
| DL Category 21 | UL Category 3 | 13 700 000 | 23 500 000 |
| DL Category 21 | UL Category 5 | 13 900 000 | 23 700 000 |
| DL Category 21 | UL Category 7 | 14 200 000 | 24 000 000 |
| DL Category 21 | UL Category 13 | 14 600 000 | 24 400 000 |
| DL Category 21 | UL Category 15 | 15 300 000 | 25 200 000 |
| DL Category 21 | UL Category 16 | 14 200 000 | 24 000 000 |
| DL Category 21 | UL Category 18 | 15 200 000 | 25 000 000 |
| DL Category 21 | UL Category 20 | 16 200 000 | 26 000 000 |
| DL Category 22 | UL Category 20 | 26 600 000 | 47 000 000 |
| DL Category 22 | UL Category 22 | 27 500 000 | 48 000 000 |
| DL Category 22 | UL Category 23 | 30 500 000 | 51 300 000 |
| DL Category 22 | UL Category 24 | 32 400 000 | 57 000 000 |
| DL Category 22 | UL Category 25 | 35 000 000 | 59 900 000 |
| DL Category 22 | UL Category 26 | 38 000 000 | 67 600 000 |
| DL Category 23 | UL Category 20 | 29 500 000 | 50 400 000 |
| DL Category 23 | UL Category 22 | 28 500 000 | 49 000 000 |
| DL Category 23 | UL Category 23 | 31 500 000 | 52 300 000 |
| DL Category 23 | UL Category 24 | 33 300 000 | 57 900 000 |
| DL Category 23 | UL Category 25 | 36 000 000 | 60 900 000 |
| DL Category 23 | UL Category 26 | 39 000 000 | 68 600 000 |
| DL Category 24 | UL Category 20 | 31 400 000 | 56 000 000 |
| DL Category 24 | UL Category 22 | 29 500 000 | 50 000 000 |
| DL Category 24 | UL Category 23 | 32 400 000 | 53 300 000 |
| DL Category 24 | UL Category 24 | 34 300 000 | 58 900 000 |
| DL Category 24 | UL Category 25 | 37 000 000 | 61 900 000 |
| DL Category 24 | UL Category 26 | 40 000 000 | 69 500 000 |
| DL Category 25 | UL Category 20 | 34 100 000 | 58 900 000 |
| DL Category 25 | UL Category 22 | 30 500 000 | 51 000 000 |
| DL Category 25 | UL Category 23 | 33 400 000 | 54 300 000 |
| DL Category 25 | UL Category 24 | 35 300 000 | 59 900 000 |
| DL Category 25 | UL Category 25 | 38 000 000 | 62 900 000 |
| DL Category 25 | UL Category 26 | 41 000 000 | 70 500 000 |
| DL Category 26 | UL Category 20 | 37 000 000 | 66 600 000 |
| DL Category 26 | UL Category 22 | 31 500 000 | 52 000 000 |
| DL Category 26 | UL Category 23 | 34 400 000 | 55 300 000 |
| DL Category 26 | UL Category 24 | 36 300 000 | 60 900 000 |
| DL Category 26 | UL Category 25 | 39 000 000 | 63 900 000 |
| DL Category 26 | UL Category 26 | 42 000 000 | 71 500 000 |
| NOTE 1: The UE supports "Total layer 2 buffer size" of 40 000 bytes if the UE indicates support of <i>ce-PUSCH-NB-MaxTBS-r14</i> . Otherwise the UE supports 20 000 bytes. | | | |

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 M2 | NA |
| DL Category 0 | 4584 |
| DL Category 1bis | 10296 |
| DL Category 4 | 75376 |
| 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) |
| DL Category 20 | 75376 (64QAM) 97896 (256QAM) |
| DL Category 21 | 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 M2 | Type B |
| DL Category 0 | Type B |
| DL Category 1bis | Type A |
| DL Category 4 | Type A |
| 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 |
| DL Category 20 | Type A |
| DL Category 21 | 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 by UEs other than Category M

| UE DL Category | UE UL Category | UE categories | Maximum UE channel bandwidth [MHz] |
|------------------|------------------|---|---|
| DL Category 0 | UL Category 0 | N/A | According to maximum channel bandwidth specified per band in TS 36.101 [6]. |
| DL Category 1bis | UL Category 1bis | Category 1 (NOTE 1) | |
| DL Category 4 | UL Category 5 | Category 4 | |
| DL Category 6 | UL Category 5 | Category 6, 4 | |
| DL Category 6 | UL Category 16 | Category 6, 4 DL Category 6 and UL Category 5 | |
| DL Category 7 | UL Category 13 | Category 7, 4 | |
| DL Category 7 | UL Category 18 | Category 7, 4 DL Category 7 and UL Category 13 | |
| DL Category 9 | UL Category 5 | Category 9, 6, 4 | |
| DL Category 9 | UL Category 16 | Category 9, 6, 4 DL Category 9 and UL Category 5 | |
| DL Category 10 | UL Category 13 | Category 10, 7, 4 | |
| DL Category 10 | UL Category 18 | Category 10, 7, 4 DL Category 10 and UL Category 13 | |
| DL Category 11 | UL Category 5 | Category 11, 9, 6, 4 | |
| DL Category 11 | UL Category 16 | Category 11, 9, 6, 4 DL Category 11 and UL Category 5 | |
| 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 12 | UL Category 18 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 | |
| DL Category 12 | UL Category 20 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 12 and UL Category 15 | |
| DL Category 13 | UL Category 3 | Category 6, 4 Category 9 (if supported) | |
| DL Category 13 | UL Category 5 | Category 6, 4 Category 9 (if supported) | |
| DL Category 13 | UL Category 7 | Category 7, 4 Category 10 (if supported) | |
| DL Category 13 | UL Category 13 | Category 7, 4 Category 10 (if supported) | |
| DL Category 13 | UL Category 16 | Category 6, 4 DL Category 13 and UL Category 5 | |
| DL Category 13 | UL Category 18 | Category 7, 4 DL Category 13 and UL Category 13 | |
| DL Category 14 | UL Category 8 | Category 8, 5 | |
| DL Category 14 | UL Category 17 | Category 8, 5 DL Category 14 and UL Category 8 | |
| 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 15 | UL Category 16 | Category 11, 9, 6, 4 DL Category 11 and UL Category 5 DL Category 15 and UL Category 5 |
| DL Category 15 | UL Category 18 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 15 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 16 | UL Category 16 | Category 11, 9, 6, 4 DL Category 11 and UL Category 5 DL Category 16 and UL Category 5 |
| DL Category 16 | UL Category 18 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 |
| DL Category 16 | UL Category 20 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 DL Category 16 and UL Category 15 |
| DL Category 17 | UL Category 14 | Category 8, 5 DL Category 14 and UL Category 8 |
| DL Category 17 | UL Category 19 | Category 8, 5 DL Category 14 and UL Category 8 DL Category 17 and UL Category 14 |
| 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 18 | UL Category 16 | Category 11, 9, 6, 4 DL Category 11 and UL Category 5 DL Category 16 and UL Category 5 DL Category 18 and UL Category 5 |

| | | |
|----------------|----------------|--|
| DL Category 18 | UL Category 18 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 |
| DL Category 18 | UL Category 20 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 DL Category 18 and UL Category 15 |
| 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 |
| DL Category 19 | UL Category 16 | Category 11, 9, 6, 4 DL Category 11 and UL Category 5 DL Category 16 and UL Category 5 DL Category 19 and UL Category 5 |
| DL Category 19 | UL Category 18 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 DL Category 19 and UL Category 13 |
| DL Category 19 | UL Category 20 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 DL Category 19 and UL Category 15 |
| DL Category 19 | UL Category 21 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 DL Category 19 and UL Category 15 |
| DL Category 20 | UL Category 3 | Category 11, 9, 6, 4 DL Category 16 and UL Category 3 DL Category 19 and UL Category 3 |
| DL Category 20 | UL Category 5 | Category 11, 9, 6, 4 DL Category 16, 11 and UL Category 5 DL Category 19 and UL Category 5 |

| | | | |
|----------------|----------------|---|--|
| DL Category 20 | UL Category 7 | Category 12, 10, 7, 4 DL Category 16 and UL Category 7 DL Category 19 and UL Category 7 | |
| DL Category 20 | UL Category 13 | Category 12, 10, 7, 4 DL Category 16, 12 and UL Category 13 DL Category 19 and UL Category 13 | |
| DL Category 20 | UL Category 15 | Category 12, 10, 7, 4 DL Category 16, 12 and UL Category 13 DL Category 19 and UL Category 13 DL Category 19 and UL Category 15 | |
| DL Category 20 | UL Category 16 | Category 11, 9, 6, 4 DL Category 11 and UL Category 5 DL Category 16 and UL Category 5 DL Category 19 and UL Category 5 DL Category 19 and UL Category 16 | |
| DL Category 20 | UL Category 18 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 DL Category 19 and UL Category 13 DL Category 19 and UL Category 18 | |
| DL Category 20 | UL Category 20 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 DL Category 19 and UL Category 15 DL Category 19 and UL Category 20 | |
| DL Category 20 | UL Category 21 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 DL Category 19 and UL Category 15 DL Category 19 and UL Category 21 | |
| DL Category 21 | UL Category 3 | Category 11, 9, 6, 4 DL Category 16 and UL Category 3 DL Category 18 and UL Category 3 | |
| DL Category 21 | UL Category 5 | Category 11, 9, 6, 4 DL Category 16, 11 and UL Category 5 DL Category 18 and UL Category 5 | |
| DL Category 21 | UL Category 7 | Category 12, 10, 7, 4 DL Category 16 and UL Category 7 DL Category 18 and UL Category 7 | |

| | | | |
|----------------|----------------|---|--|
| DL Category 21 | UL Category 13 | Category 12, 10, 7, 4 DL Category 16, 12 and UL Category 13 DL Category 18 and UL Category 13 | |
| DL Category 21 | UL Category 15 | Category 12, 10, 7, 4 DL Category 16,12 and UL Category 13 DL Category 18 and UL Category 13 DL Category 18 and UL Category 15 | |
| DL Category 21 | UL Category 16 | Category 11, 9, 6, 4 DL Category 11 and UL Category 5 DL Category 16 and UL Category 5 DL Category 18 and UL Category 5 DL Category 18 and UL Category 16 | |
| DL Category 21 | UL Category 18 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 DL Category 18 and UL Category 13 DL Category 18 and UL Category 18 | |
| DL Category 21 | UL Category 20 | Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13 DL Category 18 and UL Category 15 DL Category 18 and UL Category 20 | |
| DL Category 22 | UL Category 20 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 22 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 22 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 22 | UL Category 23 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 22 | UL Category 24 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 22 | UL Category 25 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 22 | UL Category 26 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 23 | UL Category 20 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 23 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 23 | UL Category 23 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 23 | UL Category 24 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 23 | UL Category 25 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 23 | UL Category 26 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 24 | UL Category 20 | DL Category 20 and UL Category 20 (NOTE3) | |

| | | | |
|---|----------------|---|--|
| DL Category 24 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 24 | UL Category 23 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 24 | UL Category 24 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 24 | UL Category 25 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 24 | UL Category 26 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 25 | UL Category 20 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 25 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 25 | UL Category 23 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 25 | UL Category 24 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 25 | UL Category 25 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 25 | UL Category 26 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 26 | UL Category 20 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 26 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 26 | UL Category 23 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 26 | UL Category 24 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 26 | UL Category 25 | DL Category 20 and UL Category 20 (NOTE3) | |
| DL Category 26 | UL Category 26 | DL Category 20 and UL Category 20 (NOTE3) | |
| NOTE 1: The UE indicating DL category 1bis is only required to support 1Rx antenna even though the UE indicates UE category 1 for legacy compatibility. | | | |
| NOTE 2: Void. | | | |
| NOTE 3: The UE indicating DL Category 20 and UL Category 20 also indicates Category 12, 10, 7, 4, DL Category 12 and UL Category 13, DL Category 16 and UL Category 13, DL Category 19 and UL Category 15, DL Category 19 and UL Category 20. | | | |

Table 4.1A-7: 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 by UEs of Category M

| 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 M2 | UL Category M2 | DL Category M1 and UL Category M1 | 5 (NOTE) |
| NOTE: The minimum of 5 MHz and the maximum channel bandwidth specified per band in TS 36.101 [6]. | | | |

4.1B *ue-CategorySL-C-RX*, *ue-CategorySL-C-TX* and *ue-CategorySL-D*

The *ue-CategorySL-C-RX*, *ue-CategorySL-C-TX* and *ue-CategorySL-D* define reception and transmission capabilities for sidelink communication, V2X sidelink communication and sidelink discovery respectively. The parameters set by the UE *SL-C-RX*, *SL-C-TX* (sidelink communication and V2X sidelink communication) category and *SL-D* (sidelink discovery) category are defined in clause 4.2A. Table 4.1B-1 and Table 4.1B-2 defines the reception and transmission physical layer parameter values for each *SL-C-RX* and each *SL-C-TX* Category, respectively. Table 4.1B-3 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-RX Category 1 and SL-C-TX Category 1. If a UE of this release supports V2X sidelink communication, the UE shall support SL-C-RX Category 2 to 4 for reception, and SL-C-TX category 2 to 5 for transmission. If a UE of this release supports sidelink discovery, the UE shall support SL-D Category 1.

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

| UE SL-C-RX 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 | Total number of soft channel bits |
|---------------------|---|--|-----------------------------------|
| SL-C-RX Category 1 | 25456 | 25456 | |
| SL-C-RX Category 2 | 31704 | 31704 | 737280 |
| SL-C-RX Category 3 | 48936 | 48936 | 995328 |
| SL-C-RX Category 4 | 73488 | 48936 | 1492992 |

Table 4.1B-2: Transmission physical parameter values set by ue-CategorySL-C-TX

| UE SL-C-TX Category | 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-TX |
|---------------------|--|---|--|
| SL-C-TX Category 1 | 25456 | 25456 | 1 |
| SL-C-TX Category 2 | 31704 | 31704 | 1 |
| SL-C-TX Category 3 | 49272 | 32856 | 1 |
| SL-C-TX Category 4 | 48936 | 48936 | 1 |
| SL-C-TX Category 5 | 73488 | 48936 | 1 |

Table 4.1B-3: 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 clause 4.2. Tables 4.1C-1 and 4.1C-2 define the downlink and, respectively, uplink physical layer parameter values for each UE Category. A UE indicating Category NB2 shall also indicate Category NB1.

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 |
| Category NB2 (Note 1) | 2536 or 4968 | 2536 or 4968 | 6400 or 12800 |
| NOTE 1: The UE supports "Maximum number of DL-SCH transport block bits received within a TTI" and "Maximum number of bits of a DL-SCH transport block received within a TTI" of 4968 bits and "Total number of soft channel bits" of 12800 bits if the UE indicates support of <i>npdsch-16QAM-r17</i> . Otherwise the UE supports "Maximum number of DL-SCH transport block bits received within a TTI" and "Maximum number of bits of a DL-SCH transport block received within a TTI" of 2536 bits and "Total number of soft channel bits" of 6400 bits. | | | |

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 |
| Category NB2 | 2536 | 2536 |

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 |
| Category NB2 (Note 1) | 8000 or 12000 |
| NOTE 1: The UE supports "Total layer 2 buffer size" of 12000 bytes if the UE indicates support of <i>npdsch-16QAM-r17</i> . Otherwise the UE supports 8000 bytes. | |

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 |
| Category NB2 | 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 clause 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 or V2X 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 5795)
- 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 6846)
- 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 5795).

'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 5795)
- 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 6846)
- 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 5795). This field is only applicable if the UE supports S1-U data transfer or User plane CIoT EPS Optimisation, see TS 36.331 [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 S1-U data transfer or User plane CIoT EPS Optimisation, see TS 36.331 [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].

4.3.1.6 *supportedUplinkOnlyROHC-Profiles*

This field defines which ROHC profile(s) from the list below are supported in uplink-only ROHC operation by the UE.

- 0x0006 ROHC TCP (RFC 6846)

A UE that supports uplink-only ROHC profile(s) shall support ROHC profile 0x0000 ROHC uncompressed (RFC 5795).

4.3.1.7 *supportedUDC-r15*

This field defines whether the UE supports the uplink data compression operation as specified in TS 36.323 [2].

A UE that supports the uplink data compression operation shall support 8192 bytes for compression buffer per UDC DRB and support up to 2 UDC DRBs.

4.3.1.8 *supportedStandardDic-r15*

This field defines whether the UE supports UL data compression with SIP static dictionary as defined in TS 36.323 [2].

4.3.1.9 *supportedOperatorDic-r15*

This field defines whether the UE supports UL data compression with operator defined dictionary. If UE supports operator defined dictionary, the UE shall report *versionOfDictionary*, the version number of the dictionary, and *associatedPLMN-ID*, the associated PLMN ID of this operator defined dictionary as defined in TS 36.331 [5]. Note this parameter is not required to be present if the UE is in VPLMN. In this release of specification, UE can only support one operator defined dictionary.

4.3.1.10 *pdcp-Duplication-r15*

This field defines whether the UE supports PDCP duplication.

4.3.1.11 *pdcp-VersionChangeWithoutHO-r16*

This field defines whether the UE supports changing the PDCP version of DRBs, from LTE PDCP to NR PDCP and vice versa, without handover.

4.3.1.12 *ehc-r16*

Indicates that the UE supports Ethernet header compression and decompression using EHC protocol, as specified in TS 36.323 [2] and in Annex A of TS 38.323 [40]. The UE indicating this capability and indicating support for at least one ROHC profile, shall support simultaneous configuration of EHC and ROHC on different DRBs.

4.3.1.13 *maxNumberEHC-Contexts-r16*

Defines the maximum number of Ethernet header compression contexts supported by the UE across all DRBs and across UE's EHC compressor and EHC decompressor. The indicated number defines the number of contexts in addition to CID = "all zeros" as specified in Annex A of TS 38.323 [40].

4.3.1.14 *continueEHC-Context-r16*

Indicates that the UE supports EHC context continuation operation where the UE keeps the established EHC context(s) upon PDCP re-establishment, as specified in TS 36.323 [2].

4.3.1.15 *jointEHC-ROHC-Config-r16*

Indicates whether the UE supports simultaneous configuration of EHC and ROHC protocols for the same DRB.

4.3.1A NR PDCP Parameters

NR PDCP capabilities: the definition of *rohc-Profiles-r15*, *rohc-ContextMaxSessions-r15*, *rohc-ProfilesUL-Only-r15*, *rohc-ContextContinue-r15*, *outOfOrderDelivery-r15* and *sn-SizeLo-r15* are the same as *supportedROHC-Profiles*, *maxNumberROHC-ContextSessions*, *uplinkOnlyROHC-Profiles*, *continueROHC-Context*, *outOfOrderDelivery* and *shortSN* defined in TS 38.306 [32].

ims-VoiceOverNR-PDCP-MCG-Bearer-r15 indicates whether the UE supports IMS voice over NR PDCP with only MCG RLC bearer.

ims-VoiceOverNR-PDCP-SCG-Bearer-r15 indicates whether the UE supports IMS voice over NR PDCP with only SCG RLC bearer when configured with EN-DC.

ims-VoNR-PDCP-SCG-NGENDC-r15 indicates whether the UE supports IMS voice over NR PDCP with only SCG RLC bearer when configured with NGEN-DC.

NOTE: In this release of specification, IMS voice over split bearer is not supported for (NG)EN-DC.

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.

4.3.2.4 *extendedPollByte-r14*

This field defines whether the UE supports extended pollByte values as defined by *pollByte-r14* in TS 36.331 [5].

4.3.2.5 *rlc-UM-r15*

This field defines whether the UE supports RLC UM as specified in TS 36.322 [3]. This field is only applicable for UEs of any *ue-Category-NB*.

4.3.2.6 *rlc-AM-Ooo-Delivery-r15*

This field defines whether the UE supports out-of-order delivery from RLC to PDCP for RLC AM.

4.3.2.7 *rlc-UM-Ooo-Delivery-r15*

This field defines whether the UE supports out-of-order delivery from RLC to PDCP for RLC UM.

4.3.2.8 *flexibleUM-AM-Combinations-r15*

This field defines whether the UE supports any combination of RLC UM and RLC AM DRBs as long as the total number of DRBs is at most 8, regardless of what FGI20 indicates.

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 when not operating in CE mode.

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 uplink LAA, this field is only applicable for non-LAA cells. For LAA SCells, see clause 7.7.4. 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, M1, 1bis and M2 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, M1, 1bis and M2 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.

4.3.4.21A *tdd-SpecialSubframe-r14*

This field defines whether the UE supports TDD special subframe configuration 10 as specified in TS 36.211 [17]. A UE indicating support of *tdd-SpecialSubframe-r14* shall not indicate support of *ssp10-TDD-Only-r14*.

4.3.4.21B *ssp10-TDD-Only-r14*

This field defines whether the UE supports TDD special subframe configuration 10 when operating only in TDD carriers (i.e., not in TDD/FDD CA or TDD/FS3 CA) as specified in TS 36.211 [17]. A UE indicating support of *ssp10-TDD-Only-r14* shall not indicate support of *tdd-SpecialSubframe-r14*.

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*. UE supporting *txDiv-PUCCH1b-ChSelect* shall support configuration of *PUCCH-ConfigDedicated-v13c0*.

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 eMTC-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 eMTC-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 and Category M2 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-r12* 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 I_{TBS} 26A and 33A 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 I_{TBS} 33A is applied for the UE supporting 256QAM in DL.

4.3.4.42 *codebook-HARQ-ACK-r13*

The first bit of this bitmap defines whether HARQ ACK codebook size determination based on the DAI-based solution as specified in TS 36.213 [22] is supported by the UE. If the UE supports carrier aggregation with more than 5 DL

component carriers, it is mandatory to support HARQ ACK codebook size determination based on the DAI-based solution.

The second bit of this bitmap defines whether HARQ ACK codebook size determination based on the number of configured CCs as specified in TS 36.213 [22] is supported by the UE. If the UE supports carrier aggregation with more than 5 DL component carriers, it is mandatory to support HARQ ACK codebook size determination based on the number of configured CCs.

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 *pdccch-CandidateReduction-r13* and/or *skipMonitoringDCI-Format0-1A-r13*.

4.3.4.48.2 *pdccch-CandidateReductions-r13*

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

If this field is present, UE supports any of the following features:

- 1) CRS-IM with 2 CRS antenna ports for PDSCH for UEs with 2 receiver antenna ports (as specified in the TS 36.101 [6])
- 2) CRS-IM with 4 CRS antenna ports for PDSCH for UEs with 2 receiver antenna ports (as specified in the TS 36.101 [6])
- 3) CRS-IM with 2 CRS antenna ports for PDSCH for UEs with 4 receiver antenna ports (as specified in the TS 36.101 [6])
- 4) CRS-IM with 4 CRS antenna ports for PDSCH for UEs with 4 receiver antenna ports (as specified in the TS 36.101 [6])

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], clause 7.2.1 and/or aperiodic CSI reporting mode 1-0 and mode 1-1 as specified in TS 36.213 [22], clause 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], clauses 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], clause 5.2.2.6 and TS 36.213 [22], clause 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]).

If this field is present, the UE supports at least one the following features:

- 1) Enhanced downlink control channel interference mitigation Type A receiver for 2 CRS antenna ports for UEs with 2 receiver antenna ports (Enhanced downlink control channel performance requirements Type A in the TS 36.101 [6]).
- 2) Enhanced downlink control channel interference mitigation Type A receiver for 4 CRS antenna ports for UEs with 2 receiver antenna ports (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.

4.3.4.60 *tdd-TTI-Bundling-r14*

This field defines whether the UE supporting TDD special subframe configuration 10 also supports TTI bundling for TDD configuration 2 and 3 when *ssp10* is configured as specified in TS 36.331 [5].

4.3.4.61 *dmrs-LessUpPTS-r14*

This field defines whether the UE supports not to transmit DMRS for PUSCH in UpPTS as specified in TS 36.211 [17].

4.3.4.62 *twoHARQ-Processes-r14*

This field defines whether the UE supports 2 HARQ processes in DL and UL. This field is only applicable for UEs that support category NB2.

4.3.4.63 *ce-PUSCH-NB-MaxTBS-r14*

This field indicates whether the UE supports the maximum UL TBS size of 2984 bits in 1.4 MHz when operating in coverage enhancement mode A, as specified in TS 36.212 [26] and TS 36.213 [22]. A UE indicating support of *ce-PUSCH-NB-MaxTBS-r14* shall also indicate support of *ce-ModeA-r13*.

4.3.4.64 *ce-PDSCH-PUSCH-MaxBandwidth-r14*

This field indicates support of a maximum PDSCH/PUSCH channel bandwidth larger than 1.4 MHz when the UE is operating in coverage enhancement mode A and B, as specified in TS 36.212 [26] and TS 36.213 [22]. The maximum supported PDSCH channel bandwidth in coverage enhancement mode A and B is indicated by *ce-PDSCH-PUSCH-MaxBandwidth-r14*. The maximum supported PUSCH channel bandwidth is 5 MHz in coverage enhancement mode A

and 1.4 MHz in coverage enhancement mode B. This field is not applicable for UEs of Category M1. This field is mandatory for UEs of Category M2. A UE indicating support of *ce-PDSCH-PUSCH-MaxBandwidth-r14* shall also indicate support of *ce-ModeA-r13*.

4.3.4.65 *ce-HARQ-AckBundling-r14*

This field indicates whether the UE supports HARQ-ACK bundling in FDD when operating in coverage enhancement mode A, as specified in TS 36.212 [26] and TS 36.213 [22]. A UE indicating support of *ce-HARQ-AckBundling-r14* shall also indicate support of *ce-ModeA-r13*.

4.3.4.66 *ce-PDSCH-TenProcesses-r14*

This field indicates whether the UE supports 10 DL HARQ processes in FDD when operating in coverage enhancement mode A, as specified in TS 36.212 [26] and TS 36.213 [22]. A UE indicating support of *ce-PDSCH-TenProcesses-r14* shall also indicate support of *ce-ModeA-r13*.

4.3.4.67 *ce-RetuningSymbols-r14*

This field indicates the number of retuning symbols used by the UE when operating in coverage enhancement mode A and B, as specified in TS 36.211 [17]. A UE indicating support of *ce-RetuningSymbols-r14* shall also indicate support of *ce-ModeA-r13*.

4.3.4.68 *ce-PDSCH-PUSCH-Enhancement-r14*

This field indicates whether the UE supports new numbers of repetitions for PUSCH and modulation restriction for PDSCH and PUSCH in coverage enhancement mode A, as specified in TS 36.212 [26] and TS 36.213 [22]. A UE indicating support of *ce-PDSCH-PUSCH-Enhancement-r14* shall also indicate support of *ce-ModeA-r13*.

4.3.4.69 *ce-SchedulingEnhancement-r14*

This field indicates whether the UE supports dynamic HARQ-ACK delay for HD-FDD in coverage enhancement mode A, as specified in TS 36.212 [26] and TS 36.213 [22]. A UE indicating support of *ce-SchedulingEnhancement-r14* shall also indicate support of *ce-ModeA-r13*.

4.3.4.70 *ce-SRS-Enhancement-r14*

This field indicates whether the UE supports SRS coverage enhancement with support of SRS combs 2 and 4, as specified in TS 36.213 [22]. A UE indicating support of *ce-SRS-Enhancement-r14* shall also indicate support of *ce-ModeA-r13* and shall not indicate support of *ce-SRS-EnhancementWithoutComb4-r14*.

4.3.4.70A *ce-SRS-EnhancementWithoutComb4-r14*

This field indicates whether the UE supports SRS coverage enhancement with support of SRS comb 2 but without support of SRS comb 4, as specified in TS 36.213 [22]. A UE indicating support of *ce-SRS-EnhancementWithoutComb4-r14* shall also indicate support of *ce-ModeA-r13* and shall not indicate support of *ce-SRS-Enhancement-r14*.

4.3.4.71 *ce-PUCCH-Enhancement-r14*

This field indicates whether the UE supports repetition levels 64 and 128 for PUCCH in CE Mode B, as specified in TS 36.211 [17] and in TS 36.213 [22]. A UE indicating support of *ce-PUCCH-Enhancement-r14* shall also indicate support of *ce-ModeB-r13*.

4.3.4.72 *ce-ClosedLoopTxAntennaSelection-r14*

This field indicates whether the UE supports UL closed-loop Tx antenna selection in coverage enhancement mode A, as specified in TS 36.212 [26]. A UE indicating support of *ce-ClosedLoopTxAntennaSelection-r14* shall also indicate support of *ce-ModeA-r13* and *ue-TxAntennaSelectionSupported*.

4.3.4.73 *ul-256QAM-r14*

This field indicates UL 256QAM support by the UE on a single component carrier within a band combination (i.e. bandwidth class A).

4.3.4.73A *ul-256QAM-r15*

This field indicates whether the UE supports UL 256QAM for MR-DC within the indicated feature set. This field is reported per component carrier in a bandwidth class (A,B, C, D and so on) for a band in a given band combination.

4.3.4.74 *alternativeTBS-Index-r14*

This field defines whether alternative TBS index I_{TBS} 33B as specified in TS 36.213 [22] is supported by the UE. Support of the alternative TBS index I_{TBS} 33B is applied for the UE supporting 256QAM in DL.

4.3.4.75 *multiCarrier-NPRACH-r14*

This field defines whether the UE supports NPRACH on non-anchor carrier, as specified in TS 36.321 [4] and TS 36.331 [5]. This field is only applicable for UEs of any *ue-Category-NB*. It is mandatory for UEs of this release of the specification.

4.3.4.76 *multiCarrierPaging-r14*

This field defines whether the UE supports paging on non-anchor carriers for FDD, as specified in TS 36.331 [5] and TS 36.304 [14]. This field is only applicable for UEs of any *ue-Category-NB*. It is mandatory for UEs of this release of the specification.

4.3.4.77 *ul-256QAM-perCC-InfoList-r14*

This field indicates UL 256QAM support by the UE on a single component carrier within a band combination, which the corresponding bandwidth class includes multiple serving carriers (i.e. bandwidth class B, C, D and so on).

4.3.4.78 *unicast-fembmsMixedSCell-r14*

This field defines whether unicast reception from FeMBMS/Unicast mixed cell is supported by the UE. This field is included only if UE supports carrier aggregation.

4.3.4.79 *emptyUnicastRegion-r14*

This field defines whether the UE supports unicast reception in subframes with empty unicast control region as described in TS 36.213 [22], clause 12. This field is included only if UE supports unicast reception from FeMBMS/Unicast mixed cell.

4.3.4.80 *interferenceRandomisation-r14*

This field indicates whether the UE supports interference randomisation in connected mode for FDD as specified in TS 36.211 [17]. This field is only applicable for UEs of any *ue-Category-NB*. It is mandatory for UEs of this release of the specification.

4.3.4.81 *must-CapabilityPerBand-r14*

This field indicates that the UE supports multi-user superposition transmission operation for the corresponding frequency band as specified in 36.212 [26], clause 5.3.3.1. UE indicates the support of the different MUST features per band.

4.3.4.81.1 *must-TM234-UpTo2Tx-r14*

This field indicates that the UE supports MUST operation for TM2/3/4 using up to 2Tx.

4.3.4.81.2 *must-TM89-UpToOneInterferingLayer-r14*

This field indicates that the UE supports MUST operation for TM8/9 with assistance information for up to 1 interfering layer.

4.3.4.81.3 *must-TM10-UpToOneInterferingLayer-r14*

This field indicates that the UE supports MUST operation for TM10 with assistance information for up to 1 interfering layer.

4.3.4.81.4 *must-TM89-UpToThreeInterferingLayers-r14*

This field indicates that the UE supports MUST operation for TM8/9 with assistance information for up to 3 interfering layers.

4.3.4.81.5 *must-TM10-UpToThreeInterferingLayers-r14*

This field indicates that the UE supports MUST operation for TM10 with assistance information for up to 3 interfering layers.

4.3.4.82 *crs-LessDwPTS-r14*

This field defines whether the UE supports TDD special subframe configuration 10 without CRS transmission on the 5th symbol of DwPTS (i.e. *sps10-CRS-LessDwPTS*) as specified in TS 36.211 [17] and TS 36.331 [5].

4.3.4.83 *dl-1024QAM-Slot-r15*

This field indicates whether the UE supports 1024QAM in DL on the band for slot TTI operation.

4.3.4.84 *dl-1024QAM-SubslotTA-1-r15*

This field indicates whether the UE supports 1024QAM in DL on the band for subslot TTI operation with TA set 1.

4.3.4.85 *dl-1024QAM-SubslotTA-2-r15*

This field indicates whether the UE supports 1024QAM in DL on the band for subslot TTI operation with TA set 2.

4.3.4.86 *dmrs-PositionPattern-r15*

This field indicates whether the UE supports uplink DMRS position pattern 'D D D' in subslot #5 with application of the 1/6 as the TBS scaling factor.

4.3.4.87 *dmrs-RepetitionSubslotPDSCH-r15*

This field indicates whether the UE supports back-to-back 3/4-layer DMRS reception in two consecutive subslots across subframe boundary for subslot-PDSCH.

4.3.4.88 *dmrs-SharingSubslotPDSCH-r15*

This field indicates whether the UE supports DMRS sharing in two consecutive subslots across subframe boundary for subslot-PDSCH.

4.3.4.89 *epdcch-SPT-differentCells-r15*

This field indicates whether the UE supports EPDCCH and short processing time on different serving cells.

4.3.4.90 *epdcch-STTI-differentCells-r15*

This field indicates whether the UE supports EPDCCH and sTTI on different serving cells.

4.3.4.91 *maxLayersSlotOrSubslotPUSCH-r15*

This field indicates the maximum number of layers for slot-PUSCH or subslot-PUSCH transmission. If the UE reports maximum number of layers for UL in sTTI for a band combination using the IE *CA-MIMO-ParametersUL-r15*, the reported maximum number of layers shall not exceed the value indicated by this field.

4.3.4.92 *maxNumberUpdatedCSI-Proc-SPT-r15*

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

4.3.4.93 Void

4.3.4.94 *numberOfBlindDecodesUSS-r15*

This field defines the maximum number of blind decodes in UE specific search space in one subframe for CCs configured with sTTI operation, supported by the UE. The number of blind decodes supported by the UE is the field value $X \cdot 68$.

4.3.4.95 *pdsch-SlotSubslotPDSCH-Decoding-r15*

This field defines whether the UE supports decoding of PDSCH and slot-PDSCH/subslot-PDSCH assigned with C-RNTI/SPS C-RNTI in the same subframe for a given carrier.

4.3.4.96 *simultaneousTx-differentTx-duration-r15*

This field defines whether the UE supports simultaneous transmission of different transmission durations over different carriers. The different transmission duration can be of subframe, slot or subslot duration. A common capability is used regardless of combination of different UL transmission duration over different carriers. The capability is reported per band/band combination.

4.3.4.97 *slotPDSCH-TxDiv-TM8-r15*

This field indicates whether the UE supports TX diversity transmission using ports 7 and 8 for TM8 for slot PDSCH.

4.3.4.98 *slotPDSCH-TxDiv-TM9and10-r15*

This field indicates whether the UE supports TX diversity transmission using ports 7 and 8 for TM9/10 for slot PDSCH.

4.3.4.99 *spdcch-differentRS-types-r15*

This field indicates whether the UE supports monitoring of sPDCCH on RB sets with different RS types within a TTI.

4.3.4.100 *spt-Parameters-r15*

This field indicates the maximum number of supported CCs and the corresponding supported frame structure for short processing time. The UE capability is reported per band combination. The reported number of carriers *maxNumberCCs-SPT-r15* applies to all the FS-type(s) *frameStructureType-SPT-r15* supported in a given band combination.

4.3.4.101 *sps-CyclicShift-r15*

This field indicates whether the UE supports different cyclic shift for DMRS for UL SPS using 1ms TTI.

4.3.4.102 *subslotPDSCH-TxDiv-TM9and10-r15*

This field indicates whether the UE supports TX diversity transmission using ports 7 and 8 for TM9/10 for subslot PDSCH.

4.3.4.103 *sTTI-SupportedCombinations-r15*

This field indicates the different combinations of sTTI lengths (slot or subslot) that the UE supports in a single PUCCH group or in two PUCCH groups. A TTI length combination is reported for DL first followed by UL. In case of two PUCCH groups the support for the primary PUCCH group is indicated first. The capability is reported per band per band combination. This field is also used to report the sTTI capabilities for non-CA bands.

4.3.4.104 Void

4.3.4.105 *sTTI-SPT-BandParameters-r15*

This field indicates the different sTTI/sPT capabilities for each band of the reported band combinations using *supportedBandCombination*. The UE reports these capabilities in the same order in which the band combinations are reported. The UE is allowed to report the same band combination more than once, if the corresponding sTTI/sPT capabilities are different. If any of the fields *sTTI-CA-MIMO-ParametersDL-r15*, *sTTI-CA-MIMO-ParametersUL-r15*, *sTTI-SupportedCSI-Proc-r15* are not provided by the UE, the corresponding parameters of these fields reported from the band of the band combination for which the sTTI parameters are applied, are assumed to be supported for sTTI/sPT features as well. If any of the fields *sTTI-MIMO-CA-ParametersPerBoBCs-r15*, *sTTI-MIMO-CA-ParametersPerBoBCs-v1530* are not provided by the UE, the corresponding parameters from *mimo-UE-ParametersSTTI-r15*, *mimo-UE-ParametersSTTI-v1530* are applied, and if any of the fields *mimo-UE-ParametersSTTI-r15*, *mimo-UE-ParametersSTTI-v1530* are not provided by the UE, then the corresponding parameters of these fields reported from the band of the band combination for which the sTTI parameters are applied, are assumed to be supported for sTTI/sPT features.

4.3.4.106 *sTTI-SupportedCSI-Proc-r15*

This field indicates, for short TTI, the maximum number of CSI processes supported on a component carrier within a band. Value n1 corresponds to 1 CSI process, value n3 corresponds to 3 CSI processes, and value n4 corresponds to 4 CSI processes. If this field is included, the UE shall include the same number of entries listed in the same order as in *bandParameterList-r11*, *bandParameterList-r13* if they are reported. If the UE supports at least 1 CSI process on any component carrier, then the UE shall include this field in all bands in all band combinations.

4.3.4.107 *txDiv-SPUCCH-r15*

This field defines whether the UE supports Tx diversity on SPUCCH format 1, 1a, 1b and 3.

4.3.4.108 *ul-256QAM-Slot-r15*

This field defines whether the UE supports 256QAM in UL for slot TTI operation on the band.

4.3.4.109 *ul-256QAM-Subslot-r15*

This field defines whether the UE supports 256QAM in UL for subslot TTI operation on the band.

4.3.4.110 *ue-TxAntennaSelection-SRS-1T4R-r15*

This field indicates whether the UE supports to select one antenna among four antennas to transmit SRS for the corresponding band of the band combination as described in TS 36.213 [22].

4.3.4.111 *ue-TxAntennaSelection-SRS-2T4R-2Pairs-r15*

This field indicates whether the UE supports to select one antenna pair between two antenna pairs to transmit SRS simultaneously for the corresponding band of the band combination as described in TS 36.213 [22].

4.3.4.112 *ue-TxAntennaSelection-SRS-2T4R-3Pairs-r15*

This field indicates whether the UE supports to select one antenna pair among three antenna pairs to transmit SRS simultaneously for the corresponding band of the band combination as described in TS 36.213 [22].

4.3.4.113 *wakeUpSignal-r15*

This field indicates whether the UE supports WUS for FDD as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.304 [14]. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

4.3.4.114 *wakeUpSignalMinGap-eDRX-r15*

This field indicates the minimum gap required between end of WUS and start of PO by a UE indicating support of extended idle mode DRX for FDD, as specified in TS 24.301 [28]. A UE indicating support of *wakeUpSignalMinGap-eDRX-r15* shall also indicate support of *wakeUpSignal-r15* or *groupWakeUpSignal-r16*. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

4.3.4.115 *mixedOperationMode-r15*

This field defines whether the UE supports multi-carrier operation where the anchor carrier is in standalone mode while the non-anchor carrier is in inband or guardband mode, and vice versa, for unicast, paging, and random access for FDD as specified in TS 36.300 [30]. This field is only applicable for UEs of any *ue-Category-NB*.

4.3.4.116 *void*

4.3.4.117 *sr-WithHARQ-ACK-r15*

This field defines whether the UE supports physical layer SR with HARQ ACK for FDD as specified in TS 36.213 [22]. This field is only applicable for UEs of any *ue-Category-NB*.

4.3.4.118 *sr-WithoutHARQ-ACK-r15*

This field defines whether the UE supports physical layer SR without HARQ ACK for FDD as specified in TS 36.211 [17] and TS 36.213 [22]. This field is only applicable for UEs of any *ue-Category-NB*.

4.3.4.119 *nprach-Format2-r15*

This field defines whether the UE supports NPRACH resources using preamble format 2 for FDD. This field is only applicable for UEs of any *ue-Category-NB*.

4.3.4.120 *ce-UL-HARQ-ACK-Feedback-r15*

This field indicates whether the UE supports uplink HARQ ACK Feedback in RRC_CONNECTED when operating in coverage enhancement, as specified in TS 36.213 [22]. A UE indicating support of *ce-UL-HARQ-ACK-Feedback-r15* shall also indicate support of *ce-ModeA-r13*.

4.3.4.121 *ce-PDSCH-FlexibleStartPRB-CE-ModeA-r15*

This field indicates whether the UE supports flexible starting PRB for PDSCH in RRC_CONNECTED when operating in coverage enhancement mode A, as specified in TS 36.211 [17] and TS 36.213 [22]. A UE indicating support of *ce-PDSCH-FlexibleStartPRB-CE-ModeA-r15* shall also indicate support of *ce-ModeA-r13*.

4.3.4.122 *ce-PDSCH-FlexibleStartPRB-CE-ModeB-r15*

This field indicates whether the UE supports flexible starting PRB for PDSCH in RRC_CONNECTED when operating in coverage enhancement mode B, as specified in TS 36.211 [17] and TS 36.213 [22]. A UE indicating support of *ce-PDSCH-FlexibleStartPRB-CE-ModeB-r15* shall also indicate support of *ce-ModeB-r13*.

4.3.4.123 *ce-PUSCH-FlexibleStartPRB-CE-ModeA-r15*

This field indicates whether the UE supports flexible starting PRB for PUSCH in RRC_CONNECTED when operating in coverage enhancement mode A, as specified in TS 36.211 [17] and TS 36.213 [22]. A UE indicating support of *ce-PUSCH-FlexibleStartPRB-CE-ModeA-r15* shall also indicate support of *ce-ModeA-r13*.

4.3.4.124 *ce-PUSCH-FlexibleStartPRB-CE-ModeB-r15*

This field indicates whether the UE supports flexible starting PRB for PUSCH in RRC_CONNECTED when operating in coverage enhancement mode B, as specified in TS 36.211 [17] and TS 36.213 [22]. A UE indicating support of *ce-PUSCH-FlexibleStartPRB-CE-ModeB-r15* shall also indicate support of *ce-ModeB-r13*.

4.3.4.125 *ce-CRS-IntfMitig-r15*

This field indicates whether the UE supports CRS interference mitigation, i.e., value *supported* indicates UE does not rely on the CRS outside certain PRBs and subframes as defined in TS 36.133 [16], clauses 3.6.1.2 and 3.6.1.3 and TS 36.213 [23] when operating in coverage enhancement mode. A UE indicating support of *ce-CRS-IntfMitig-r15* shall also indicate support of *ce-ModeA-r13*.

4.3.4.126 *ce-PDSCH-64QAM-r15*

This field indicates whether the UE supports 64QAM for non-repeated unicast PDSCH in RRC_CONNECTED when operating in coverage enhancement mode A. A UE indicating support of *ce-PDSCH-64QAM-r15* shall also indicate support of *ce-ModeA-r13*.

4.3.4.127 *ce-CQI-AlternativeTable-r15*

This field indicates whether the UE supports alternative CQI table in RRC_CONNECTED when operating in coverage enhancement mode A, as specified in TS 36.213 [22]. A UE indicating support of *ce-CQI-AlternativeTable-r15* shall also indicate support of *ce-ModeA-r13*.

4.3.4.128 *ce-PUSCH-SubPRB-Allocation-r15*

This field indicates whether the UE supports sub-PRB resource allocation for PUSCH when operating in coverage enhancement mode A or B, as specified in TS 36.211 [17] and TS 36.213 [22]. A UE indicating support of *ce-PUSCH-SubPRB-Allocation-r15* shall also indicate support of *ce-ModeA-r13*.

4.3.4.129 *wakeUpSignal-TDD-r15*

This field indicates whether the UE supports WUS for TDD as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.304 [14]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

4.3.4.130 *wakeUpSignalMinGap-eDRX-TDD-r15*

This field indicates the minimum gap required between end of WUS and start of PO by a UE indicating support of extended idle mode DRX for TDD, as specified in TS 24.301 [28]. A UE indicating support of *wakeUpSignalMinGap-eDRX-TDD-r15* shall also indicate support of *wakeUpSignal-TDD-r15* or *groupWakeUpSignalTDD-r16*.

4.3.4.131 *shortCqi-ForSCellActivation-r15*

This field defines whether the UE supports temporary CQI reporting periodicity after SCell activation as defined in TS 36.321 [4] and TS 36.331 [5].

4.3.4.132 *crs-IntfMitig-r15*

This field defines whether the UE supports CRS interference mitigation as specified in TS 36.133 [16], clause 3.6.1.1.

4.3.4.133 *srs-UpPTS-6sym-r14*

This field indicates whether the UE supports up to 6-symbol SRS in UpPTS.

4.3.4.134 *multiCarrierPagingTDD-r15*

This field defines whether the UE supports paging on non-anchor carriers for TDD, as specified in TS 36.331 [5] and TS 36.304 [14]. This field is only applicable for UEs of any *ue-Category-NB*. It is mandatory for UEs of this release of the specification.

4.3.4.135 *altMCS-Table-r15*

This field defines whether the UE supports 6-bit MCS table, see TS 36.212 [26] and TS 36.213 [22].

4.3.4.136 *ul-PowerControlEnhancements-r15*

This field defines whether the UE supports UE specific UL power control.

4.3.4.137 *additionalTransmissionSIB1-r15*

This field defines whether the UE supports additional SIB1 transmission in subframe #3 for FDD, as defined in TS 36.213 [22]. This field is only applicable for UEs of any *ue-Category-NB*.

4.3.4.138 *aperiodicCsi-ReportingSTTI-r15*

This field defines whether the UE supports aperiodic CSI reporting for STTI. If the UE indicates the support of aperiodic CSI reporting for short TTI using this field, the UE also supports the legacy aperiodic CSI capabilities for short TTI.

4.3.4.139 *dmrs-BasedSPDCCH-MBSFN-r15*

This field defines whether the UE supports sDCI monitoring in DMRS based SPDCCH for MBSFN subframe. If UE supports this, it also provides the corresponding DMRS based SPDCCH capability in *min-Proc-TimelineSubslot*.

4.3.4.140 *dmrs-BasedSPDCCH-nonMBSFN -r15*

This field defines whether the UE supports sDCI monitoring in DMRS based SPDCCH for non-MBSFN subframe. If UE supports this, it also provides the corresponding DMRS based SPDCCH capability in *min-Proc-TimelineSubslot*

4.3.4.141 *maxNumberUpdatedCSI-Proc-STTI-Comb77-r15*

This field defines, for {slot, slot}, if short TTI specific A-CSI reporting is supported, the maximum number of CSI processes to be updated per UE which aperiodic CSI is requested for CA with more than 2CCs as specified in TS 36.213 [22] which is supported by the UE.

4.3.4.142 *maxNumberUpdatedCSI-Proc-STTI-Comb27-r15*

This field defines, for {subslot, slot}, if short TTI specific A-CSI reporting is supported, the maximum number of CSI processes to be updated per UE which aperiodic CSI is requested for CA with more than 2CCs as specified in TS 36.213 [22] which is supported by the UE.

4.3.4.143 *maxNumberUpdatedCSI-Proc-STTI-Comb22-Set1-r15*

This field defines, for {subslot, subslot} set 1, if short TTI specific A-CSI reporting is supported, the maximum number of CSI processes to be updated per UE which aperiodic CSI is requested for CA with more than 2CCs as specified in TS 36.213 [22] which is supported by the UE.

4.3.4.144 *maxNumberUpdatedCSI-Proc-STTI-Comb22-Set2-r15*

This field defines, for {subslot, subslot} set 2, if short TTI specific A-CSI reporting is supported, the maximum number of CSI processes to be updated per UE which aperiodic CSI is requested for CA with more than 2CCs as specified in TS 36.213 [22] which is supported by the UE.

4.3.4.145 *powerUCI-SlotPUSCH-r15*

This field Indicates whether the UE supports BPRE derivation based on the actual derived O_CQI. The parameter uplinkPower-CSIPayload configures the UE to derive BPRE based on either the actual value of O_CQI or the largest value of O_CQI across all RI values. If the UE does not support the capability, the UE will derive BPRE based on the largest value of O_CQI across all RI values.

4.3.4.146 *powerUCI-SubslotPUSCH-r15*

This field indicates whether the UE supports BPRE derivation based on the actual derived O_CQI. The parameter uplinkPower-CSIPayload configures the UE to derive BPRE based on either the actual value of O_CQI or the largest value of O_CQI across all RI values. If the UE does not support the capability, the UE will derive BPRE based on the largest value of O_CQI across all RI values.

4.3.4.147 *spdcch-Reuse-r15*

This field indicates whether the UE supports L1 based SPDCCH reuse.

4.3.4.148 *sps-STTI-r15*

This field indicates whether the UE supports SPS in DL and/or UL for slot or subslot based PDSCH and PUSCH, respectively.

4.3.4.149 *sTTI-FD-MIMO-Coexistence-r15*

This field indicates whether the UE supports CSI feedback for more than 8 NZP CSI-RS ports on subframe based PUSCH in any serving cell and supporting sTTI in any serving cell.

4.3.4.150 *sTTI-SPT-Supported-r15*

This field indicates whether the UE supports short TTI and/or short processing time features.

4.3.4.151 *tm8-slotPDSCH-r15*

This field indicates whether the UE supports configuration and decoding of TM8 for slot PDSCH in TDD.

4.3.4.152 *tm9-slotSubslot-r15*

This field indicates whether the UE supports configuration and decoding of TM9 for slot and/or subslot PDSCH for non-MBSFN.

4.3.4.153 *tm9-slotSubslotMBSFN-r15*

This field indicates whether the UE supports configuration and decoding of TM9 for slot and/or subslot PDSCH for MBSFN.

4.3.4.154 *tm10-slotSubslot-r15*

This field indicates whether the UE supports configuration and decoding of TM10 for slot and/or subslot PDSCH for non-MBSFN.

4.3.4.155 *tm10-slotSubslotMBSFN-r15*

This field indicates whether the UE supports configuration and decoding of TM10 for slot and/or subslot PDSCH for MBSFN.

4.3.4.156 *ul-AsynchHarqSharingDiff-TTI-Lengths-r15*

This field indicates whether the UE supports UL asynchronous HARQ sharing between different TTI lengths for an UL serving cell.

4.3.4.157 *semiStaticCFI-r15*

This field indicates whether the UE supports the semi-static configuration of CFI for subframe/slot/sub-slot operation.

4.3.4.158 *semiStaticCFI-Pattern-r15*

This field indicates whether the UE supports the semi-static configuration of CFI pattern for subframe/slot/sub-slot operation. This field is only applicable for UEs supporting TDD.

4.3.4.159 *pdsch-RepSubframe-r15*

This field indicates whether the UE supports subframe PDSCH repetition. A UE indicating support of *pdsch-RepSubframe-r15* shall also indicate support of *semiStaticCFI-r15* or *semiStaticCFI-Pattern-r15*.

4.3.4.160 *pdsch-RepSlot-r15*

This field indicates whether the UE supports slot PDSCH repetition. A UE indicating support of *pdsch-RepSlot-r15* shall also indicate support of *semiStaticCFI-r15* or *semiStaticCFI-Pattern-r15*. A UE indicating support of *pdsch-RepSlot-r15* shall also indicate support of rel-15 slot PDSCH.

4.3.4.161 *pdsch-RepSubslot-r15*

This field indicates whether the UE supports subslot PDSCH repetition. This field is only applicable for UEs supporting FDD. A UE indicating support of *pdsch-RepSubslot-r15* shall also indicate support of *semiStaticCFI-r15*. A UE indicating support of *pdsch-RepSlot-r15* shall also indicate support of rel-15 subslot PDSCH.

4.3.4.162 *pusch-SPS-SubframeRepPCell-r15*

This field indicates whether the UE supports SPS repetition for subframe PUSCH for PCell. A UE indicating support of *pusch-SPS-SubFrameRepPCell-r15* shall also indicate support of *semiStaticCFI-r15* or *semiStaticCFI-Pattern-r15*.

4.3.4.163 *pusch-SPS-SubframeRepPSCell-r15*

This field indicates whether the UE supports SPS repetition for subframe PUSCH for PSCell. A UE indicating support of *pusch-SPS-SubframeRepPSCell-r15* shall also indicate support of *semiStaticCFI-r15* or *semiStaticCFI-Pattern-r15*.

4.3.4.164 *pusch-SPS-SubframeRepSCell-r15*

This field indicates whether the UE supports SPS repetition for subframe PUSCH for serving cells other than SpCell. A UE indicating support of *pusch-SPS-SubframeRepSCell-r15* shall also indicate support of *semiStaticCFI-r15* or *semiStaticCFI-Pattern-r15*.

4.3.4.165 *pusch-SPS-SlotRepPCell-r15*

This field indicates whether the UE supports SPS repetition for slot PUSCH for PCell. A UE indicating support of *pusch-SPS-SlotRepPCell-r15* shall also indicate support of *semiStaticCFI-r15* or *semiStaticCFI-Pattern-r15*. A UE indicating support of *pusch-SPS-SlotRepPCell-r15* shall also indicate support of slot PUSCH and SPS for slot PUSCH.

4.3.4.166 *pusch-SPS-SlotRepPSCell-r15*

This field indicates whether the UE supports SPS repetition for slot PUSCH for PSCell. A UE indicating support of *pusch-SPS-SlotRepPSCell-r15* shall also indicate support of *semiStaticCFI-r15* or *semiStaticCFI-Pattern-r15*. A UE indicating support of *pusch-SPS-SlotRepPSCell-r15* shall also indicate support of slot PUSCH and SPS for slot PUSCH.

4.3.4.167 *pusch-SPS-SlotRepSCell-r15*

This field indicates whether the UE supports SPS repetition for slot PUSCH for serving cells other than SpCell. A UE indicating support of *pusch-SPS-SlotRepSCell-r15* shall also indicate support of *semiStaticCFI-r15* or *semiStaticCFI-Pattern-r15*. A UE indicating support of *pusch-SPS-SlotRepSCell-r15* shall also indicate support of slot PUSCH and SPS for slot PUSCH.

4.3.4.168 *pusch-SPS-SubslotRepPCell-r15*

This field indicates whether the UE supports SPS repetition for subslot PUSCH for PCell. This field is only applicable for UEs supporting FDD. A UE indicating support of *pusch-SPS-SubslotRepPCell-r15* shall also indicate support of *semiStaticCFI-r15*. A UE indicating support of *pusch-SPS-SubslotRepPCell-r15* shall also indicate support of subslot PUSCH and SPS for subslot PUSCH.

4.3.4.169 *pusch-SPS-SubslotRepPSCell-r15*

This field indicates whether the UE supports SPS repetition for subslot PUSCH for PSCell. This field is only applicable for UEs supporting FDD. A UE indicating support of *pusch-SPS-SubslotRepPSCell-r15* shall also indicate support of *semiStaticCFI-r15*. A UE indicating support of *pusch-SPS-SubslotRepPSCell-r15* shall also indicate support of subslot PUSCH and SPS for subslot PUSCH.

4.3.4.170 *pusch-SPS-SubslotRepSCell-r15*

This field indicates whether the UE supports SPS repetition for subslot PUSCH for serving cells other than SpCell. This field is only applicable for UEs supporting FDD. A UE indicating support of *pusch-SPS-SubslotRepSCell-r15* shall also indicate support of *semiStaticCFI-r15*. A UE indicating support of *pusch-SPS-SubslotRepSCell-r15* shall also indicate support of subslot PUSCH and SPS for subslot PUSCH.

4.3.4.171 *pusch-SPS-MaxConfigSubframe-r15*

This field indicates the maximum number of multiple SPS configurations of subframe PUSCH across all cells.

4.3.4.172 *pusch-SPS-MultiConfigSubframe-r15*

This field indicates the number of multiple SPS configurations of slot PUSCH for each serving cell. A UE indicating support of *pusch-SPS-MultiConfigSubframe-r15* shall also indicate support of *pusch-SPS-SubframeRepPCell-r15*, *pusch-SPS-SubframeRepPSCell-r15* or *pusch-SPS-SubframeRepSCell-r15*.

4.3.4.173 *pusch-SPS-MaxConfigSlot-r15*

This field indicates the maximum number of multiple SPS configurations of slot PUSCH across all cells.

4.3.4.174 *pusch-SPS-MultiConfigSlot-r15*

This field indicates the number of multiple SPS configurations of subframe PUSCH for each serving cell. A UE indicating support of *pusch-SPS-MultiConfigSlot-r15* shall also indicate support of *pusch-SPS-SlotRepPCell-r15*, *pusch-SPS-SlotRepPSCell-r15* or *pusch-SPS-SlotRepSCell-r15*.

4.3.4.175 *pusch-SPS-MaxConfigSubslot-r15*

This field indicates the maximum number of multiple SPS configurations of subslot PUSCH across all cells.

4.3.4.176 *pusch-SPS-MultiConfigSubslot-r15*

This field indicates the number of multiple SPS configurations of subslot PUSCH for each serving cell. This field is only applicable for UEs supporting FDD. A UE indicating support of *pusch-SPS-MultiConfigSubslot-r15* shall also indicate support of *pusch-SPS-SubslotRepPCell-r15*, *pusch-SPS-SubslotRepPSCell-r15* or *pusch-SPS-SubslotRepSCell-r15*.

4.3.4.177 *npusch-3dot75kHz-SCS-TDD-r15*

This field defines whether the UE supports NPUSCH with 3.75kHz SCS for TDD as specified in TS 36.211 [17]. This field is only applicable for UEs of any *ue-Category-NB*. It is mandatory for UEs of this release of the specification.

4.3.4.178 *crs-IM-TM1-toTM9-OneRX-Port*

- 1) The field defines whether the DL Category 1bis UE or the DL Category M2 UE supports any of the below CRS interference mitigation (CRS-IM) features while operating in the following transmission modes (TM): TM 1, TM 2, ..., TM 8 and TM 9. CRS-IM with 2 CRS antenna ports for PDSCH with 1 receiver antenna port (as specified in TS 36.101 [6]).
- 2) CRS-IM with 4 CRS antenna ports for PDSCH with 1 receiver antenna port (as specified in TS 36.101 [6]).

The UE shall not include the field if it does not support CRS IM in TMs 1-9.

4.3.4.179 *cch-IM-RefRecTypeA-OneRX-Port*

The field defines whether the DL Category 1bis UE or DL Category M2 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 TS 36.101 [6]).

For DL Category 1bis UE, if this field is present, the UE supports any of the following features:

- 1) Enhanced downlink control channel interference mitigation Type A receiver for 2 CRS antenna ports with 1 receiver antenna port (as specified in TS 36.101 [6]).
- 2) Enhanced downlink control channel interference mitigation Type A receiver for 4 CRS antenna ports with 1 receiver antenna port (as specified in TS 36.101 [6]).

For DL Category M2 UE, if this field is present, the UE supports the following feature:

- 1) Enhanced downlink control channel interference mitigation Type A receiver for 2 CRS antenna ports with 1 receiver antenna port (as specified in TS 36.101 [6]).

4.3.4.180 *dmrs-OverheadReduction-r15*

This field defines whether the UE supports OCC4 for rank 3 and 4 transmission as specified in clause 5.3.3.1.5C of TS 36.212 [26].

4.3.4.181 *srs-DCI7-TriggeringFS2-r15*

This field indicates whether the UE supports SRS triggering via DCI format 7 for FS2.

4.3.4.182 *npusch-MultiTB-r16*

This field indicates whether the UE supports multiple TB scheduling in the uplink for FDD as specified in TS 36.213 [22]. A UE indicating support of *npusch-MultiTB-r16* shall also indicate support of *twoHARQ-Processes-r14*. This feature is only applicable if the UE supports category NB2.

4.3.4.183 *npdsch-MultiTB-r16*

This field indicates whether the UE supports multiple TB scheduling in the downlink for FDD as specified in TS 36.213 [22]. A UE indicating support of *npdsch-MultiTB-r16* shall also indicate support of *twoHARQ-Processes-r14*. This feature is only applicable if the UE supports category NB2.

4.3.4.184 *pusch-MultiTB-CE-ModeA-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast in the uplink when the UE is operating in coverage enhancement mode A as specified in TS 36.213 [22]. A UE indicating support of *pusch-MultiTB-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.185 *pdsch-MultiTB-CE-ModeA-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast in the downlink when the UE is operating in coverage enhancement mode A as specified in TS 36.213 [22]. A UE indicating support of *pdsch-MultiTB-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.186 *pusch-MultiTB-CE-ModeB-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast in the uplink when the UE is operating in coverage enhancement mode B as specified in TS 36.213 [22]. A UE indicating support of *pusch-MultiTB-CE-ModeB-r16* shall also indicate support of *ce-ModeB-r13*.

4.3.4.187 *pdsch-MultiTB-CE-ModeB-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast in the downlink when the UE is operating in coverage enhancement mode B as specified in TS 36.213 [22]. A UE indicating support of *pdsch-MultiTB-CE-ModeB-r16* shall also indicate support of *ce-ModeB-r13*.

4.3.4.188 *ce-CSI-RS-Feedback-r16*

This field indicates whether the UE supports CSI-RS based feedback when the UE is operating in coverage enhancement mode A, as specified in TS 36.213 [22]. A UE indicating support of *ce-CSI-RS-Feedback-r16* shall also indicate support of *ce-ModeA-r13*. This feature is only applicable if UE supports a UE Category other than Category M1 and M2.

4.3.4.188a *ce-CSI-RS-FeedbackCodebookRestriction-r16*

This field indicates whether the UE supports codebook subset restriction for CSI-RS-based feedback when the UE is operating in coverage enhancement mode A, as specified in TS 36.213 [22]. A UE indicating support of *ce-CSI-RS-FeedbackCodebookRestriction-r16* shall also indicate support of *ce-CSI-RS-Feedback-r16*.

4.3.4.189 *mpdcch-InLteControlRegionCE-ModeA-r16*

This field indicates whether the UE supports MPDCCH reception in the LTE control channel region when the UE is operating in coverage enhancement mode A as specified in TS 36.211 [17]. A UE indicating support of *mpdcch-InLteControlRegionCE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.189a *mpdcch-InLteControlRegionCE-ModeB-r16*

This field indicates whether the UE supports MPDCCH reception in the LTE control channel region when the UE is operating in coverage enhancement mode B as specified in TS 36.211 [17]. A UE indicating support of *mpdcch-InLteControlRegion-CE-ModeB-r16* shall also indicate support of *ce-ModeB-r13*.

4.3.4.189b *pdsch-InLteControlRegionCE-ModeA-r16*

This field indicates whether the UE supports PDSCH reception in the LTE control channel region when the UE is operating in coverage enhancement mode A as specified in TS 36.211 [17]. A UE indicating support of *pdsch-InLteControlRegionCE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.189c *pdsch-InLteControlRegionCE-ModeB-r16*

This field indicates whether the UE supports PDSCH reception in the LTE control channel region when the UE is operating in coverage enhancement mode B as specified in TS 36.211 [17]. A UE indicating support of *pdsch-InLteControlRegionCE-ModeB-r16* shall also indicate support of *ce-ModeB-r13*.

4.3.4.190 *crs-ChEstMPDCCH-CE-ModeA-r16*

This field indicates whether the UE supports MPDCCH performance improvement with precoder cycling when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. A UE indicating support of *crs-ChEstMPDCCH-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.190a *crs-ChEstMPDCCH-CE-ModeB-r16*

This field indicates whether the UE supports MPDCCH performance improvement with precoder cycling when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. A UE indicating support of *crs-ChEstMPDCCH-CE-ModeB-r16* shall also indicate support of *ce-ModeB-r13*.

4.3.4.190b *crs-ChEstMPDCCH-CSI-r16*

This field indicates whether the UE supports MPDCCH performance improvement with CSI-based mapping when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. A UE indicating support of *crs-ChEstMPDCCH-CSI-r16* shall also indicate support of *crs-ChEstMPDCCH-CE-ModeA-r16*.

4.3.4.190c *crs-ChEstMPDCCH-ReciprocityTDD-r16*

This field indicates whether the UE supports MPDCCH performance improvement with reciprocity-based candidates for TDD when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. A UE indicating support of *crs-ChEstMPDCCH-ReciprocityTDD-r16* shall also indicate support of *crs-ChEstMPDCCH-CE-ModeA-r16*.

4.3.4.191 *widebandPRG-Slot-r16, widebandPRG-Subslot-r16, widebandPRG-Subframe-r16*

This field indicates whether the UE supports wideband precoding resource block group size for slot/subslot/subframe PDSCH operation as specified in TS 36.213 [22].

4.3.4.192 *npusch-MultiTB-Interleaving-r16*

This field indicates whether the UE supports interleaved transmissions when multiple TB scheduling is scheduled in the uplink for NB-IoT FDD as specified in TS 36.213 [22]. A UE indicating support of *npusch-MultiTB-Interleaving-r16* shall also indicate support of *twoHARQ-Processes-r14*. This feature is only applicable if the UE supports category NB2.

4.3.4.193 *npdsch-MultiTB-Interleaving-r16*

This field indicates whether the UE supports interleaved transmissions when multiple TB scheduling is scheduled in the downlink for NB-IoT FDD as specified in TS 36.213 [22]. A UE indicating support of *npdsch-MultiTB-Interleaving-r16* shall also indicate support of *twoHARQ-Processes-r14*. This feature is only applicable if the UE supports category NB2.

4.3.4.194 *multiTB-HARQ-AckBundling-r16*

This field indicates whether the UE supports HARQ ACK bundling for interleaved transmission in the downlink for NB-IoT FDD as specified in TS 36.213 [22]. A UE indicating support of *multiTB-HARQ-AckBundling-r16* shall also indicate support of *npdsch-multiTB-Interleaving-r16*. This feature is only applicable if the UE supports category NB2.

4.3.4.195 *groupWakeUpSignal-r16*

This field indicates whether the UE supports Group WUS without group resource alternation for FDD in RRC_IDLE as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.304 [14]. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

4.3.4.196 *groupWakeUpSignalAlternation-r16*

This field indicates whether the UE supports Group WUS with group resource alternation for FDD in RRC_IDLE as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.304 [14]. A UE indicating support of *groupWakeUpSignalAlternation-r16* shall also indicate support of *groupWakeUpSignal-r16*. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

4.3.4.197 *subframeResourceResvUL-r16*

This field indicates whether the UE supports UL resource reservation with subframe-level granularity on non-anchor carriers e.g. for NB-IoT coexistence with NR, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.4.198 *subframeResourceResvDL-r16*

This field indicates whether the UE supports DL resource reservation with subframe-level granularity on non-anchor carriers e.g. for NB-IoT coexistence with NR, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.4.199 *slotSymbolResourceResvUL-r16*

This field indicates whether the UE supports UL resource reservation with slot-level granularity on non-anchor carriers e.g. for NB-IoT coexistence with NR, as specified in TS 36.211[17]. A UE indicating support of *slotSymbolResourceResvUL-r16* shall also indicate support of *subframeResourceResvUL-r16*. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.4.200 *slotSymbolResourceResvDL-r16*

This field indicates whether the UE supports DL resource reservation with slot-level granularity on non-anchor carriers e.g. for NB-IoT coexistence with NR, as specified in TS 36.211[17]. A UE indicating support of *slotSymbolResourceResvDL-r16* shall also indicate support of *subframeResourceResvDL-r16*. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.4.201 *groupWakeUpSignalTDD-r16*

This field indicates whether the UE supports Group WUS without group resource alternation for TDD in RRC_IDLE as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.304 [14]. A UE indicating support of *groupWakeUpSignalTDD-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.202 *groupWakeUpSignalAlternationTDD-r16*

This field indicates whether the UE supports Group WUS with group resource alternation for TDD in RRC_IDLE as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.304 [14]. A UE indicating support of *groupWakeUpSignalAlternationTDD-r16* shall also indicate support of *groupWakeUpSignalTDD-r16*.

4.3.4.203 *subframeResourceResvUL-CE-ModeA-r16*

This field indicates whether the UE supports UL resource reservation with subframe-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. A UE indicating support of *subframeResourceResvUL-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.204 *subframeResourceResvUL-CE-ModeB-r16*

This field indicates whether the UE supports UL resource reservation with subframe-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. A UE indicating support of *subframeResourceResvUL-CE-ModeB-r16* shall also indicate support of *ce-ModeB-r13*.

4.3.4.205 *subframeResourceResvDL-CE-ModeA-r16*

This field indicates whether the UE supports DL resource reservation with subframe-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. A UE indicating support of *subframeResourceResvDL-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.206 *subframeResourceResvDL-CE-ModeB-r16*

This field indicates whether the UE supports DL resource reservation with subframe-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. A UE indicating support of *subframeResourceResvDL-CE-ModeB-r16* shall also indicate support of *ce-ModeB-r13*.

4.3.4.207 *slotSymbolResourceResvUL-CE-ModeA-r16*

This field indicates whether the UE supports UL resource reservation with slot/symbol-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. A UE indicating support of *slotSymbolResourceResvUL-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.208 *slotSymbolResourceResvUL-CE-ModeB-r16*

This field indicates whether the UE supports UL resource reservation with slot/symbol-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. A UE indicating support of *slotSymbolResourceResvUL-CE-ModeB-r16* shall also indicate support of *ce-ModeB-r13*.

4.3.4.209 *slotSymbolResourceResvDL-CE-ModeA-r16*

This field indicates whether the UE supports DL resource reservation with slot/symbol-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. A UE indicating support of *slotSymbolResourceResvDL-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.210 *slotSymbolResourceResvDL-CE-ModeB-r16*

This field indicates whether the UE supports DL resource reservation with slot/symbol-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. A UE indicating support of *slotSymbolResourceResvDL-CE-ModeB-r16* shall also indicate support of *ce-ModeB-r13*.

4.3.4.211 *subcarrierPuncturingCE-ModeA-r16*

This field indicates whether the UE supports DL subcarrier puncturing e.g. for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. A UE indicating support of *subcarrierPuncturing-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.4.212 *subcarrierPuncturingCE-ModeB-r16*

This field indicates whether the UE supports DL subcarrier puncturing e.g. for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. A UE indicating support of *subcarrierPuncturing-CE-ModeA-r16* shall also indicate support of *ce-ModeB-r13*.

4.3.4.213 *ce-MultiTB-Interleaving-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with TB interleaving as specified in TS 36.213 [22]. A UE indicating support of *ce-MultiTB-Interleaving-r16* shall also indicate support of *pusch-MultiTB-CE-ModeA-r16* or *pdsch-MultiTB-CE-ModeA-r16* or *pusch-MultiTB-CE-ModeB-r16* or *pdsch-MultiTB-CE-ModeB-r16*.

4.3.4.214 *ce-MultiTB-HARQ-AckBundling-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with HARQ bundling as specified in TS 36.213 [22]. A UE indicating support of *ce-MultiTB-HARQ-AckBundling-r16* shall also indicate support of *pusch-*

MultiTB-CE-ModeA-r16 or *pdsch-MultiTB-CE-ModeA-r16* or *pusch-MultiTB-CE-ModeB-r16* or *pdsch-MultiTB-CE-ModeB-r16*.

4.3.4.215 *ce-MultiTB-SubPRB-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with UL sub-PRB as specified in TS 36.213 [22]. A UE indicating support of *ce-MultiTB-SubPRB-r16* shall also indicate support of (*pusch-MultiTB-CE-ModeA-r16* or *pusch-MultiTB-CE-ModeB-r16*) and *ce-PUSCH-SubPRB-Allocation-r15*.

4.3.4.216 *ce-MultiTB-EarlyTermination-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with UL early termination as specified in TS 36.213 [22]. A UE indicating support of *ce-MultiTB-EarlyTermination-r16* shall also indicate support of (*pusch-MultiTB-CE-ModeA-r16* or *pusch-MultiTB-CE-ModeB-r16*).

4.3.4.217 *ce-MultiTB-64QAM-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with 64QAM in the downlink when the UE is operating in coverage enhancement mode A as specified in TS 36.213 [22]. A UE indicating support of *ce-MultiTB-64QAM-r16* shall also indicate support of (*pdsch-MultiTB-CE-ModeA-r16* and *ce-pdsch-64QAM-r15*).

4.3.4.218 *ce-MultiTB-FrequencyHopping-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with frequency hopping as specified in TS 36.213 [22]. A UE indicating support of *ce-MultiTB-FrequencyHopping-r16* shall also indicate support of (*pusch-MultiTB-CE-ModeA-r16* or *pdsch-MultiTB-CE-ModeA-r16* or *pusch-MultiTB-CE-ModeB-r16* or *pdsch-MultiTB-CE-ModeB-r16*).

4.3.4.219 Void

4.3.4.220 *virtualCellID-BasicSRS-r16*

Indicates whether the UE supports virtual cell ID for basic SRS symbol(s).

4.3.4.221 *addSRS-r16*

Presence of this field indicates the UE supports the additional SRS symbol(s) within the normal UL subframes in TDD as described in TS 36.213 [23].

4.3.4.221.1 *addSRS-1T2R-r16*

Indicates whether the UE supports selecting one antenna among two antennas to transmit additional SRS symbol(s) for the corresponding band of the band combination as described in TS 36.213 [23]. This field can be included only if *addSRS-r16* is included.

4.3.4.221.2 *addSRS-1T4R-r16*

Indicates whether the UE supports selecting one antenna among four antennas to transmit additional SRS symbol(s) for the corresponding band of the band combination as described in TS 36.213 [23]. This field can be included only if *addSRS-r16* is included.

4.3.4.221.3 *addSRS-2T4R-2Pairs-r16*

Indicates whether the UE supports selecting one antenna pair between two antenna pairs to transmit additional SRS symbol(s) simultaneously for the corresponding band of the band combination as described in TS 36.213 [23]. This field can be included only if *addSRS-r16* is included.

4.3.4.221.4 *addSRS-2T4R-3Pairs-r16*

Indicates whether the UE supports selecting one antenna pair among three antenna pairs to transmit additional SRS symbol(s) simultaneously for the corresponding band of the band combination as described in TS 36.213 [23]. This field can be included only if *addSRS-r16* is included.

4.3.4.221.5 *addSRS-AntennaSwitching-r16*

Indicates the antenna switching capabilities for additional SRS symbol(s). This field can be included only if *addSRS-r16* is included.

If signalled in *addSRS*, value *useBasic* indicates the antenna switching capabilities for additional SRS symbol(s) for a band of band combination for which the capability is not signalled in *bandParameterList-v1610* is the same as indicated by *bandParameterList-v1380* and/or *bandParameterList-v1530* for the concerned band of band combination.

If signalled in *bandParameterList-v1610*, the field indicates the antenna switching capabilities for additional SRS symbol(s) for the concerned band of band combination.

4.3.4.221.6 *addSRS-CarrierSwitching-r16*

Indicates the carrier switching capabilities for additional SRS symbol(s). This field can be included only if *addSRS-r16* and *srs-CapabilityPerBandPairList-r14* are included.

If signalled in *addSRS*, the field indicates whether carrier switching is supported for additional SRS symbol(s) for all band pairs of band combinations for which UE supports SRS carrier switching. If signalled in *addSRS*, the field in *bandParameterList-v1610* is not signalled.

If signalled in *bandParameterList-v1610*, the field indicates whether carrier switching is supported for additional SRS symbol(s) for the concerned band pair of band combination. If signalled in *bandParameterList-v1610*, the field in *addSRS* is not signalled.

4.3.4.221.7 *addSRS-FrequencyHopping-r16*

Indicates the frequency hopping capabilities for additional SRS symbol(s). This field can be included only if *addSRS-r16* is included.

If signalled in *addSRS*, the field indicates whether frequency hopping is supported for additional SRS symbol(s) for all bands of band combinations for which the capability is not signalled in *bandParameterList-v1610*.

If signalled in *bandParameterList-v1610*, the field indicates whether frequency hopping is supported for additional SRS symbol(s) for the concerned band of band combination.

4.3.4.221.8 *virtualCellID-AddSRS-r16*

Indicates whether the UE supports virtual cell ID for additional SRS symbol(s).

4.3.4.222 *npdsch-16QAM-r17*

This field indicates whether the UE supports 16QAM for DL unicast, as specified in TS 36.211 [17], TS 36.212 [26] and TS 36.213 [22]. This feature is only applicable if the UE supports category NB2.

4.3.4.223 *npusch-16QAM-r17*

This field indicates whether the UE supports 16QAM for UL unicast, as specified in TS 36.211 [17], TS 36.212 [26] and TS 36.213 [22]. This feature is only applicable if the UE supports category NB2.

4.3.4.224 *ce-PDSCH-MaxTBS-r17*

This field indicates whether the UE supports the maximum DL TBS size of 1736 bits in 1.4 MHz when operating in coverage enhancement mode A as specified in TS 36.213 [22]. A UE indicating support of *ce-PDSCH-MaxTBS-r17* shall also indicate support of *ce-ModeA-r13*.

4.3.4.225 *ce-PDSCH-14HARQProcesses-r17*

This field indicates whether the UE supports 14 DL HARQ processes with HARQ-ACK delay solution Alt-1 in FDD when operating in coverage enhancement mode A, as specified in TS 36.212 [26] and TS 36.213 [22]. A UE indicating support of *ce-PDSCH-14HARQProcesses-r17* shall also indicate support of *ce-ModeA-r13*.

4.3.4.226 *ce-PDSCH-14HARQProcesses-Alt2-r17*

This field indicates whether the UE supports 14 DL HARQ processes with HARQ-ACK delay solution Alt-2 in FDD when operating in coverage enhancement mode A, as specified in TS 36.212 [26] and TS 36.213 [22]. A UE indicating support of *ce-PDSCH-14HARQProcesses-Alt2-r17* shall also indicate support of *ce-PDSCH-14HARQProcesses-r17*.

4.3.5 RF parameters

4.3.5.1 *supportedBandListEUTRA*

This field defines which E-UTRA radio frequency bands, see TS 36.101 [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.

4.3.5.1.3 *ue-CA-PowerClass-N*

This field defines the power class the UE supports for a E-UTRA band combination, 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 combination, as specified in TS 36.101 [6].

4.3.5.1A *supportedBandList-r13*

This field defines which NB-IoT radio frequency bands, as specified in TS 36.101 [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].

4.3.5.1A.2 *powerClassNB-14dBm-r14*

This field defines whether the UE supports power class 14 dBm in NB-IoT for all the bands that are supported by the UE, as specified in TS 36.101 [6]. The UE shall not include the field if it includes *powerClassNB-20dBm-r13*.

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 may indicate support for MBMS reception from FeMBMS/Uncast mixed cells (*fembmsMixedCell*) or MBMS-dedicated cells (*fembmsDedicatedCell*). 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 (*sctm-SCell*) and for any cell that may be additionally configured as an SCell (*sctm-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.

While reporting the sTTI/sPT capabilities, the UE is allowed to report the same band combination more than once with this IE, if the UE supports different combinations of the corresponding sTTI/sPT capabilities.

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 parent band combination.

NOTE: A fallback band combination may have multiple different parent band combinations.

While reporting the sTTI/sPT capabilities, the UE is allowed to report the same band combination more than once with this IE, if the UE supports different combinations of the corresponding sTTI/sPT capabilities.

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. It is mandatory for UEs to support 2 TAGs for inter-frequency DAPS handover.

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. The sTTI/sPT capabilities are also considered by the UE when using this field.

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. UE that indicates support for this shall also indicate support for *requestReducedFormat-r13*. In this release of the specification, UEs capable of *supportedBandCombinationReduced* shall indicate support for *skipFallbackCombinations-r13*.

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* (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* or *FeatureSetDL-PerCC* for MR-DC, UE supports the configuration of *maxLayersMIMO* for these cases regardless of indicating *maxLayersMIMO-Indication*.

4.3.5.24 *rf-RetuningTimeDL-r14*

This field indicates the interruption time on DL reception within a band pair during the RF retuning for switching between the band pair to transmit SRS on a PUSCH-less SCell as specified in TS 36.331 [5]. This field is mandatory present if switching between the band pair is supported.

4.3.5.25 *rf-RetuningTimeUL-r14*

This field indicates the interruption time on UL transmission within a band pair during the RF retuning for switching between the band pair to transmit SRS on a PUSCH-less SCell as specified in TS 36.331 [5]. This field is mandatory present if switching between the band pair is supported.

4.3.5.26 *diffFallbackCombReport-r14*

This field indicates whether the UE supports reporting of UE radio access capabilities for the CA band combinations asked by the eNB as well as, if any, reporting of different UE radio access capabilities for their fallback band combination as specified in TS 36.331 [5]. The UE does not report fallback combinations if their UE radio access capabilities are the same as the ones for the CA band combination asked by the eNB. UEs capable of *supportedBandCombinationReduced* shall indicate support for *diffFallbackCombReport-r14*. UE that indicates support for this shall also indicate support for *requestReducedFormat-r13*.

4.3.5.27 *v2x-SupportedTxBandCombListPerBC-r14, v2x-SupportedRxBandCombListPerBC-r14*

This field indicates, for a particular band combination of EUTRA, the supported band combination list among *v2x-SupportedTxBandCombinationList* or *v2x-SupportedRxBandCombinationList* on which the UE supports simultaneous transmission and reception of EUTRA and V2X sidelink communication respectively.

4.3.5.28 *txAntennaSwitchDL-r13*

The field indicates the entry number of the first-listed band with UL in the band combination that causes this DL to be affected when transmit antenna switching occurs. If this field is not included, this DL is not affected by transmit antenna switching. All DL and UL that switch together indicate the same entry number.

4.3.5.29 *txAntennaSwitchUL-r13*

The presence of this field indicates the UE supports transmit antenna selection for this UL band in the band combination as described in TS 36.213 [22], clauses 8.2 and 8.7.

The field indicates the entry number of the first-listed band with UL in the band combination that switches together with this UL when transmit antenna switching occurs. All DL and UL that switch together indicate the same entry number.

4.3.5.30 *supportedMIMO-CapabilityDL-r15*

This field defines the number of downlink MIMO layers the UE supports when the UE is configured with sTTI. Only two layers or four layers for MIMO support using this field are applicable with sTTI.

4.3.5.31 *dl-1024QAM-r15*

This field defines whether the UE supports 1024QAM in DL on this band or on this band within the band combination as described in TS 36.331 [5]. This field is only applicable for UEs of DL category 20, 22 and onwards.

When *dl-1024QAM-ScalingFactor-r15* and *dl-1024QAM-TotalWeightedLayers-r15* are included, the UE supports 1024QAM in a set of CCs in a band combination if the CCs belong to bands indicated to support 1024QAM in that band combination, and the 1024QAM processing capability condition described by equation 4.3.5.31-1 is satisfied.

$$w \cdot l_{1024QAM} + l_{non1024QAM} \leq y$$

where:

- w is the scaling factor for processing a CC configured with 1024QAM with respect to a CC not configured with 1024QAM as indicated by *dl-1024QAM-ScalingFactor-r15*,
- $l_{1024QAM}$ is the total number of DL layers across all CCs configured with 1024QAM,
- $l_{non1024QAM}$ is the total number of DL layers across all CCs not configured with 1024QAM, and
- y is total number of weighted layers the UE can process for 1024QAM. Value of y is indicated by *dl-1024QAM-TotalWeightedLayers-r15* for all band combinations except for those (NG)EN-DC/NE-DC band combinations for which *dl-1024QAM-TotalWeightedLayers* is included in *ca-ParametersEUTRA* (see TS 38.306 [32] and TS 38.331 [35]).

Equation 4.3.5.31-1: 1024QAM processing capability condition.

NOTE: The 1024QAM processing capability condition described by equation 4.3.5.31-1 applies only when at least one of the CCs in a band combination is configured with 1024QAM.

4.3.5.32 *srs-MaxSimultaneousCCs-r14*

This field indicates, for a particular band combination, the maximum number of simultaneously configurable target CCs supported by the UE for SRS switching.

4.3.5.33 *powerClass-14dBm-r15*

This field defines whether the UE supports power class 14 dBm when operating in coverage enhancement mode A or B for all the bands that are supported by the UE, as specified in TS 36.101 [6]. A UE indicating support of *powerClass-14dBm-r15* shall also indicate support of *ce-ModeA-r13*.

4.3.5.34 *supportedMIMO-CapabilityDL-MRDC-r15*

This field indicates in MR-DC the maximum number of supported layers in TM9/10 for the component carrier in the corresponding bandwidth class.

4.3.5.35 *srs-FlexibleTiming-r14*

This field indicates, for a particular band pair, whether the UE supports configuration of *soundingRS-FlexibleTiming-r14*. For a TDD-TDD band pair, UE shall include at least one of *srs-FlexibleTiming-r14* and/or *srs-HARQ-ReferenceConfig-r14* when *rf-RetuningTimeDL-r14* or *rf-RetuningTimeUL-r14* corresponding to the band pair is larger than 1 OFDM symbol.

4.3.5.36 *srs-HARQ-ReferenceConfig-r14*

This field indicates, for a particular band pair, whether the UE supports configuration of *harq-ReferenceConfig-r14*. For a TDD-TDD band pair, UE shall include at least one of *srs-FlexibleTiming-r14* and/or *srs-HARQ-ReferenceConfig-r14* when *rf-RetuningTimeDL-r14* or *rf-RetuningTimeUL-r14* corresponding to the band pair is larger than 1 OFDM symbol.

4.3.5.37 *fourLayerTM3-TM4-r15*

This field indicates whether the UE supports 4-layer spatial multiplexing for TM3 and TM4 for MR-DC within the indicated feature set.

NOTE: Cat5 UE supporting only 2-layer spatial multiplexing will still determine the RI bit width according to TS 36.212 [26], which means it may still use 2-bit RI bit width despite not supporting more than 2-layer spatial multiplexing.

4.3.5.38 *supportedCSI-Proc-r15*

This field indicates in MR-DC the number of CSI processes for the component carrier in the corresponding bandwidth class.

4.3.5.39 *intraFreqAsyncDAPS-r16*

This field indicates whether the UE supports asynchronous DAPS handover in source PCell and intra-frequency target PCell.

4.3.5.40 *intraFreqDAPS-r16*

This field indicates whether the UE supports DAPS handover in source PCell and intra-frequency target PCell, i.e. support of simultaneous DL reception of PDCCH and PDSCH from source and target cell. A UE indicating this capability shall also support synchronous DAPS handover, and single UL transmission for intra-frequency DAPS handover.

4.3.5.41 *Void*

4.3.5.42 *interFreqAsyncDAPS-r16*

This field indicates whether the UE supports asynchronous DAPS handover in source PCell and inter-frequency target PCell.

4.3.5.43 *interFreqDAPS-r16*

This field indicates whether the UE supports DAPS handover in source PCell and inter-frequency target PCell, i.e. support of simultaneous DL reception of PDCCH and PDSCH from source and target cell. For a BC, the capability applies to every carrier pair for source and target. A UE indicating this capability shall also support synchronous DAPS handover, and single UL transmission for inter-frequency DAPS handover.

4.3.5.44 *interFreqMultiUL-TransmissionDAPS-r16*

This field indicates whether the UE supports simultaneous UL transmission in source PCell and inter-frequency target PCell.

4.3.5.45 *intraFreqTwoTAGs-DAPS-r16*

This field indicates whether the UE supports different timing advance groups in source PCell and intra-frequency target PCell. It is mandatory for *intraFreqDAPS* capable UE.

4.3.5.46 *v2x-SupportedTxBandCombListPerBC-v1630, v2x-SupportedRxBandCombListPerBC-v1630*

This field indicates, for a particular band combination of EUTRA, the supported band combination list among *v2x-SupportedBandCombinationListEUTRA-NR* on which the UE supports simultaneous transmission or reception of EUTRA and NR sidelink communication respectively, or simultaneous transmission or reception of EUTRA and mixed V2X sidelink and NR sidelink communication respectively.

4.3.5.47 *scalingFactorTxSidelink-r16, scalingFactorRxSidelink-r16*

This field indicates, for a particular band combination of EUTRA, the scaling factor, as defined in TS 38.306 [32], for the PC5 band combination(s) *v2x-SupportedBandCombinationListEUTRA-NR* on which the UE supports simultaneous transmission/reception of EUTRA and NR sidelink communication respectively, or simultaneous transmission or reception of EUTRA and joint V2X sidelink communication and NR sidelink communication respectively (as indicated by *v2x-SupportedTxBandCombListPerBC-v1630 / v2x-SupportedRxBandCombListPerBC-v1630*). The leading / leftmost value corresponds to the first band combination included in *v2x-SupportedBandCombinationListEUTRA-NR* which is indicated with value 1 by *v2x-SupportedTxBandCombListPerBC-v1630 / v2x-SupportedRxBandCombListPerBC-v1630*, the next value corresponds to the second band combination included in *v2x-SupportedBandCombinationListEUTRA-NR* which is indicated with value 1 by *v2x-SupportedTxBandCombListPerBC-v1630 / v2x-SupportedRxBandCombListPerBC-v1630* and so on.

4.3.5.48 *interBandPowerSharingSyncDAPS-r16*

This field indicates whether the UE supports power sharing for inter-band synchronous DAPS handovers as defined in TS 36.213 [22].

A UE that supports power sharing for inter-band synchronous DAPS handovers shall also support inter-frequency DAPS handovers.

4.3.5.49 *interBandPowerSharingAsyncDAPS-r16*

This field indicates whether the UE supports power sharing for inter-band asynchronous DAPS handovers as defined in TS 36.213 [22].

A UE that supports power sharing for inter-band asynchronous DAPS handovers shall also support inter-frequency DAPS handovers.

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 and 1bis 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 *allowedCellList-r13*

This field defines whether the UE supports configuration and use of allow-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.

A UE supporting NR SA operation shall support extended E-UTRA frequency priorities and NR frequency priorities as specified in TS 36.331 [9] 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 field 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].

4.3.6.21 Void

4.3.6.22 Void

4.3.6.23 *ceMeasurements-r14*

This field defines whether the UE supports intra-frequency RSRQ measurements and inter-frequency RSRP and RSRQ measurements in RRC_CONNECTED, as specified in TS 36.133 [16], TS 36.304 [14] and TS 36.331 [5]. In this release of specification, it is mandatory for UEs of Category M1 and M2 and UEs that support coverage enhancements to support *ceMeasurements-r14*. A UE indicating support of *ceMeasurements-r14* shall also indicate support of *ce-ModeA-r13*.

4.3.6.24 *ncsg-r14*

This field defines whether the UE supports NCSG gap as specified in TS 36.133 [16]. If the UE supports *ncsg-r14* and asynchronous DC, the UE shall support NCSG Pattern Id 0, 1, 2 and 3. If the UE supports *ncsg-r14* but the UE does not support asynchronous DC, only NCSG Pattern Id 0 and 1 shall be supported.

4.3.6.25 *perServingCellMeasurementGap-r14*

This field defines whether the UE supports per CC measurement gap as specified in TS 36.331 [5].

4.3.6.26 *shortMeasurementGap-r14*

This field defines whether the UE supports shorter measurement gap length (i.e. *gp2* and *gp3*) in LTE standalone as specified in TS 36.133 [16], and for independent measurement gap configuration on FR1 and per-UE gap in (NG)EN-DC as specified in TS38.133 [37].

4.3.6.27 *nonUniformGap-r14*

This field defines whether the UE supports measurement non uniform Pattern Id 1, 2, 3 and 4 in LTE standalone as specified in TS 36.133 [16].

4.3.6.28 *rlm-ReportSupport-r14*

This field defines whether the UE supports RLM event and information reporting as specified in TS 36.133 [16].

4.3.6.29 Void

4.3.6.30 *qoe-MeasReport-r15*

This field defines whether the UE supports QoE Measurement Collection for streaming services.

4.3.6.31 *ca-IdleModeMeasurements-r15*

This field defines whether the UE supports performing eNB-configured CRS-based RRM measurements for configured carrier(s) in RRC_IDLE mode, including reporting them when requested by eNB while in RRC_CONNECTED, as specified in TS 36.331 [5].

4.3.6.32 *ca-IdleModeValidityArea-r15*

This field defines whether the UE supports configuration of *validityArea* for performing eNB-configured CRS-based RRM measurements for configured carrier(s) in RRC_IDLE mode, as specified in TS 36.331 [5]. A UE that supports this feature shall also indicate support of *ca-IdleModeMeasurements-r15*.

4.3.6.33 *qoe-MTSI-MeasReport-r15*

This field defines whether the UE supports QoE Measurement Collection for MTSI services.

4.3.6.34 *multipleCellsMeasExtension-r15*

This field defines whether the UE supports measurement reporting triggered based on a number of cells. It is mandatory to support this feature for UEs which have Aerial UE subscription as defined in TS 23.401 [18].

4.3.6.35 *heightMeas-r15*

This field defines whether the UE supports height-based measurement reporting as specified in TS 36.331 [5]. It is mandatory to support this feature for UEs which have Aerial UE subscription as defined in TS 23.401 [18].

4.3.6.36 *measGapPatterns-r15*

This field defines whether the UE that supports NR supports gap patterns 4 to 11 in LTE standalone as specified in TS 36.133 [16], and for independent measurement gap configuration on FR1 and per-UE gap in (NG)EN-DC as specified in TS38.133 [37].

4.3.6.37 *dl-ChannelQualityReporting-r16*

This field indicates whether the UE supports DL channel quality reporting of the configured carrier for FDD in RRC_CONNECTED as specified in TS 36.321 [4]. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.6.37a *ce-DL-ChannelQualityReporting-r16*

This field indicates whether the UE supports DL channel quality reporting of the serving cell when the UE is operating in coverage enhancement mode A or B in RRC_CONNECTED as specified in TS 36.321 [4]. A UE indicating support of *ce-DL-ChannelQualityReporting-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.6.38 *interRAT-NeedForGapsNR-r16*

This field defines for each supported E-UTRA band or band combination whether measurement gaps are required to perform SSB based inter-RAT measurements on each supported NR band.

4.3.6.39 *ce-MeasRSS-Dedicated-r16*

This field indicates whether the UE supports improved DL RSRP measurement accuracy through use of RSS in RRC_CONNECTED, and whether the UE supports measurement of neighbour cell RSS in the same narrowband as the MPDCCH, when the UE is operating in coverage enhancement mode A or B as specified in 36.133 [16]. A UE indicating support of *ce-MeasRSS-Dedicated-r16* shall also support resynchronization signals as defined in 6.8.8.

4.3.6.39a *ce-MeasRSS-DedicatedSameRBs-r16*

This field indicates whether the UE supports improved DL RSRP measurement accuracy through use of RSS in RRC_CONNECTED, and whether the UE supports measurement of neighbour cell RSS in the same 2-RBs as the serving cell RSS 2-RBs, when the UE is operating in coverage enhancement mode A or B as specified in 36.133 [16]. A UE indicating support of *ce-MeasRSS-Dedicated-r16* shall also support resynchronization signals as defined in 6.8.8. A UE indicating support of *ce-MeasRSS-DedicatedSameRBs-r16* shall not indicate support of *ce-MeasRSS-Dedicated-r16*.

4.3.6.40 *eutra-IdleInactiveMeasurements-r16*

This field defines whether the UE supports:

- (if the UE also indicates support of *inactiveState-r15*), performing eNB-configured CRS-based RRM measurements for configured carrier(s) in RRC_INACTIVE, including reporting them when requested by the eNB while resuming from RRC_INACTIVE or in RRC_CONNECTED, as specified in TS 36.331 [5];
- (if the UE also indicates support of RRC connection suspension), reporting eNB-configured CRS-based RRM measurements for configured carrier(s) in RRC_IDLE while resuming the RRC connection from RRC_IDLE or in RRC_CONNECTED, as specified in TS 36.331 [5];

A UE that indicates support of this feature shall also indicate support of *ca-IdleModeMeasurements-r15*.

4.3.6.41 *nr-IdleInactiveMeasFR1-r16*

This field defines whether the UE supports performing eNB-configured SSB-based RRM measurements for configured NR FR1 carrier(s) in RRC_IDLE and in RRC_INACTIVE (if the UE also indicates support of *inactiveState-r15*), including reporting them when requested by the eNB while resuming from RRC_IDLE/RRC_INACTIVE or in RRC_CONNECTED, as specified in TS 36.331 [5].

4.3.6.42 *nr-IdleInactiveMeasFR2-r16*

This field defines whether the UE supports performing eNB-configured SSB-based RRM measurements for configured NR FR2 carrier(s) in RRC_IDLE and in RRC_INACTIVE (if the UE also indicates support of *inactiveState-r15*), including reporting them when requested by the eNB while resuming from RRC_IDLE/RRC_INACTIVE or in RRC_CONNECTED, as specified in TS 36.331 [5].

4.3.6.43 *idleInactiveValidityAreaList-r16*

This field defines whether the UE supports configuration of *validityAreaList-r16* for performing eNB-configured measurements for configured carrier(s) in RRC_IDLE and in RRC_INACTIVE (if the UE supports *inactiveState-r15*), as specified in TS 36.331 [5].

A UE that indicates support of this feature shall also indicate support of *extra-IdleInactiveMeasurements-r16* or *nr-IdleInactiveMeasFR1-r16* or *nr-IdleInactiveMeasFR2-r16*.

4.3.6.44 *measGapPatterns-NRonly-r16*

This field indicates whether the UE supports gap patterns 2, 3 and 11 in LTE standalone when the frequencies to be measured within this measurement gap are all NR frequencies.

4.3.6.45 *measGapPatterns-NRonly-ENDC-r16*

This field indicates whether the UE supports gap patterns 2, 3 and 11 in (NG)EN-DC when the frequencies to be measured within this measurement gap are all NR frequencies.

4.3.6.46 *nr-IdleInactiveBeamMeasFR1-r16*

This field defines whether the UE supports performing eNB-configured SSB-based beam level RRM measurements for configured NR FR1 carrier(s) in RRC_IDLE and in RRC_INACTIVE (if the UE also indicates support of *inactiveState-r15*), including reporting them when requested by the eNB while resuming from RRC_IDLE/RRC_INACTIVE or in RRC_CONNECTED, as specified in TS 36.331 [5].

A UE that supports this feature shall also support *nr-IdleInactiveMeasFR1-r16*.

4.3.6.47 *nr-IdleInactiveBeamMeasFR2-r16*

This field defines whether the UE supports performing eNB-configured SSB-based beam level RRM measurements for configured NR FR2 carrier(s) in RRC_IDLE and in RRC_INACTIVE (if the UE also indicates support of *inactiveState-r15*), including reporting them when requested by the eNB while resuming from RRC_IDLE/RRC_INACTIVE or in RRC_CONNECTED, as specified in TS 36.331 [5].

A UE that supports this feature shall also support *nr-IdleInactiveMeasFR2-r16*.

4.3.6.48 *nr-RSSI-ChannelOccupancyReporting-r17*

This field indicates whether the UE supports performing measurements and reporting of RSSI and channel occupancy on the corresponding NR band. If both *sharedSpectrumMeasNR-EN-DC-r17* and *sharedSpectrumMeasNR-SA-r17* are included, the UE shall set the value of *nr-RSSI-ChannelOccupancyReporting-r17* consistently for the same NR band.

4.3.6.49 *connModeMeasIntraFreq-r17*

This field defines whether the UE supports intra-frequency neighbour cell measurements in RRC_CONNECTED, as specified in TS 36.133 [16] and TS 36.331 [5]. This field is only applicable for UEs of any *ue-Category-NB*.

4.3.6.50 *connModeMeasInterFreq-r17*

This field defines whether the UE supports inter-frequency neighbour cell measurements in RRC_CONNECTED, as specified in TS 36.133 [16] and TS 36.331 [5]. This field is only applicable for UEs of any *ue-Category-NB*.

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 *mfbj-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 indicates whether the UE supports multiple DRBs. This field is only applicable if the UE supports S1-U data transfer or User plane CIoT EPS Optimisation as defined in TS 24.301 [28] or NG-U data transfer or User plane CIoT 5GS Optimisation as defined in TS 24.501 [39], and any *ue-Category-NB*. If a UE of this release supports multiple DRBs, the UE shall support two simultaneous DRBs.

4.3.8.6 Void

4.3.8.7 *earlyData-UP-r15*

This field defines whether the UE supports MO-EDT for User Plane CIoT EPS optimizations, as defined in TS 24.301 [28]. This feature is only applicable if the UE supports *ce-ModeA-r13*, or for FDD if the UE supports any *ue-Category-NB*.

4.3.8.8 void

4.3.8.9 *extendedNumberOfDRBs-r15*

This field defines whether the UE supports up to 15 DRBs. The UE shall support any combination of RLC AM and RLC UM entities for the configured DRBs. A UE that supports *extendedNumberOfDRBs-r15* shall also support the extended LCID as specified in TS 36.321 [4].

4.3.8.10 *reducedCP-Latency-r15*

This field defines whether the UE supports reduced control plane latency as defined in TS 36.213 [22] and TS 36.331 [5].

4.3.8.11 *earlySecurityReactivation-r16*

This field defines whether the UE supports early security reactivation when resuming a suspended RRC connection as specified in TS 36.331 [5].

4.3.8.12 Void

4.3.8.13 Void

4.3.8.14 *dl-DedicatedMessageSegmentation-r16*

Indicates whether the UE supports reception of segmented DL RRC messages.

4.3.8.15 *altFreqPriority-r16*

This field defines whether the UE supports alternative cell reselection priority as defined in TS 36.331 [5].

4.3.8.16 *coverageBasedPaging-r17*

This field defines whether the UE supports coverage based paging carrier selection as specified in TS 36.304 [14]. This field is only applicable if the UE supports any *ue-Category-NB*.

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 Permitted CSG list.

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 Permitted CSG list.

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 Permitted CSG list.

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].

4.3.11.4 *reportCGI-NR-EN-DC-r15*

This parameter defines whether the UE supports acquisition of relevant information from a neighbouring NR cell by reading the SI of the neighbouring cell and reporting the acquired information to the network as specified in TS 36.331 [5] when the (NG)EN-DC is configured.

4.3.11.5 *reportCGI-NR-NoEN-DC-r15*

This parameter defines whether the UE supports acquisition of relevant information from a neighbouring NR cell by reading the SI of the neighbouring cell and reporting the acquired information to the network as specified in TS 36.331 [5] when the (NG)EN-DC is not configured.

4.3.11.6 *eutra-CGI-Reporting-ENDC*

This parameter defines whether the UE supports acquisition of relevant information from a neighbouring E-UTRA cell by reading the SI of the neighbouring cell and reporting the acquired information to the network as specified in TS 36.331 [5] when the (NG)EN-DC is configured wherein either MN and SN have different DRX cycles, or on-duration configured by MN does not contain on-duration configured by SN if their DRX cycles are same.

4.3.11.7 *utra-GERAN-CGI-Reporting-ENDC*

This parameter defines whether the UE supports acquisition of relevant information from a neighbouring GERAN/UTRA cell by reading the SI of the neighbouring cell and reporting the acquired information to the network as specified in TS 36.331 [5] when the (NG)EN-DC is configured wherein either MN and SN have different DRX cycles, or on-duration configured by MN does not contain on-duration configured by SN if their DRX cycles are same.

4.3.11.8 *eutra-SI-AcquisitionForHO-ENDC-r16*

This parameter defines whether the UE supports, upon configuration of *si-RequestForHO* by the network, acquisition of relevant information from a neighbouring E-UTRA 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] when the (NG)EN-DC is configured.

4.3.11.9 *nr-AutonomousGaps-ENDC-FR1-r16*

This parameter defines whether the UE supports, upon configuration of *useAutonomousGapsNR* by the network, acquisition of relevant information from a neighbouring NR cell by reading the SI of the neighbouring cell on FR1 using autonomous gaps and reporting the acquired information to the network as specified in TS 36.331 [5] when it is configured with (NG)EN-DC.

4.3.11.10 *nr-AutonomousGaps-ENDC-FR2-r16*

This parameter defines whether the UE supports, upon configuration of *useAutonomousGapsNR* by the network, acquisition of relevant information from a neighbouring NR cell by reading the SI of the neighbouring cell on FR2 using autonomous gaps and reporting the acquired information to the network as specified in TS 36.331 [5] when it is configured with (NG)EN-DC.

4.3.11.11 *nr-AutonomousGaps-FR1-r16*

This parameter defines whether the UE supports, upon configuration of *useAutonomousGapsNR* by the network, acquisition of relevant information from a neighbouring NR cell by reading the SI of the neighbouring cell on FR1 using autonomous gaps and reporting the acquired information to the network as specified in TS 36.331 [5] when it is not configured with (NG)EN-DC.

4.3.11.12 *nr-AutonomousGaps-FR2-r16*

This parameter defines whether the UE supports, upon configuration of *useAutonomousGapsNR* by the network, acquisition of relevant information from a neighbouring NR cell by reading the SI of the neighbouring cell on FR2 using autonomous gaps and reporting the acquired information to the network as specified in TS 36.331 [5] when it is not configured with (NG)EN-DC.

4.3.11.13 *eutra-CGI-Reporting-NE-DC-r15*

This parameter defines whether the UE supports acquisition of relevant information from a neighbouring E-UTRA cell by reading the SI of the neighbouring cell and reporting the acquired information to the network as specified in TS 36.331 [5] when the NE-DC is configured.

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.

4.3.12.2 *anr-Report-r16*

This field indicates whether the UE supports ANR measurement configuration and reporting in RRC_IDLE as specified in TS 36.304 [14] and TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.12.3 *rach-Report-r16*

This field indicates whether the UE supports delivery of *rachReport* upon request from the network as specified in TS 36.331 [5] when connected to EPC. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.13 UE-based network performance measurement parameters

4.3.13.1 *loggedMeasurementsIdle*

This parameter defines whether the UE supports logged measurements including logging in *any cell selection* state in RRC_IDLE upon request from the network as specified in TS 36.331 [5] and TS 36.304 [14]. 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.

4.3.13.5 *locationReport-r14*

This parameter defines whether the UE supports reporting of its geographical location information to eNB.

4.3.13.6 *loggedMeasBT-r15*

This parameter indicates whether the UE supports Bluetooth measurements in RRC_IDLE mode.

4.3.13.7 *loggedMeasWLAN-r15*

This parameter indicates whether the UE supports WLAN measurements in RRC_IDLE mode.

4.3.13.8 *immMeasBT-r15*

This parameter indicates whether the UE supports Bluetooth measurements in RRC_CONNECTED mode.

4.3.13.9 *immMeasWLAN-r15*

This parameter indicates whether the UE supports WLAN measurements in RRC_CONNECTED mode.

4.3.13.10 *ul-PDCP-AvgDelay-r16*

This parameter indicates whether the UE supports UL PDCP Packet Average Delay measurement (as specified in TS 38.314 [41]) and reporting in RRC_CONNECTED state.

4.3.13.11 *loggedMeasIdleEventL1-r17*

This parameter defines whether the UE supports event triggered logged measurements for *eventL1* in RRC_IDLE upon request from the network. A UE indicating support of *loggedMeasIdleEventL1-r17* shall also indicate support of *loggedMeasurementsIdle*.

4.3.13.12 *loggedMeasIdleEventOutOfCoverage-r17*

This parameter defines whether the UE supports event triggered logged measurements for event *outOfCoverage* in RRC_IDLE upon request from the network. A UE indicating support of *loggedMeasIdleEventOutOfCoverage-r17* shall also indicate support of *loggedMeasurementsIdle*.

4.3.13.13 *loggedMeasUncomBarPre-r17*

This parameter indicates whether the UE supports logging of uncompensated barometric pressure measurement in RRC_IDLE mode.

4.3.13.14 *immMeasUncomBarPre-r17*

This parameter indicates whether the UE supports uncompensated barometric pressure measurement in RRC_CONNECTED mode.

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.

4.3.15.9 *bwPrefInd-r14*

This parameter defines whether the UE supports maximum PDSCH/PUSCH bandwidth preference indication as specified in TS 36.331 [5]. A UE indicating support of *bwPrefInd-r14* shall also indicate support of *ce-ModeA-r13*.

4.3.15.10 *inDeviceCoexInd-HardwareSharingInd-r13*

This parameter defines whether the UE supports hardware sharing indication as specified in TS 36.331 [5]. A UE that supports hardware sharing indication shall also indicate support of LAA operation.

4.3.15.11 *overheatingInd-r14*

This parameter defines whether the UE supports overheating assistance information as specified in TS 36.331 [5].

4.3.15.12 *assistInfoBitForLC-r15*

This parameter defines whether the UE supports assistance information bit for local cache as specified in TS 36.323 [2].

4.3.15.13 *timeReferenceProvision-r15*

This parameter defines whether the UE supports provision of time reference message *TimeReferenceInformation* as specified in TS 36.331 [5].

4.3.15.14 *flightPathPlan-r15*

This field defines whether the UE supports reporting of the flight path plan through the procedure defined in TS 36.331 [5].

4.3.15.15 *inDeviceCoexInd-ENDC-r15*

This parameter defines whether the UE supports in-device coexistence indication for (NG)EN-DC operation as specified in TS 36.331 [5]. A UE that supports in-device coexistence indication for (NG)EN-DC operation shall also support in-device coexistence indication.

4.3.15.16 *nonCSG-SI-Reporting-r14*

This parameter defines whether the UE supports reporting of PLMN list from cells not broadcasting the field *csg-Identity*.

4.3.15.17 *resumeWithStoredMCG-SCells-r16*

This parameter defines whether the UE supports not deleting the stored E-UTRA MCG SCell configuration when initiating the resume procedure as specified in TS 36.331 [5]. A UE indicating support of *resumeWithStoredMCG-SCells-r16* shall also indicate support of *resumeWithMCG-SCellConfig-r16*.

4.3.15.18 *resumeWithMCG-SCellConfig-r16*

This parameter defines whether the UE supports (re-)configuration of E-UTRA MCG SCells in the *RRCConnectionResume* message as specified in TS 36.331 [5].

4.3.15.19 *resumeWithStoredSCG-r16*

This parameter defines whether the UE supports not deleting the stored NR SCG configuration when initiating the resume procedure as specified in TS 36.331 [5]. A UE indicating support of *resumeWithStoredSCG-r16* shall also indicate support of *resumeWithSCG-Config-r16*.

4.3.15.20 *resumeWithSCG-Config-r16*

This parameter defines whether the UE supports (re-)configuration of an NR SCG in the *RRCConnectionResume* message as specified in TS 36.331 [5].

4.3.15.21 *mcgRLF-RecoveryViaSCG-r16*

This parameter defines whether the UE supports recovery from MCG RLF via split SRB1 (if supported) and via SRB3 (if supported) as specified in TS 36.331 [5].

4.3.15.22 *overheatingIndForSCG-r16*

This parameter defines whether the UE supports the inclusion of NR SCG reduced configuration in the overheating assistance information as specified in TS 36.331 [5]. The UE which indicates support of *overheatingIndForSCG-r16* shall also indicate support of *overheatingInd-r14*.

4.3.15.23 *mpsPriorityIndication-r16*

This parameter defines whether the UE supports *mpsPriorityIndication* on RRC release with redirect as defined in TS 36.331 [5].

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*.

4.3.17.4 *fembmsMixedCell-r14*

This parameter defines whether the UE in RRC_CONNECTED supports MBMS reception with 15kHz subcarrier spacings via MBSFN from FeMBMS/Unicast mixed cells on a frequency indicated in an *MBMSInterestIndication* message.

4.3.17.5 *fembmsDedicatedCell-r14*

This parameter defines whether the UE in RRC_CONNECTED supports MBMS reception with 15kHz subcarrier spacings via MBSFN from MBMS-dedicated cells on a frequency indicated in an *MBMSInterestIndication* message.

4.3.17.6 *subcarrierSpacingMBMS-khz1dot25-r14, subcarrierSpacingMBMS-khz7dot5-r14*

This parameter defines the supported subcarrier spacing for MBSFN subframes on FeMBMS/Unicast mixed cells or MBMS-Dedicated cells in addition to 15kHz subcarrier spacing. The *subcarrierSpacingMBMS-khz7dot5-r14* refers to 7.5kHz subcarrier spacing and *subcarrierSpacingMBMS-khz1dot25-r14* refers to 1.25 kHz subcarrier spacing as defined in TS 36.211 [21], clause 6.12. This field is included only if UE supports MBMS reception from FeMBMS/Unicast mixed cell or MBMS-dedicated cell.

4.3.17.6a *subcarrierSpacingMBMS-khz0dot37-r16, subcarrierSpacingMBMS-khz2dot5-r16*

This parameter defines for each supported E-UTRA band the supported subcarrier spacing for MBSFN subframes on FeMBMS/Unicast mixed cells or MBMS-Dedicated cells in addition to 15kHz subcarrier spacing. The *subcarrierSpacingMBMS-khz0dot37-r16* refers to 0.37 kHz subcarrier spacing and *subcarrierSpacingMBMS-khz2dot5-r16* refers to 2.5 kHz subcarrier spacing as defined in TS 36.211 [21], clause 6.12. This field is included only if UE supports MBMS reception from FeMBMS/Unicast mixed cell or MBMS-dedicated cell for the supported E-UTRA band.

4.3.17.7 *mbms-MaxBW-r14*

This parameter defines the maximum supported bandwidth (T) for MBMS reception, see TS 36.213 [22], clause 11.1. If the value is set to *implicitValue*, the corresponding value of T is calculated as specified in TS 36.213 [22], clause 11.1. If the value is set to *explicitValue*, the actual value of T = *explicitValue* * 40 MHz.

4.3.17.8 *mbms-ScalingFactor1dot25-r14, mbms-ScalingFactor7dot5-r14*

These parameters correspond to $A^{(1.25)}$ and $A^{(7.5)}$, respectively, i.e., scaling factor for processing one unit of bandwidth corresponding to subcarrier spacing of 1.25 kHz and 7.5 kHz, with respect to one unit of bandwidth corresponding to subcarrier spacing of 15 kHz. See TS 36.213 [22], clause 11.1. The field is included only if UE supports corresponding subcarrier spacing for MBSFN subframes on FeMBMS/Unicast mixed cells or MBMS-Dedicated cells in addition to 15kHz subcarrier spacing. The field shall be included if the UE supports corresponding subcarrier spacing for MBSFN subframes on FeMBMS/Unicast mixed cells or MBMS-Dedicated cells in addition to 15kHz subcarrier spacing and *mbms-MaxBW-r14* is included.

4.3.17.9 *mbms-ScalingFactor0dot37-r16, mbms-ScalingFactor2dot5-r16*

These parameters correspond to $A^{(0.37)}$ / $A^{(2.5)}$, i.e., scaling factor for processing one unit of bandwidth corresponding to subcarrier spacing of 0.37 kHz / 2.5 kHz, with respect to one unit of bandwidth corresponding to subcarrier spacing of 15 kHz. See TS 36.213 [22], clause 11.1. This field is included only if UE supports MBMS reception from FeMBMS/Unicast mixed cell or MBMS-dedicated cell. This field shall be included if *subcarrierSpacingMBMS-khz0dot37-r16* / *subcarrierSpacingMBMS-khz2dot5-r16* is included for at least one supported E-UTRA band.

4.3.17.10 *timeSeparationSlot2-r16, timeSeparationSlot4-r16*

These parameters define for each supported E-UTRA band the supported time staggering length of 2 slots (MBSFN reference signal pattern type 2) / 4 slots (MBSFN reference signal pattern type 1) for MBSFN-RS associated with PMCH with subcarrier spacing of 0.37 kHz for MBSFN subframes as described in TS 36.211 [17], clause 6.10.2.2.4. This field is included only if UE supports subcarrier spacing of 0.37 kHz for MBSFN subframes on FeMBMS/Unicast mixed cells or MBMS-Dedicated cells in addition to 15kHz subcarrier spacing.

4.3.17.11 *pmch-Bandwidth-n40-r17, pmch-Bandwidth-n35-r17, pmch-Bandwidth-n30-r17*

This parameter defines, for the corresponding E-UTRA band, whether the UE in RRC_CONNECTED supports MBMS reception via MBSFN from MBMS-dedicated cells in an MBSFN area with PMCH bandwidth of 40/ 35/ 30 PRBs as described in TS 36.331 [5], TS 36.211 [17] and TS 36.213 [22].

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].

4.3.19.5 *shortSPS-IntervalFDD-r14*

This field indicates whether the UE supports uplink SPS intervals shorter than 10 subframes in FDD mode. A UE that supports *shortSPS-IntervalFDD-r14* shall also support *skipUplinkSPS-r14*.

4.3.19.6 *shortSPS-IntervalTDD-r14*

This field indicates whether the UE supports uplink SPS intervals shorter than 10 subframes in TDD mode. A UE that supports *shortSPS-IntervalTDD-r14* shall also support *skipUplinkSPS-r14*.

4.3.19.7 *skipUplinkDynamic-r14*

This field indicates whether the UE supports skipping of UL transmission for an uplink grant indicated on PDCCH if no data is available for transmission as specified in TS 36.321 [4].

4.3.19.8 *skipUplinkSPS-r14*

This field indicates whether the UE supports skipping of UL transmission for a configured uplink grant if no data is available for transmission as specified in TS 36.321 [4].

4.3.19.9 *dataInactMon-r14*

This field defines whether the UE supports data inactivity monitoring as specified in TS 36.321 [4].

4.3.19.10 *rai-Support-r14*

This field defines whether the UE supports Release Assistance Indication (RAI) as specified in TS 36.321 [4]. This field is only applicable if the UE supports UE category M1 or UE category M2 or any *ue-Category-NB*.

4.3.19.11 *multipleUplinkSPS-r14*

This field defines whether the UE supports multiple uplink SPS and reporting SPS assistance information. A UE indicating *multipleUplinkSPS* shall also support V2X communication via Uu, as defined in TS 36.300 [30].

4.3.19.12 *min-Proc-TimelineSubslot-r15*

This field defines the UE minimum processing timeline supported for subslot operation for the different SPDCCH configurations. The minimum processing timeline is indicated by one of two sets in *ProcessingTimelineSet-r15*. Each set consists of two different processing timeline options and associated maximum TA. The minimum processing timeline to use out of the two options for a given set is configured by *min-proc-TimeTA-SubslotSet1-r15* and *min-procTimeTA-SubslotSet2-r15*, see TS 36.331 [5]. Support of Set 1 implicitly means support of Set 2.

The sets supported can be different for 1os CRS-based SPDCCH, 2os CRS-based SPDCCH and DMRS-based SPDCCH. The field consists of a sequence of *ProcessingTimelineSet-r15*. The sequence applies to (in order):

1. 1os CRS based SPDCCH
2. 2os CRS based SPDCCH
3. DMRS based SPDCCH

4.3.19.13 *skipSubframeProcessing-r15*

This field defines whether the UE supports, within a serving cell, aborting reception of PDSCH if the UE receives slot-PDSCH/subslot-PDSCH during an ongoing PDSCH reception and instead starts receiving the slot-PDSCH/subslot-PDSCH, as well as whether the UE supports aborting a PUSCH transmission if the UE gets a grant for a slot-PUSCH/subslot-PUSCH transmission that overlaps with a grant received for a PUSCH transmission. The capability indicates the number of subframes that the UE may drop prior to the subframe in which it prioritizes the processing of slot/subslot PDSCH/PUSCH. Separate capability for UL and DL and per sTTI length in each direction.

4.3.19.14 *earlyContentionResolution-r14*

This field defines whether the UE supports MAC PDU that contains only the UE Contention Resolution Identity MAC control element but no RRC response message, as specified in TS 36.331 [5]. It is mandatory for UEs that support any *ue-Category-NB* of this release of the specification.

4.3.19.15 *sr-SPS-BSR-r15*

This field defines whether the UE supports SR with SPS BSR, as defined in TS 36.321 [4]. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.19.16 *dormantSCellState-r15*

This field defines whether the UE supports the dormant SCell state, as specified in TS 36.321 [4] and TS 36.331 [5].

4.3.19.17 *directSCellActivation-r15*

This field defines whether the UE supports having an E-UTRA SCell configured in activated SCell state in the *RRCConnectionReconfiguration* message, as defined in TS 36.321 [4] and TS 36.331 [5]. This field is applicable to both LTE standalone and LTE-DC.

4.3.19.18 *directSCellHibernation-r15*

This field defines whether the UE supports having an SCell configured in dormant SCell state, as defined in TS 36.321 [4] and TS 36.331 [5]. A UE that indicates support for this shall also indicate support for *dormantSCellState-r15*.

4.3.19.19 *sps-ServingCell-r15*

This field indicates whether the UE supports multiple UL/DL SPS configurations simultaneously active on different serving cells as specified in TS 36.321 [4].

4.3.19.20 *extendedLCID-Duplication-r15*

This field indicates whether the UE supports use of extended LCIDs 32-38 for PDCP duplication. A UE that supports *extendedLCID-Duplication-r15* shall also support the extended LCID as specified in TS 36.321 [4].

4.3.19.21 *eLCID-Support-r15*

This field indicates whether the UE supports LCID "10000" and MAC PDU subheader containing the eLCID field as specified in TS 36.321 [4].

4.3.19.22 *rai-SupportEnh-r16*

This field indicates whether the UE supports AS Release Assistance Indication (AS RAI) in Downlink Channel Quality Report and AS RAI MAC Control Element as specified in TS 36.321 [4] when connected to EPC. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

4.3.19.23 *directMCG-SCellActivationResume-r16*

This field defines whether the UE supports having an E-UTRA MCG SCell configured in activated SCell state in the *RRCConnectionResume* message, as defined in TS 36.321 [4] and TS 36.331 [5];

If the UE indicates support of *directMCG-SCellActivationResume-r16*, the UE shall also indicate support of *resumeWithMCG-SCellConfig-r16*.

4.3.19.24 *directSCG-SCellActivationResume-r16*

This field defines whether the UE supports having an E-UTRA SCG SCell configured in activated SCell state in the *RRCConnectionReconfiguration* message contained in the *RRCResume* message, as defined in TS 36.321 [4], TS 36.331 [5] and TS 38.331 [35].

If the UE indicates support of *directSCG-SCellActivationResume-r16*, the UE shall also indicate support of *ne-dc* and *resumeWithSCG-Config-r16* as specified in TS 38.331 [35].

4.3.19.25 *directSCG-SCellActivationNEDC-r16*

This field defines whether the UE supports having an E-UTRA SCG SCell configured in activated SCell state in the *RRCConnectionReconfiguration* message contained in the NR *RRCReconfiguration* message, as defined in TS 36.321 [4], TS 36.331 [5] and TS 38.331 [35].

If the UE indicates support of *directSCG-SCellActivationNEDC-r16*, the UE shall also indicate support of *ne-dc* as specified in TS 38.331 [35].

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 the 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 the 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.

4.3.21.12 *zoneBasedPoolSelection-r14*

This parameter indicates whether the UE supports zone based transmission resource pool selection for V2X sidelink communication.

4.3.21.13 *v2x-HighReception-r14*

This parameter indicates whether the UE supports reception of 20 PSCCH in a subframe and decoding of 136 RBs per subframe counting both PSCCH and PSSCH in a band for V2X sidelink communication.

4.3.21.14 *v2x-eNB-Scheduled-r14*

This parameter indicates whether the UE supports transmitting PSCCH/PSSCH using dynamic scheduling, SPS in eNB scheduled mode for V2X sidelink communication, reporting SPS assistance information and the UE supports maximum transmit power associated with Power class 3 V2X UE, see TS 36.101 [6] in a band.

4.3.21.15 *ue-AutonomousWithFullSensing-r14*

This parameter indicates whether the UE supports transmitting PSCCH/PSSCH using UE autonomous resource selection mode with full sensing (i.e., continuous channel monitoring) for V2X sidelink communication and the UE supports maximum transmit power associated with Power class 3 V2X UE, see TS 36.101 [6].

4.3.21.16 *ue-AutonomousWithPartialSensing-r14*

This parameters indicates whether the UE supports transmitting PSCCH/PSSCH using UE autonomous resource selection mode with partial sensing (i.e., channel monitoring in a limited set of subframes) for V2X sidelink communication and the UE supports maximum transmit power associated with Power class 3 V2X UE, see TS 36.101 [6].

4.3.21.17 *slss-TxRx-r14*

This parameter indicates whether the UE supports SLSS/PSBCH transmission and reception in UE autonomous resource selection mode and eNB scheduled mode for V2X sidelink communication.

4.3.21.18 *sl-CongestionControl-r14*

This parameter indicates whether the UE supports Channel Busy Ratio measurement and reporting of Channel Busy Ratio measurement to eNB for V2X sidelink communication.

4.3.21.19 *v2x-TxWithShortResvInterval-r14*

This parameter indicates whether the UE supports 20 ms and 50 ms resource reservation periods for UE autonomous resource selection and eNB scheduled resource allocation for V2X sidelink communication.

4.3.21.20 *v2x-numberTxRxTiming-r14*

This parameter indicates the number of multiple reference TX/RX timings counted over all the configured sidelink carriers for V2X sidelink communication.

4.3.21.21 *v2x-nonAdjacentPSCCH-PSSCH-r14*

This parameter indicates whether the UE supports transmission and reception in the configuration of non-adjacent PSCCH and PSSCH for V2X sidelink communication.

4.3.21.22 *v2x-HighPower-r14*

This parameter indicates whether the UE supports maximum transmit power associated with Power class 2 V2X UE for V2X sidelink transmission in a band, see TS 36.101 [6].

4.3.21.23 *v2x-SupportedBandCombinationList-r14*

This field indicates the bands on which the UE supports V2X sidelink communication, as defined in TS 23.285 [29] and specified in TS 36.331 [5]. If a UE supports V2X sidelink communication, the UE shall support a maximum number of 8 sidelink processes associated with the Sidelink HARQ Entity for the transmission of V2X sidelink communication on SL-SCH.

4.3.21.24 *slss-SupportedTxFreq-r15*

This parameter indicates whether the UE supports the SLSS transmission on single carrier or on multiple carriers in the case of sidelink carrier aggregation.

4.3.21.25 *sl-64QAM-Tx-r15*

This parameter indicates whether the UE supports 64QAM for the transmission of V2X sidelink communication.

4.3.21.26 *sl-TxDiversity-r15*

This parameter indicates whether the UE supports transmit diversity for V2X sidelink communication. See TS 36.101 [6].

4.3.21.27 *v2x-EnhancedHighReception-r15*

This parameter indicates whether the UE supports reception of 30 PSCCH in a subframe and decoding of 204 RBs per subframe counting both PSCCH and PSSCH in a band for V2X sidelink communication.

4.3.21.28 *sl-64QAM-Rx-r15*

This parameter indicates whether the UE supports 64QAM for the reception of V2X sidelink communication. It is mandatory to support 64QAM for the reception of V2X sidelink communication for UEs which are supporting Rel-15 V2X sidelink communication as specified in TS 36.331 [5].

4.3.21.29 *sl-RateMatchingTBSScaling-r15*

This parameter indicates whether the UE supports rate matching and TBS scaling of V2X sidelink communication. It is mandatory to support rate matching and TBS scaling of V2X sidelink communication for UEs which are supporting Rel-15 V2X sidelink communication as specified in TS 36.331 [5].

4.3.21.30 *sl-LowT2min-r15*

This parameter indicates whether the UE supports 10ms as minimum value of T2 for resource selection of V2X sidelink communication. It is mandatory to support 10ms as minimum value of T2 of V2X sidelink communication for UEs which are supporting Rel-15 V2X sidelink communication as specified in TS 36.331 [5].

4.3.21.31 *v2x-SensingReportingMode3-r15*

This parameter indicates whether the UE supports sensing measurements and reporting of measurement results in eNB scheduled mode for V2X sidelink communication.

4.3.21.32 *v2x-SupportedBandCombinationListEUTRA-NR-r16*

This field indicates the supported band combination list on which the UE supports simultaneous transmission and/or reception of NR sidelink communication only as specified in TS 38.331 [35], or joint V2X sidelink communication and NR sidelink communication as specified in TS 36.331 [5].

4.3.21.33 Void

4.3.21.34 *tx-Sidelink-r16, rx-Sidelink-r16*

This parameter indicates whether the UE supports sidelink transmission/reception on the band in the band combination. For NR sidelink transmission, *tx-Sidelink-r16* is only applicable if the UE supports at least one of *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16* on the band as specified in TS 38.331 [35]. For NR sidelink reception, *rx-Sidelink-r16* is only applicable if the UE supports *sl-Reception-r16* on the band as specified in TS 38.331 [35].

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.

4.3.23.8 *uplinkLAA-r14*

This field defines whether the UE supports uplink LAA operation.

4.3.23.9 *crossCarrierSchedulingLAA-UL-r14*

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

4.3.23.10 *twoStepSchedulingTimingInfo-r14*

This field defines whether the UE supports two step uplink scheduling using PUSCH trigger A and PUSCH trigger B as defined in TS 36.213 [22]. This field also defines the timing between reception of a PUSCH trigger B and the earliest time the UE supports performing the associated UL transmission. This field is only applicable if the UE supports uplink LAA operation.

4.3.23.11 *uss-BlindDecodingAdjustment-r14*

This field defines whether the UE supports blind decoding adjustment on UE specific search space as defined in TS 36.213 [22]. This field is only applicable if the UE supports uplink LAA operation.

4.3.23.12 *uss-BlindDecodingReduction-r14*

This field defines whether the UE supports blind decoding reduction on UE specific search space by not monitoring DCI format 0A/0B/4A/4B as defined in TS 36.213 [22]. This field is only applicable if the UE supports uplink LAA operation.

4.3.23.13 *outOfSequenceGrantHandling-r14*

This field defines whether the UE supports PUSCH transmissions with out of sequence UL grants as defined in TS 36.213 [22]. This field is only applicable if the UE supports uplink LAA operation.

4.3.23.14 *aul-r15*

This field defines whether the UE supports Autonomous Uplink as defined in TS 36.321 [4]. This field is only applicable if the UE supports uplink LAA operation.

4.3.23.15 *laa-PUSCH-Mode1-r15*

This field defines whether the UE supports LAA PUSCH Mode 1 as defined in TS 36.213 [22]. This field is only applicable if the UE supports uplink LAA operation.

4.3.23.16 *laa-PUSCH-Mode2-r15*

This field defines whether the UE supports LAA PUSCH Mode 2 as defined in TS 36.213 [22]. This field is only applicable if the UE supports uplink LAA operation.

4.3.23.17 *laa-PUSCH-Mode3-r15*

This field defines whether the UE supports LAA PUSCH Mode 3 as defined in TS 36.213 [22]. This field is only applicable if the UE supports uplink 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.

4.3.24.2 *lwip-Aggregation-UL-r14*

This field defines whether the UE supports aggregation over LWIP in uplink. A UE which supports aggregation over LWIP uplink shall also support LWIP operation.

4.3.24.3 *lwip-Aggregation-DL-r14*

This field defines whether the UE supports aggregation over LWIP in downlink. A UE which supports aggregation over LWIP downlink shall also support LWIP operation.

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.

4.3.25.5 *lwa-HO-WithoutWT-Change-r14*

Only applicable if the UE supports LWA. This parameter indicates whether the UE supports enhancements to HO operation without WT change for LWA operation as specified in TS36.331 [5].

4.3.25.6 *lwa-UL-r14*

Only applicable if the UE supports LWA. This parameter indicates whether the UE supports LWA bearer in the UL.

4.3.25.7 *Void*

4.3.25.8 *wlan-SupportedDataRate-r14*

Only applicable if the UE supports LWA. This parameter indicates the maximum WLAN data rate supported by the UE for LWA operation.

4.3.25.9 *lwa-RLC-UM-r14*

Only applicable if the UE supports LWA. This parameter indicates whether the UE supports RLC UM for LWA bearer.

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], clause 7.2.5. The capabilities comprise of a list of pairs of {k-Max, n-MaxList} values with the nth 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), which is applicable for all bands of band combinations except when additionally included per band of band combination per TM indicating the concerned capability is different from the per TM capability.

4.3.28.2 *channelMeasRestriction-r13*

Indicates whether the UE supports channel measurement restriction, see TS 36.213 [22], clause 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], clause 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], clause 7.1.5B and TS 36.212 [26], clauses 5.3.3.1.5C/ D.

The capability parameter is provided separately per transmission mode (TM9, TM10), which is applicable for all bands of band combinations except when additionally included per band of band combination per TM indicating the concerned capability is different from the per TM capability.

This field is absent when the FD-MIMO capability is provided as part of sTTI/sPT band combinations.

4.3.28.5 *interferenceMeasRestriction-r13*

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

4.3.28.6 *nonPrecoded-r13*

Indicates the UE capabilities concerning non-precoded EBF/ FD-MIMO operation (class A) for CSI-RS and CSI reporting using 8, 12 and 16 antenna ports, see TS 36.213 [22], clause 7.2.

- config1: Indicates support of codebook configuration 1.
- config2: Indicates support of codebook configuration 2.

- config3: Indicates support of codebook configuration 3.
- config4: Indicates support of codebook configuration 4.

The capability parameters are provided separately per transmission mode (TM9, TM10), which is applicable for all bands of band combinations except when additionally included per band of band combination per TM indicating the concerned capability is different from the per TM capability. See also TS 36.331 [5] clause 6.3.6, NOTE 8 in *UE-EUTRA-Capability* field descriptions.

4.3.28.7 *srs-Enhancements-r13*

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

4.3.28.9 *csi-ReportingAdvanced-r14, csi-ReportingAdvancedMaxPorts-r14*

Indicates the maximum number of CSI-RS ports supported by the UE for advanced CSI reporting. The field *csi-ReportingAdvanced-r14* is included to indicate 32 CSI-RS ports whereas *csi-ReportingAdvancedMaxPorts-r14* is included to indicate 8, 12, 16, 20, 24 or 28 CSI-RS ports (i.e., UE shall not include both *csi-ReportingAdvanced-r14* and *csi-ReportingAdvancedMaxPorts-r14*). The capability parameter is provided separately per transmission mode (TM9, TM10), which is applicable for all bands of band combinations except when additionally included per band of band combination per TM indicating the concerned capability is different from the per TM capability.

4.3.28.10 *mimo-CBSR-AdvancedCSI-r15*

Indicates whether the UE supports CBSR for advanced CSI reporting with and without amplitude restriction as defined in TS 36.213 [22], clause 7.2.

4.3.28.11 *csi-ReportingNP-r14*

Indicates whether the UE supports CSI reporting on non-precoded CSI-RS with 20, 24, 28 or 32 antenna ports, see TS 36.213 [22], Table 7.2.4-9. The capability parameter is provided separately per transmission mode (TM9, TM10), which is applicable for all bands of band combinations except when additionally included per band of band combination per TM indicating the concerned capability is different from the per TM capability. See also TS 36.331 [5] clause 6.3.6, NOTE 8 in *UE-EUTRA-Capability* field descriptions. A UE indicating support of *csi-ReportingNP-r14* shall also indicate support of *nonPrecoded-r13*.

4.3.28.12 *relWeightTwoLayers-r13, relWeightFourLayers-r13, relWeightEightLayers-r13*

This field indicates relative weight of processing FD-MIMO with 2/ 4/ 8 layers with respect to non-FD-MIMO with the same number of layers, as described in equation 4.3.28.13-1 and TS 36.331 [5] clause 6.3.6, NOTE 8 in *UE-EUTRA-Capability* field descriptions. This field can be included only if the UE supports the corresponding number of layers (i.e. 2/ 4/ 8 layers).

4.3.28.13 *totalWeightedLayers-r13*

This field indicates total number of weighted layers the UE can process for FD-MIMO, as described in equation 4.3.28.13-1 below and TS 36.331 [5] clause 6.3.6, NOTE 8 in *UE-EUTRA-Capability* field descriptions.

The FD-MIMO processing capability condition is satisfied if:

$$\sum_{i \in \text{configured CCs}} w_i \cdot l_i \leq y$$

where:

- y is total number of weighted layers the UE can process for FD-MIMO. Value of y is indicated by *totalWeightedLayers-r13* for all band combinations except for those (NG)EN-DC/NE-DC band combinations for which *fd-MIMO-TotalWeightedLayers* is included in *ca-ParametersEUTRA* (see TS 38.331 [35] and TS 38.306 [32]),
- l_i is the maximum number of DL layers configured for CC i , and
- $w_i = \begin{cases} relWeightTwoLayers, & \text{if CC } i \text{ is configured with FD-MIMO and } l_i = 2 \\ relWeightFourLayers, & \text{if CC } i \text{ is configured with FD-MIMO and } l_i = 4 \\ relWeightEightLayers, & \text{if CC } i \text{ is configured with FD-MIMO and } l_i = 8 \\ 1, & \text{if CC } i \text{ is not configured with FD-MIMO.} \end{cases}$

Equation 4.3.28.13-1: FD-MIMO processing capability condition.

4.3.28.14 *zp-CSI-RS-AperiodicInfo-r14*

Indicates whether the UE supports aperiodic ZP-CSI-RS transmission for the indicated transmission mode, see TS 36.213 [22], clause 7.2.1. The capability parameter is provided separately per transmission mode (TM9, TM10).

4.3.28.15 *ul-dmrs-Enhancements-r14*

Indicates whether the UE supports UL DMRS enhancements, see TS 36.211 [17], clause 6.10.3A. The capability parameter is provided separately per transmission mode (TM9, TM10).

4.3.28.16 *densityReductionNP-r14, densityReductionBF-r14*

Indicates whether the UE supports CSI-RS density reduction with values 1, 1/2 and 1/3 for non-precoded CSI-RS and beamformed CSI-RS respectively, see TS 36.213 [22], clause 7.2.5. The capability parameter is provided separately per transmission mode (TM9, TM10).

4.3.28.17 *hybridCSI-r14*

Indicates whether the UE supports hybrid CSI transmission, see TS 36.213 [22], clauses 7.2.1 and 7.2.2. The capability parameter is provided separately per transmission mode (TM9, TM10).

4.3.28.18 *semiOL-r14*

Indicates whether the UE supports semi-open-loop transmission for the indicated transmission mode, see TS 36.213 [22], clause 7.2.4. The capability parameter is provided separately per transmission mode (TM9, TM10).

4.3.28.19 *nzp-CSI-RS-AperiodicInfo-r14*

This field indicates the support of aperiodic NZP CSI-RS transmission, separately per transmission mode (TM9, TM10). The field *nMaxProc* indicates the maximum number of updated CSI process for aperiodic NZP CSI-RS. The field *nMaxResource* indicates the maximum number of CSI-RS resources which can be activated by MAC CE for aperiodic NZP CSI-RS.

4.3.28.20 *nzp-CSI-RS-PeriodicInfo-r14*

This field indicates the support of periodic NZP CSI-RS transmission, separately per transmission mode (TM9, TM10). The field *nMaxResource* indicates the maximum number of CSI-RS resources which can be activated by MAC CE for periodic NZP CSI-RS.

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, UL category M1, DL category M2 and UL category M2

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].

4.3.29.8 *unicastFrequencyHopping-r13*

This field, and a specific MAC header field LCID value specified in TS 36.321 [4], define whether the UE supports frequency hopping for unicast MPDCCH/PDSCH (configured by *mpdcch-pdsch-HoppingConfig*) and unicast PUSCH (configured by *pusch-HoppingConfig*). It is mandatory for UEs of this release of the specification if *ce-ModeA-r13* and/or *ce-ModeB-r13* is supported.

4.3.29.9 *ce-SwitchWithoutHO-r14*

This field defines whether the UE supports switching between normal and CE mode without a handover as specified in TS 36.331 [5]. A UE indicating support of *ce-SwitchWithoutHO-r14* shall also indicate support of *ce-ModeA-r13* except for UEs of DL category M1, UL category M1, DL category M2 or UL category M2.

4.3.29.10 *tm9-CE-ModeA-r13*

This field indicates whether the UE supports tm9 operation in CE mode A as specified in TS 36.213 [22], TS 36.321 [4] and TS 36.331 [5]. A UE indicating support of *tm9-CE-ModeA-r13* shall also indicate support of *ce-ModeA-r13*.

4.3.29.11 *tm9-CE-ModeB-r13*

This field indicates whether the UE supports tm9 operation in CE mode B as specified in TS 36.213 [22], TS 36.321 [4] and TS 36.331 [5]. A UE indicating support of *tm9-CE-ModeB-r13* shall also indicate support of *ce-ModeB-r13* and *tm9-CE-ModeA-r13*.

4.3.29.12 *tm6-CE-ModeA-r13*

This field indicates whether the UE supports tm6 operation in CE mode A as specified in TS 36.213 [22] and TS 36.331 [5]. A UE indicating support of *tm6-CE-ModeA-r13* shall also indicate support of *ce-ModeA-r13*.

4.3.29.13 *etws-CMAS-RxInConnCE-ModeA-r16*

This field indicates whether the UE supports ETWS/CMAS indication reception in RRC_CONNECTED state when the UE is operating in coverage enhancement mode A as specified in TS 36.331 [5]. A UE indicating support of *etws-CMAS-RxInConnCE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*. This feature is only applicable if the UE supports a UE Category other than Category M1 and M2.

4.3.29.14 *etws-CMAS-RxInConnCE-ModeB-r16*

This field indicates whether the UE supports ETWS/CMAS indication reception in RRC_CONNECTED state when the UE is operating in coverage enhancement mode B as specified in TS 36.331 [5]. A UE indicating support of *etws-CMAS-RxInConnCE-ModeB-r16* shall also indicate support of *ce-ModeB-r13*. This feature is only applicable if the UE supports a UE Category other than Category M1 and M2.

4.3.30 Mobility enhancement parameters

4.3.30.1 *makeBeforeBreak-r14*

This field defines whether the UE supports Make-Before-Break handover and, if the UE supports DC, Make-Before-Break SeNB change, as specified in TS 36.331 [5].

4.3.30.2 *rach-Less-r14*

This field defines whether the UE supports RACH-less handover and, if the UE supports DC, RACH-less SeNB change, as specified in TS 36.213 [22] and TS 36.331 [5].

4.3.30.3 *cho-r16*

This field indicates whether the UE supports conditional handover including execution condition, candidate cell configuration and maximum 8 candidate cells.

4.3.30.4 *cho-Failure-r16*

This field indicates whether the UE supports conditional handover during re-establishment procedure when the selected cell is configured as candidate cell for condition handover.

4.3.30.5 *cho-FDD-TDD-r16*

This field indicates whether the UE supports conditional handover between FDD and TDD cells.

4.3.30.6 *cho-TwoTriggerEvents-r16*

This field indicates whether the UE supports 2 trigger events for the same execution condition. It is mandatory supported if the UE supports *cho*.

4.3.31 Void

4.3.31.1 Void

4.3.31.2 Void

4.3.32 MMTEL parameters

4.3.32.1 *delayBudgetReporting-r14*

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

4.3.32.2 *pusch-Enhancements-r14*

This field defines whether the UE supports the PUSCH enhancement mode as specified in TS 36.211 [17] and TS 36.213 [22].

4.3.32.3 *recommendedBitRate-r14*

This field defines whether the UE supports the bit rate recommendation message from the eNB to the UE as specified in TS 36.321 [4], clause 6.1.3.13.

4.3.32.4 *recommendedBitRateQuery-r14*

This field defines whether the UE supports the bit rate recommendation query message from the UE to the eNB as specified in TS 36.321 [4], clause 6.1.3.13. This field is only applicable if the UE supports *recommendedBitRate-r14*.

4.3.32.5 *recommendedBitRateMultiplier-r16*

This field defines whether the UE supports the bit rate multiplier for recommended bit rate MAC CE as specified in TS 36.321 [4], clause 6.1.3.13. This field is only applicable if the UE supports *recommendedBitRate-r14*.

4.3.33 High speed enhancement parameters

4.3.33.1 *measurementEnhancements-r14*

This field defines whether UE supports measurement enhancements in high speed scenario as specified in TS 36.133 [16].

4.3.33.2 *demodulationEnhancements-r14*

This field defines whether the UE supports advanced receiver in SFN scenario as specified in TS 36.101 [6].

4.3.33.3 *prach-Enhancements-r14*

This field defines whether the UE supports random access preambles generated from restricted set type B in high speed scenario as specified in TS 36.211 [17].

4.3.33.4 *measurementEnhancements2-r16*

This field defines whether UE supports further enhanced measurements on PCC and timing adjustments to support 500km/h velocity in HST-SFN scenario as specified in TS 36.133 [16]. A UE indicating support of *measurementEnhancements2-r16* shall also indicate support of *measurementEnhancements-r14*.

4.3.33.5 *demodulationEnhancements2-r16*

This field defines whether the UE supports further enhanced demodulation requirements to support 500km/h velocity in HST-SFN scenario as specified in TS 36.101 [6]. A UE indicating support of *demodulationEnhancements2-r16* shall also indicate support of *demodulationEnhancements-r14*.

4.3.33.6 *measurementEnhancementsSCell-r16*

This field defines whether the UE supports enhanced measurements on SCC to support 350km/h velocity with active SCells or deactivated SCells as specified in TS 36.133 [16].

4.3.33.7 *interRAT-enhancementNR-r16*

This field defines whether the UE supports enhanced inter-RAT NR measurement requirements to support high speed up to 500 km/h as specified in TS 36.133 [16], when EN-DC is not configured and when EN-DC is configured.

4.3.34 Inter-RAT Parameters NR

4.3.34.1 *en-DC-r15*

This field indicates whether UE supports E-UTRA NR Dual Connectivity as specified in TS 37.340 [38].

4.3.34.2 *supportedBandListEN-DC-r15*

Only applicable if the UE supports E-UTRA NR Dual Connectivity or NG-RAN E-UTRA-NR Dual Connectivity. This field includes the supported NR bands as defined in TS 38.101-1 [33] and TS 38.101-2 [34]. The presence of this field also indicates that the UE can perform both NR SS-RSRP and SS-RSRQ measurement in the included NR band(s) as specified in TS 38.215 [36].

4.3.34.3 *supportedBandListNR-SA-r15*

This field indicates whether UE supports standalone NR, as specified in TS 38.331 [35], and includes the supported NR bands as defined in TS 38.101-1 [33] and TS 38.101-2 [34]. The presence of this field also indicates that the UE can perform both NR SS-RSRP and SS-RSRQ measurement in the included NR band(s) as specified in TS 38.215 [36].

4.3.34.4 *eutra-5GC-HO-ToNR-FDD-FR1-r15*

This field indicates whether the UE supports handover from E-UTRA/5GC to NR FDD FR1. It is mandatory for UEs of this release of the specification if the UE supports the associated RATs and if the UE supports *eutra-5GC-r15*.

4.3.34.5 *eutra-5GC-HO-ToNR-TDD-FR1-r15*

This field indicates whether the UE supports handover from E-UTRA/5GC to NR TDD FR1. It is mandatory for UEs of this release of the specification if the UE supports the associated RATs and if the UE supports *eutra-5GC-r15*.

4.3.34.6 *eutra-5GC-HO-ToNR-FDD-FR2-r15*

This field indicates whether the UE supports handover from E-UTRA/5GC to NR FDD FR2. It is mandatory for UEs of this release of the specification if the UE supports the associated RATs and if the UE supports *eutra-5GC-r15*.

4.3.34.7 *eutra-5GC-HO-ToNR-TDD-FR2-r15*

This field indicates whether the UE supports handover from E-UTRA/5GC to NR TDD FR2-1 as specified in TS 38.101-x [xx]. It is mandatory for UEs of this release of the specification if the UE supports the associated RATs and if the UE supports *eutra-5GC-r15*.

4.3.34.8 *eutra-EPC-HO-ToNR-FDD-FR1-r15*

This field indicates whether the UE supports handover from E-UTRA/EPC to NR FDD FR1. It is mandatory for UEs of this release of the specification if the UE supports the associated RATs.

4.3.34.9 *eutra-EPC-HO-ToNR-TDD-FR1-r15*

This field indicates whether the UE supports handover from E-UTRA/EPC to NR TDD FR1. It is mandatory for UEs of this release of the specification if the UE supports the associated RATs.

4.3.34.10 *eutra-EPC-HO-ToNR-FDD-FR2-r15*

This field indicates whether the UE supports handover from E-UTRA/EPC to NR FDD FR2. It is mandatory for UEs of this release of the specification if the UE supports the associated RATs.

4.3.34.11 *eutra-EPC-HO-ToNR-TDD-FR2-r15*

This field indicates whether the UE supports handover from E-UTRA/EPC to NR TDD FR2-1 as specified in TS 38.101-x [xx]. It is mandatory for UEs of this release of the specification if the UE supports the associated RATs.

4.3.34.12 *sa-NR-r15*

This field indicates whether the UE supports standalone NR as specified in TS 38.331 [35].

4.3.34.13 *ims-VoiceOverNR-FR1-r15*

This field indicates whether the UE supports IMS voice over NR FR1.

4.3.34.14 *ims-VoiceOverNR-FR2-r15*

This field indicates whether the UE supports IMS voice over NR FR2-1 as specified in TS 38.101-x [xx].

4.3.34.15 *eventB2-r15*

This field defines whether the UE supports event B2. In this release of specification, it is mandatory for a UE supporting NR SA operation to support *eventB2-r15*.

4.3.34.16 *ss-SINR-Meas-NR-FR1-r15*

This field indicates whether the UE can perform NR FR1 SS-SINR measurement as specified in TS 38.215 [36].

4.3.34.17 *ss-SINR-Meas-NR-FR2-r15*

This field indicates whether the UE can perform NR FR2 SS-SINR measurement as specified in TS 38.215 [36].

4.3.34.18 *ng-EN-DC-r15*

This field indicates whether UE supports NG-RAN E-UTRA-NR Dual Connectivity as specified in TS 37.340 [38].

4.3.34.19 *nr-HO-ToEN-DC-r16*

This field indicates whether the UE supports inter-RAT handover from NR to EN-DC while NR-DC or NE-DC is not configured as defined in TS 37.340 [38]. It is mandatory to support inter-RAT handover from NR to EN-DC if the UE supports E-UTRA NR Dual Connectivity.

4.3.34.20 *ce-EUTRA-5GC-HO-ToNR-FDD-FR1-r16*

This field indicates whether the UE supports handover from E-UTRA/5GC in coverage enhancement mode A or B to NR FDD FR1. A UE indicating support of *ce-EUTRA-5GC-HO-ToNR-FDD-FR1-r16* shall also indicate support of *ce-EUTRA-5GC-r16*. This feature is only applicable if the UE supports a UE Category other than Category M1 and M2.

4.3.34.21 *ce-EUTRA-5GC-HO-ToNR-TDD-FR1-r16*

This field indicates whether the UE supports handover from E-UTRA/5GC in coverage enhancement mode A or B to NR TDD FR1. A UE indicating support of *ce-EUTRA-5GC-HO-ToNR-TDD-FR1-r16* shall also indicate support of *ce-EUTRA-5GC-r16*. This feature is only applicable if the UE supports a UE Category other than Category M1 and M2.

4.3.34.22 *ce-EUTRA-5GC-HO-ToNR-FDD-FR2-r16*

This field indicates whether the UE supports handover from E-UTRA/5GC in coverage enhancement mode A or B to NR FDD FR2-1 as specified in TS 38.101-x [xx]. A UE indicating support of *ce-EUTRA-5GC-HO-ToNR-FDD-FR2-r16* shall also indicate support of *ce-EUTRA-5GC-r16*. This feature is only applicable if the UE supports a UE Category other than Category M1 and M2.

4.3.34.23 *ce-EUTRA-5GC-HO-ToNR-TDD-FR2-r16*

This field indicates whether the UE supports handover from E-UTRA/5GC in coverage enhancement mode A or B to NR TDD FR2. A UE indicating support of *ce-EUTRA-5GC-HO-ToNR-TDD-FR2-r16* shall also indicate support of *ce-EUTRA-5GC-r16*. This feature is only applicable if the UE supports a UE Category other than Category M1 and M2.

4.3.34.24 *extendedBand-n77-r16*

This field is only applicable for UEs that indicate support for band n77. If present, the UE supports the restriction to 3450 - 3550 MHz and 3700 - 3980 MHz ranges of band n77 in the USA as specified in Note 12 of Table 5.2-1 in TS 38.101-1 [33]. If absent, the UE supports only restriction to the 3700 - 3980 MHz range of band n77 in the USA. A UE that indicates this field shall also support NS value 55 as specified in TS 38.101-1 [33].

4.3.34.25 *eutra-5GC-HO-ToNR-TDD-FR2-2-r17*

This field indicates whether the UE supports handover from E-UTRA/5GC to NR TDD FR2-2 as specified in TS 38.101-x[xx]. A UE that indicates this field also supports *eutra-5GC-r15*.

4.3.34.26 *eutra-EPC-HO-ToNR-TDD-FR2-2-r17*

This field indicates whether the UE supports handover from E-UTRA/EPC to NR TDD FR2-2 as specified in TS 38.101-x[xx].

4.3.34.27 *ims-VoiceOverNR-FR2-2-r17*

This field indicates whether the UE supports IMS voice over NR FR2-2 as specified in TS 38.101-x[xx].

4.3.34.28 *ce-EUTRA-5GC-HO-ToNR-TDD-FR2-2-r17*

This field indicates whether the UE supports handover from E-UTRA/5GC in coverage enhancement mode A or B to NR TDD FR2-2 as specified in TS 38.101-x[xx]. A UE indicating support of *ce-EUTRA-5GC-HO-ToNR-TDD-FR2-2-r17* shall also indicate support of *ce-EUTRA-5GC-r16*. This feature is only applicable if the UE supports a UE Category other than Category M1 and M2.

4.3.35 FeCoMP Parameters

4.3.35.1 *qcl-CRI-BasedCSI-Reporting-r15*

This field indicates whether the UE supports CRI based CSI feedback for the FeCoMP feature as specified in TS 36.213 [22], clause 7.1.10.

4.3.35.2 *qcl-TypeC-Operation-r15*

This field indicates the support of the following three UE features: QCL Type-C operation for FeCoMP, the capability to support separate PDSCH RE mapping for different PDSCH CWs in non-coherent joint transmission and the capability to support handling new DMRS port to MIMO layer mapping for the CWs, as specified in TS 36.213 [22], clause 7.1.10. The UE includes this field only when all three features are supported by the UE.

4.3.36 E-UTRA/5GC Parameters

4.3.36.1 *eutra-5GC-r15*

This field indicates whether the UE supports E-UTRA/5GC.

4.3.36.2 *eutra-EPC-HO-EUTRA-5GC-r15*

This field indicates whether the UE supports handover between E-UTRA/EPC and E-UTRA/5GC. It is mandatory for UEs of this release of the specification if the UE supports the associated core networks.

4.3.36.3 Void

4.3.36.4 *ho-EUTRA-5GC-FDD-TDD-r15*

This field indicates whether the UE supports handover between E-UTRA/5GC FDD and E-UTRA/5GC TDD. It is mandatory for UEs of this release of the specification if the UE supports *eutra-5GC-r15* and the associated RATs.

4.3.36.5 *ho-InterfreqEUTRA-5GC-r15*

This field indicates whether the UE supports inter frequency handover within E-UTRA/5GC. It is mandatory for UEs of this release of the specification.

4.3.36.6 *IMS-VoiceOverMCG-BearerEUTRA-5GC-r15*

This field indicates whether the UE supports IMS voice over NR PDCP for MCG bearer for E-UTRA/5GC. It is mandated to the IMS voice capable UE if the UE supports *eutra-5GC-r15*.

4.3.36.7 *inactiveState-r15*

This field indicates whether the UE supports RRC_INACTIVE. It is mandatory for UEs of this release of the specification if the UE supports *eutra-5GC-r15*.

4.3.36.8 *reflectiveQoS-r15*

This field indicates whether the UE supports AS reflective QoS.

4.3.36.9 *earlyData-UP-5GC-r16*

This field indicates whether the UE supports MO-EDT for User Plane CIoT 5GS optimisations, as defined in TS 24.501 [39]. This feature is only applicable if the UE supports *ce-ModeA-r13*, or for FDD if the UE supports any *ue-Category-NB*.

4.3.36.10 *ce-InactiveState-r16*

This field indicates whether the UE supports RRC_INACTIVE state with extended DRX cycles up to 10.24s without PTW when the UE is operating in coverage enhancement mode A or B as specified in TS 36.331 [5]. A UE indicating support of *ce-InactiveState-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.36.11 *ce-EUTRA-5GC-r16*

This field indicates whether the UE supports E-UTRA/5GC when the UE is operating in coverage enhancement mode A or B as specified in TS 36.331 [5]. A UE indicating support of *ce-EUTRA-5GC-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.36.12 *inactiveStatePO-Determination-r17*

This field indicates whether the UE supports to use the same *i_s* in RRC_INACTIVE as in RRC_IDLE for PO determination as specified in TS 36.304 [14]. A UE indicating support of *inactiveStatePO-Determination-r17* shall also indicate support of *inactiveState-r15*.

4.3.37 PUR parameters

4.3.37.1 *pur-CP-EPC-r16*

This field indicates whether the UE supports transmission in preconfigured UL resource (PUR) for NB-IoT FDD for Control Plane CIoT EPS optimisation, as defined in TS 36.300 [30]. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.37.2 *pur-UP-EPC-r16*

This field indicates whether the UE supports transmission in preconfigured UL resource (PUR) for NB-IoT FDD for User Plane CIoT EPS optimisation, as defined in TS 36.300 [30]. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.37.3 *pur-CP-5GC-r16*

This field indicates whether the UE supports transmission in preconfigured UL resource (PUR) for NB-IoT FDD for Control Plane CIoT 5GS optimisation as specified TS 36.300 [30]. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.37.4 *pur-UP-5GC-r16*

This field indicates whether the UE supports transmission in preconfigured UL resource (PUR) for NB-IoT FDD for User Plane CIoT 5GS optimisation as specified TS 36.300 [30]. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.37.5 *pur-CP-L1Ack-r16*

This field indicates whether the UE supports PUR Layer1 acknowledgement as specified in TS 36.213 [22]. A UE indicating support of *pur-CP-L1Ack-r16* shall also indicate support of *pur-CP-EPC-r16* or *pur-CP-5GC-r16* or *pur-CP-EPC-CE-ModeA-r16* or *pur-CP-5GC-CE-ModeA-r16*. This feature is only applicable if the UE supports *ce-ModeA-r13*, or for FDD if the UE supports any *ue-Category-NB*.

4.3.37.6 *pur-NRSRP-Validation-r16*

This field indicates whether the UE supports NRSRP validation for FDD as specified in TS 36.304 [14] and TS 36.331 [5]. A UE indicating support of *pur-NRSRP-Validation-r16* shall also indicate support of *pur-CP-EPC-r16* or *pur-CP-5GC-r16* or *pur-UP-EPC-r16* or *pur-UP-5GC-r16*. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.37.7 *pur-CP-EPC-CE-ModeA-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for Control Plane CIoT EPS optimisation when the UE is operating in coverage enhancement mode A, as specified in TS 36.300 [30]. A UE indicating support of *pur-CP-EPC-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.37.8 *pur-CP-EPC-CE-ModeB-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for Control Plane CIoT EPS optimisation when the UE is operating in coverage enhancement mode B, as specified in TS 36.300 [30]. A UE indicating support of *pur-CP-EPC-CE-ModeB-r16* shall also indicate support of *pur-CP-EPC-CE-ModeA-r16* and *ce-ModeB-r13*.

4.3.37.9 *pur-UP-EPC-CE-ModeA-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for User Plane CIoT EPS optimisation when the UE is operating in coverage enhancement mode A, as specified in TS 36.300 [30]. A UE indicating support of *pur-UP-EPC-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.37.10 *pur-UP-EPC-CE-ModeB-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for User Plane CIoT EPS optimisation when the UE is operating in coverage enhancement mode B, as specified in TS 36.300 [30]. A UE indicating support of *pur-UP-EPC-CE-ModeB-r16* shall also indicate support of *pur-UP-EPC-CE-ModeA-r16* and *ce-ModeB-r13*.

4.3.37.11 *pur-CP-5GC-CE-ModeA-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for Control Plane CIoT 5GS optimisation when the UE is operating in coverage enhancement mode A, as specified in TS 36.300 [30]. A UE indicating support of *pur-CP-5GC-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.37.12 *pur-CP-5GC-CE-ModeB-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for Control Plane CIoT 5GS optimisation when the UE is operating in coverage enhancement mode B, as specified in TS 36.300 [30]. A UE indicating support of *pur-CP-5GC-CE-ModeB-r16* shall also indicate support of *pur-CP-5GC-CE-ModeA-r16* and *ce-ModeB-r13*.

4.3.37.13 *pur-UP-5GC-CE-ModeA-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for User Plane CIoT 5GS optimisation when the UE is operating in coverage enhancement mode A, as specified in TS 36.300 [30]. A UE indicating support of *pur-UP-5GC-CE-ModeA-r16* shall also indicate support of *ce-ModeA-r13*.

4.3.37.14 *pur-UP-5GC-CE-ModeB-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for User Plane CIoT 5GS optimisation when the UE is operating in coverage enhancement mode B, as specified in TS 36.300 [30]. A UE indicating support of *pur-UP-5GC-CE-ModeB-r16* shall also indicate support of *pur-UP-5GC-CE-ModeA-r16* and *ce-ModeB-r13*.

4.3.37.15 *pur-PUSCH-NB-MaxTBS-r16*

This field indicates whether the UE supports Combination of PUR for full-PRB with maximum uplink TBS of 2984 bits when the UE is operating in coverage enhancement mode A, as specified in TS 36.213 [22]. A UE indicating support of *pur-PUSCH-NB-MaxTBS-r16* shall also indicate support of (*pur-CP-EPC-CE-ModeA-r16* or *pur-CP-5GC-CE-ModeA-r16* or *pur-UP-EPC-CE-ModeA-r16* or *pur-UP-5GC-CE-ModeA-r16*) and *ce-PUSCH-NB-MaxTBS-r14*.

4.3.37.16 *pur-SubPRB-CE-ModeA-r16*

This field indicates whether the UE supports Combination of PUR for sub-PRB when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. A UE indicating support of *pur-SubPRB-CE-ModeA-r16* shall also indicate support of (*pur-CP-EPC-CE-ModeA-r16* or *pur-CP-5GC-CE-ModeA-r16* or *pur-UP-EPC-CE-ModeA-r16* or *pur-UP-5GC-CE-ModeA-r16*) and *ce-PUSCH-SubPRB-Allocation-r15*.

4.3.37.17 *pur-SubPRB-CE-ModeB-r16*

This field indicates whether the UE supports Combination of PUR for sub-PRB when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. A UE indicating support of *pur-SubPRB-CE-ModeB-r16* shall also indicate support of (*pur-CP-EPC-CE-ModeB-r16* or *pur-CP-5GC-CE-ModeB-r16* or *pur-UP-EPC-CE-ModeB-r16* or *pur-UP-5GC-CE-ModeB-r16*) and *ce-PUSCH-SubPRB-Allocation-r15*.

4.3.37.18 *pur-RSRP-Validation-r16*

This field indicates whether the UE supports PUR with serving cell RSRP TA validation, as specified in TS 36.331 [5]. A UE indicating support of *pur-RSRP-Validation-r16* shall also indicate support of *pur-CP-EPC-CE-ModeA-r16* or *pur-CP-5GC-CE-ModeA-r16* or *pur-UP-EPC-CE-ModeA-r16* or *pur-UP-5GC-CE-ModeA-r16*.

4.3.37.19 *pur-FrequencyHopping-r16*

This field indicates whether the UE supports PUR frequency hopping, as specified in TS 36.213 [22]. A UE indicating support of *pur-FrequencyHopping-r16* shall also indicate support of (*pur-CP-EPC-CE-ModeA-r16* or *pur-CP-5GC-CE-ModeA-r16* or *pur-UP-EPC-CE-ModeA-r16* or *pur-UP-5GC-CE-ModeA-r16*).

4.3.38 IoT NTN parameters

4.3.38.1 *ntn-Connectivity-EPC-r17*

This field indicates whether the UE supports NTN access. This field is only applicable if the UE supports *ce-ModeA-r13* or any *ue-Category-NB*. If the UE indicates this capability the UE shall support timer extension in MAC/RLC/PDCP layers and RACH adaptation to handle long RTT, acquiring NTN specific SIB and more than one TAC per PLMN broadcast in one cell.

Editor's Note: Physical layer features mandatory for NTN connectivity should be updated in this list. Only per UE physical layer features are considered.

A UE indicating support of *ce-ModeA-r13* and *ntn-Connectivity-EPC-r17* shall also indicate support of *standaloneGNSS-Location*.

4.3.38.2 *ntn-TA-Report-r17*

This field indicates whether the UE supports Timing advance reporting in NTN cell as specified in TS 36.321 [4]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

4.3.38.3 *ntn-PUR-TimerEnhancement-r17*

This field indicates whether the UE supports modified timer value for PUR operation required for NTN operation as specified in TS36.321 [4].

5 Void

6 Optional features without UE radio access capability parameters

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

NOTE: This clause 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], clause 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]. It is optional for a CMAS-capable UE to support Geofencing information (*warningAreaCoordinates-r15*) 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 European 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 to support MBMS reception with 256QAM for UEs supporting MBMS. A UE which supports MBMS reception with 256QAM shall also support *dl-256QAM-r12* as specified in TS 36.331 [5], except UEs configured to operate in Receive Only Mode as defined in TS 23.246 [31].

6.3.3 PBCH repetition in CAS

It is optional to support PBCH repetition in CAS for UEs supporting MBMS as specified in TS 36.211 [17]. A UE which supports PBCH repetition in CAS shall also support *fembmsDedicatedCell-r14* as specified in TS 36.331 [5].

6.3.4 PDCCH AL16 for CAS in MBMS-dedicated cell

It is optional to support of PDCCH AL16 for CAS in MBMS-dedicated cell for UEs supporting MBMS as specified in TS 36.211 [17]. A UE which supports PDCCH AL16 for CAS in MBMS-dedicated cell shall also support *fembmsDedicatedCell-r14* as specified in TS 36.331 [5].

6.3.5 Semi-static CFI indication in MIB

It is optional to support semi-static CFI indication in MIB for UEs supporting MBMS as specified in TS 36.331 [5]. A UE which supports semi-static CFI indication in MIB shall also support *fembmsDedicatedCell-r14* as specified in TS 36.331 [5].

6.3.6 MBMS reception using Receive Only Mode

It is optional to support indication of MBMS reception using Receive Only Mode in an *MBMSInterestIndication* message for UEs supporting MBMS as specified in TS 36.331 [5].

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 clause 6.6.1.

6.6.3 Single-user MIMO interference mitigation advanced receiver for UEs with 2 receiver antenna ports

It is optional for UE with 2 receiver antenna ports to support receivers with enhanced inter-stream interference suppression for SU-MIMO PDSCH with rank 2 (Enhanced performance requirements Type C for 2 receiver antenna ports capable UEs in the TS 36.101 [6]).

6.6.4 Single-user MIMO interference mitigation advanced receiver for UEs with 4 receiver antenna ports

It is optional for UE with 4 receiver antenna ports to support R-ML receivers with enhanced inter-stream interference suppression for SU-MIMO PDSCH with rank 2, 3, and 4 (Enhanced performance requirements Type C for 4 receiver antenna ports capable UEs in the TS 36.101 [6]).

6.6.5 MMSE-IRC DL Control Channel interference mitigation receiver for UEs with 4 receiver antenna ports

It is optional for UE with 4 receiver antenna ports to support MMSE-IRC DL Control Channel interference mitigation receivers for UEs with 4 receiver ports (Enhanced downlink control channel performance requirements Type A for 4 receiver antenna ports capable UEs in the TS 36.101 [6]).

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].

6.7.3 *mo-VoiceCall* establishment cause for mobile originating MMTEL video

It is optional for UE to support *mo-VoiceCall* establishment cause for mobile originating MMTEL video as specified in TS 36.331 [5].

6.7.4 *mo-VoiceCall* establishment cause for mobile originating MMTEL voice

It is optional for UE to support *mo-VoiceCall* establishment cause for mobile originating MMTEL voice as specified in TS 36.331 [5].

6.7.5 RRC Connection Re-establishment for the Control Plane CIoT EPS Optimization

It is optional for UE to support *RRCConnectionReestablishment* for the Control Plane CIoT EPS Optimization as specified in TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.7.6 Void

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].

6.8.3 Enhanced random access power control

It is optional for UE to support enhanced random access power control for FDD as specified in TS 36.321 [4] and TS 36.213 [22], clauses 16.2.1.1.1 and 16.3.1. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.8.4 MO-EDT for Control Plane CIoT EPS Optimization

It is optional for UE to support MO-EDT for Control Plane CIoT EPS optimizations as specified in TS 24.301 [28]. This feature is only applicable if the UE supports *ce-ModeA-r13*, or for FDD if the UE supports any *ue-Category-NB*.

6.8.5 Void

6.8.6 Enhanced PHR

It is optional for UE to support enhanced PHR in MSG3 for FDD, as defined in TS 36.321 [4]. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.8.7 void

6.8.8 Resynchronization Signals

It is optional for UE to support resynchronization signals, as defined in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

6.8.9 Measurement gaps for higher UE velocity

It is optional for UE to support measurement gaps for higher UE velocity, as defined in TS 36.331 [5] and TS 36.133[16]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

6.8.10 MT-EDT for Control Plane CIoT EPS Optimisation

It is optional for UE to support MT-EDT for Control Plane CIoT EPS Optimisation, as defined in TS 24.301 [28]. If the UE supports 'MT-EDT for Control Plane CIoT EPS Optimisation' it shall support 'MO-EDT for Control Plane CIoT EPS Optimisation' as described in clause 6.8.4. This feature is only applicable if the UE supports *ce-ModeA-r13*, or for FDD if the UE supports any *ue-Category-NB*.

6.8.11 MT-EDT for User Plane CIoT EPS Optimisation

It is optional for UE to support MT-EDT for User Plane CIoT EPS Optimisation, as defined in TS 24.301 [28]. If the UE supports 'MT-EDT for User Plane CIoT EPS Optimisation' it shall support *earlyData-UP-r15* as described in clause 4.3.8.7. This feature is only applicable if the UE supports *ce-ModeA-r13*, or for FDD if the UE supports any *ue-Category-NB*.

6.8.12 Segmentation for UE capability information

It is optional for UE to support segmentation of *UECapabilityInformation* as specified in TS 36.331 [5].

6.8.13 Reduced MIB/SIB1-BR acquisition time

It is optional for UE to support reduced MIB/SIB1-BR acquisition time requirements as specified in TS 36.133 [16]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

6.8.14 High speed dedicated network features

It is optional for UE to support HSDN cell reselection handling in RRC_IDLE and RRC_INACTIVE (if the UE supports *eutra-5GC-r15*) as specified in TS 36.304 [14] and TS 36.331 [5].

6.8.15 Carrier specific NRSRP thresholds for NPRACH resource selection

It is optional for UE to support carrier specific NRSRP thresholds for NPRACH resource selection as specified in TS 36.321 [4]. This feature is only applicable if the UE supports any *ue-Category-NB* and *multiCarrier-NPRACH-r14* or *multiCarrierPagingTDD-r15*.

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].

6.10.2 Radio Link Failure Report for NB-IoT

It is optional for UE to support the storage of *RLF-Report* and the reporting in *UEInformationResponse* message as specified in TS 36.331 [5] when connected to EPC. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.10.3 Radio Link Failure Report for inter-RAT MRO NR

It is optional for UE to include *previousNR-PCellId*, *failedNR-PCellId* and *nrReconnectCellId* 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].

6.13.4 Enhanced sidelink resource selection

It is optional for limited TX capability UE to support enhanced sidelink resource selection with carrier aggregation as specified in clause 5.14.1.1 of TS 36.321 [4].

6.13.5 Short-term time-scale TDM for in-device coexistence

It is optional for UE to support prioritization between LTE sidelink transmission/reception and NR sidelink transmission/reception. This feature is only applicable if the UE supports at least one of *sl-Reception-r16*, *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16* as specified in TS 38.331 [35], and if UE supports LTE V2X sidelink in the band combination.

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].

6.16 SC-PTM features

6.16.1 SC-PTM in Idle mode

It is optional for UE to support the SC-PTM reception in RRC_IDLE as specified in TS 36.331 [5]. This feature is only applicable if the UE supports UE category M1 or UE category M2 or if the UE supports coverage enhancements (*ce-ModeB-r13* and/or *ce-ModeA-r13*) or for FDD, if the UE supports any *ue-Category-NB*.

6.16.2 Multiple TB scheduling for SC-PTM in Idle mode for NB-IoT

It is optional for UE to support multiple TB scheduling for multicast as specified in TS 36.331 [5] when connected to EPC. This feature is only applicable for FDD if the UE supports any *ue-Category-NB*.

6.16.3 Multiple TB scheduling for SC-PTM in Idle mode for CE Mode A

It is optional for UE to support multiple TB scheduling for multicast as specified in TS 36.331 [5] when connected to EPC. This feature is only applicable if the UE supports *ce-ModeA-r13*.

6.16.4 Multiple TB scheduling for SC-PTM in Idle mode for CE Mode B

It is optional for UE to support multiple TB scheduling for multicast as specified in TS 36.331 [5] when connected to EPC. This feature is only applicable if the UE supports *ce-ModeB-r13*.

6.17 Idle mode measurements

6.17.1 Relaxed monitoring

It is optional for UE to support relaxed monitoring in RRC_IDLE as specified in TS 36.304 [14]. This feature is only applicable if the UE supports any *ue-Category-NB* or if the UE supports UE category M1 or UE category M2 or if the UE supports coverage enhancements (*ce-ModeB-r13* and/or *ce-ModeA-r13*).

6.17.2 DL channel quality reporting in Msg3 for the anchor carrier

It is optional for UE to support DL channel quality reporting in Msg3 for the anchor carrier for FDD, as specified in TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.17.3 Serving cell idle mode measurements reporting

It is optional for UE to include *measResultServCell-r14* in *RRCConnectionReestablishmentComplete-NB*, *RRCConnectionResumeComplete-NB* and *RRCConnectionSetupComplete-NB* messages as specified in TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.17.4 NSSS-Based RRM measurements

It is optional for UE to support NSSS-Based RRM measurements for FDD, as specified in TS 36.211 [17] and TS 36.214 [23]. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.17.5 NPBCH-Based RRM measurements

It is optional for UE to support NPBCH-Based RRM measurements for the serving cell for FDD, as specified in TS 36.214 [23]. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.17.6 RRM measurements on non-anchor paging carriers

It is optional for UE to support idle mode RRM measurements on non-anchor paging carriers for FDD, as specified in TS 36.133 [6]. A UE supporting RRM measurements on non-anchor paging carriers shall also support NRS presence on non-anchor paging carriers. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.17.7 NRS presence on non-anchor paging carriers

It is optional for UE to support NRS presence on non-anchor paging carriers for FDD as specified in TS 36.211 [17]. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.17.8 DL channel quality reporting in Msg3 for non-anchor carrier

It is optional for UE to support DL channel quality reporting for a non-anchor carrier for FDD in Msg3 as specified in TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.17.9 Assistance information for inter-RAT cell selection to/from NB-IoT

It is optional for UE to support assistance information for inter-RAT cell selection to/from NB-IoT as specified in TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.17.10 DL channel quality reporting in Msg3

It is optional for UE to support DL channel quality reporting of the serving cell in Msg3, as specified in TS 36.321 [4]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

6.17.11 Relaxed RRM measurements

It is optional for UE to support relaxation of RRM measurements for serving cell while using WUS, as specified in TS 36.133 [16]. This feature is only applicable if the UE supports *ce-ModeA-r13* and (*wakeUpSignal-r15* or *groupWakeUpSignal-r16* or *wakeUpSignal-TDD-r15* or *groupWakeUpSignalTDD-r16*).

6.17.12 RSS based measurement improvement

It is optional for UE to support improved DL RSRP measurement accuracy through use of RSS in RRC_IDLE as specified in TS 36.133 [16]. This feature is only applicable if the UE supports resynchronization signals as defined in 6.8.8.

6.17.13 RSS based measurement in paging MPDCCH narrowband

It is optional for UE to support measurement of the neighbour cell RSS in the same narrowband as the paging MPDCCH narrowband in RRC_IDLE as specified in TS 36.133 [16]. This feature is only applicable if the UE supports resynchronization signals as defined in 6.8.8.

6.18 E-UTRA/5GC features

6.18.1 Void

6.18.2 Void

6.18.3 RRC Connection Re-establishment for the Control Plane CIoT 5GS Optimisation

It is optional for UE to support *RRCCConnectionReestablishment* for the Control Plane CIoT 5GS Optimisation as specified in TS 36.331 [5]. A UE supporting *RRCCConnectionReestablishment* for the Control Plane CIoT 5GS Optimisation shall also support NB-IoT/5GC. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.18.4 NB-IoT/5GC

It is optional for UE to support NB-IoT when connected to 5GC. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.18.5 MO-EDT for Control Plane CIoT 5GS Optimisation

It is optional for UE to support MO-EDT for Control Plane CIoT 5GS optimisations as specified in TS 24.501 [39]. A UE supporting MO-EDT for the Control Plane CIoT 5GS Optimisation shall also support NB-IoT/5GC or indicate support of *ce-EUTRA-5GC-r16*. This feature is only applicable if the UE supports *ce-ModeA-r13*, or for FDD if the UE supports any *ue-Category-NB*.

6.18.6 AS RAI

It is optional for UE to support AS Release Assistance Indication (AS RAI) in Downlink Channel Quality Report and AS RAI MAC Control Element as specified in TS 36.321 [4] when connected to 5GC. A UE supporting AS RAI shall also support NB-IoT/5GC or indicate support of *ce-EUTRA-5GC-r16*. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

6.18.7 Minimization of service interruption

It is optional for UE to support minimization of service interruption including reporting to NAS of disaster roaming information for available PLMNs and Access Barring check for Access Identity 3, as specified in TS 36.331 [5].

6.19 IoT NTN Features

6.19.1 Cell reselection measurements triggering based on service time

It is optional for UE camped on NTN cell to support triggering of early cell reselection measurements based on the service time broadcasted by the cell.

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], clause 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], clause 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], clause 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], clause 5.3.3.13 for UEs which are supporting an access subject to ACDC.

7.1.5 EAB per RSRP

It is mandatory to support *eab-PerRSRP* as specified in clause 5.3.3.12 of TS 36.331 [5] for BL UEs or UEs in coverage enhancement supporting Extended Access Barring.

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-MPR_c, see TS 36.101 [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 clause 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], clause 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 across PUCCH groups if the UE indicates support for *pucch-SCell*.

7.7.4 Simultaneous transmission of PUCCH in licensed spectrum and PUSCH in LAA SCells

It is mandatory to support simultaneous transmission of PUCCH in licensed spectrum and PUSCH in LAA SCells if the UE supports uplink LAA operation. If the UE supports dual connectivity, this is applicable within each cell group.

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], clause 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

7.10 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].

7.10.2 Support of extended reporting of WLAN measurements

It is mandatory to support reporting of extended number of measurements of WLAN IDs for UEs which are supporting WLAN measurements as specified in TS 36.331 [5].

7.10.3 wlan-ReportAnyWLAN-r14

Indicates whether UE supports reporting of measurements of unknown WLAN as specified in TS 36.331 [5]. It is mandatory to support reporting of measurements of unknown WLAN ID for UEs which are supporting WLAN measurements as specified in TS 36.331 [5].

7.10.4 wlan-PeriodicMeas-r14

This parameter indicates whether the UE supports periodic reporting of WLAN measurements. It is mandatory to support periodic reporting of WLAN measurements for UEs which are supporting WLAN measurements as specified in TS 36.331 [5].

7.11 E-UTRA/5GC Parameters

7.11.1 Downlink SDAP header

It is mandatory to support downlink SDAP header for UEs which are either NAS reflective QoS or AS reflective QoS (i.e., *reflectiveQoS-r15*) capable in LTE.

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. The values are applicable for a TTI length of 1 ms. For other TTI lengths, the table refers to maximum number of DL PDCP SDUs within a 1ms period.

NOTE: Due to the need for the network buffer data for efficient scheduling, values for Category 1, 1bis and 2 are same. It is not expected that category 1 or category 1bis 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 1bis | 10 |
| Category 2 | 10 |
| Category 3 | 20 |
| Category 4 / DL 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 |
| DL Category 20 | 360 |
| DL Category 21 | 240 |
| DL Category 22 | 430 |
| DL Category 23 | 480 |
| DL Category 24 | 510 |
| DL Category 25 | 560 |
| DL Category 26 | 600 |

Annex B (informative): Change history

| Change history | | | | | | | |
|----------------|-------|-----------|------|-----|-----|--|-------------|
| Date | TSG # | TSG Doc. | CR | Rev | Cat | Subject/Comment | New version |
| 11/2007 | RP-38 | RP-070916 | | | | Presented for approval at TSG RAN-38 | 1.0.0 |
| 12/2007 | | - | | | | Approved at TSG RAN-38 and placed under change control | 8.0.0 |
| 03/2008 | RP-39 | RP-080194 | 0001 | 1 | | CR to 36.306 with Update to E-UTRA UE capabilities | 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 | 8.2.0 |
| 03/2009 | RP-43 | RP-090126 | 0007 | - | | CR to remove the clauses on MBMS | 8.3.0 |
| | RP-43 | RP-090126 | 0008 | - | | Final values for L2 buffer sizes | 8.3.0 |
| | RP-43 | RP-090126 | 0009 | - | | Various Corrections | 8.3.0 |
| | RP-43 | RP-090126 | 0010 | - | | CR to update uplink transmit diversity (UE transmit antenna selection) | 8.3.0 |
| | RP-43 | RP-090126 | 0011 | - | | Downlink PDCP SDU limitation | 8.3.0 |
| | RP-43 | RP-090126 | 0014 | - | | Thoughts on UE capability for RoHC | 8.3.0 |
| | RP-43 | RP-090126 | 0015 | 1 | | Capturing USIMless UE to stage 3 | 8.3.0 |
| 06/2009 | RP-44 | RP-090511 | 0016 | 2 | | Support of inter-RAT PS handover to GERAN Editor Note Removal | 8.4.0 |
| | RP-44 | RP-090511 | 0017 | 1 | | Clarification of Half Duplex in TDD | 8.4.0 |
| | RP-44 | RP-090511 | 0018 | - | | Correcting the maximum number of bits received during one TTI | 8.4.0 |
| | RP-44 | RP-090511 | 0019 | - | | Clarification of field names used in TS 36.331 | 8.4.0 |
| | RP-44 | RP-090511 | 0021 | - | | Clarification on disabling E-UTRA capabilities with a USIM | 8.4.0 |
| 09/2009 | RP-45 | RP-090906 | 0023 | - | | Unit for "Total layer 2 buffer size" | 8.5.0 |
| 12/2009 | RP-46 | - | - | | | Upgrade to the Release 9 - no technical change | 9.0.0 |
| 03/2010 | RP-47 | RP-100308 | 0024 | 1 | | CR to 36.306 on Optionality of Rel-9 UE features | 9.1.0 |
| | RP-47 | RP-100308 | 0025 | - | | Introduction of power-limited device indication in UE capability. | 9.1.0 |
| | RP-47 | RP-100308 | 0026 | - | | UE capability for enhanced 1xRTT CS fallback | 9.1.0 |
| | RP-47 | RP-100285 | 0028 | 1 | | Bounds to RoHC requirements for IMS capable UEs supporting voice | 9.1.0 |
| | RP-47 | RP-100309 | 0029 | 1 | | CR to 36.306 on Redirection enhancements to UTRAN | 9.1.0 |
| | RP-47 | RP-100188 | 0030 | 1 | | Redirection enhancements to GERAN | 9.1.0 |
| 06/2010 | RP-48 | RP-100556 | 0031 | 1 | | Clarification regarding / alignment of REL-9 UE capabilities | 9.2.0 |
| | RP-48 | RP-100531 | 0033 | - | | Correction on the definition of ue-SpecificRefSigsSupported | 9.2.0 |
| 09/2010 | RP-49 | RP-100853 | 0035 | - | | Clarification of MBMS UE capability | 9.3.0 |
| 12/2010 | RP-50 | RP-101268 | 0037 | - | | Inclusion of new UE categories in Rel-10 | 10.0.0 |
| 03/2011 | RP-51 | RP-110290 | 0038 | - | | Description of carrier aggregation and MIMO capabilities | 10.1.0 |
| | RP-51 | RP-110290 | 0039 | - | | L2 buffer sizes for Rel-10 categories | 10.1.0 |
| | RP-51 | RP-110280 | 0041 | - | | CR to 36.306 adding UE capability indicator for dual Rx/Tx e1xCSFB | 10.1.0 |
| | RP-51 | RP-110288 | 0042 | 1 | | UE UL&DL MIMO Capabilities | 10.1.0 |
| | RP-51 | RP-110282 | 0043 | - | | Counter proposal to R2-110795 on UE capabilities for MDT | 10.1.0 |
| 06/2011 | RP-52 | RP-110828 | 0048 | - | | Clarification of optionality of UE features without capability | 10.2.0 |
| | RP-52 | RP-110830 | 0051 | - | | Options for CSFB to GSM | 10.2.0 |
| | RP-52 | RP-110840 | 0056 | 1 | | CR to 36.306 on UE capabilities for Rel-10 LTE features | 10.2.0 |
| | RP-52 | RP-110701 | 0058 | 2 | | CA and MIMO Capabilities in LTE Rel-10 | 10.2.0 |
| | RP-52 | RP-110839 | 0062 | - | | Introduction of UE capability for enhanced redirection to UTRA TDD | 10.2.0 |
| | RP-52 | RP-110834 | 0063 | 2 | | Clarification of "supportedMIMO-CapabilityDL" | 10.2.0 |
| | RP-52 | RP-110627 | 0064 | - | | Correction of "total number of soft channel bits" for category 6 and 7 | 10.2.0 |
| 09/2011 | RP-53 | RP-111291 | 0065 | - | | The SON feature in optional features without UE radio access capability parameters | 10.3.0 |
| | RP-53 | RP-111283 | 0067 | - | | AdditionalSpectrumEmissions in CA | 10.3.0 |
| | RP-53 | RP-111278 | 0069 | - | | Correction to UE capability parameters for handover to CSG cell | 10.3.0 |
| 12/2011 | RP-54 | RP-111716 | 0070 | 1 | | Corrections to enhancedDualLayerTDD | 10.4.0 |
| | RP-54 | RP-111710 | 0072 | - | | Optionality of SR Masking | 10.4.0 |
| | RP-54 | RP-111709 | 0074 | 1 | | Optionality of UE Rx-Tx time difference report | 10.4.0 |
| | RP-54 | RP-111714 | 0077 | - | | Correction to the number of soft channel bits | 10.4.0 |
| 03/2012 | RP-55 | RP-120321 | 0078 | - | | Clarification on physical layer parameter values requirement | 10.5.0 |
| | RP-55 | RP-120326 | 0080 | 1 | | Clarification on number of PDCP SDUs for categories 6-7 UEs | 10.5.0 |
| | RP-55 | RP-120326 | 0082 | - | | UE processing requirement in the presence of MCH transmission | 10.5.0 |
| 06/2012 | RP-56 | RP-120813 | 0090 | - | | Korean Public Alert System (KPAS) in relation to CMAS | 10.6.0 |
| | RP-56 | RP-120813 | 0093 | 1 | | EU-Alert in relation to CMAS | 11.0.0 |
| 09/2012 | RP-57 | RP-121359 | 0100 | - | | Voice support Capabilities | 11.1.0 |
| | RP-57 | RP-121375 | 0103 | - | | Introducing MBMS enhancements | 11.1.0 |
| | RP-57 | RP-121395 | 0105 | - | | Clarification on spatial multiplexing requirement in supportedBandCombination | 11.1.0 |
| 12/2012 | RP-58 | RP-121936 | 0120 | - | | Power Management Indicator in PHR | 11.2.0 |
| | RP-58 | RP-121936 | 0124 | 1 | | Clarification on UL CA in supportedBandCombination | 11.2.0 |
| | RP-58 | RP-122002 | 0125 | 2 | | Introduction of Rel-11 UE features | 11.2.0 |
| | RP-58 | RP-121960 | 0132 | - | | Broadcast of Time Info by using a New SIB | 11.2.0 |
| 03/2013 | RP-59 | RP-130243 | 0133 | 2 | | DL COMP capability related correction | 11.3.0 |

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|---------|-------|-----------|------|---|--|--------|
| | RP-59 | RP-130233 | 0135 | - | MIMO capability related correction | 11.3.0 |
| | RP-59 | RP-130241 | 0137 | - | Correction to supported DL MIMO capability for TM10 | 11.3.0 |
| | RP-59 | RP-130240 | 0138 | - | Optional support of RLF report for inter-RAT MRO | 11.3.0 |
| | RP-59 | RP-130248 | 0140 | 1 | Corrections to UE capability naming and definition | 11.3.0 |
| | RP-59 | RP-130233 | 0142 | - | Clarification on cross carrier scheduling capability | 11.3.0 |
| | RP-59 | RP-130226 | 0146 | - | Introduction of PDSCH TM5 capabilities for FDD and TDD | 11.3.0 |
| 09/2013 | RP-61 | RP-131315 | 0151 | - | Remove TBD in max MCH TB size table | 11.4.0 |
| | RP-61 | RP-131314 | 0157 | - | Clarification of InterFreqRSTDMeasurementIndication procedure support | 11.4.0 |
| 12/2013 | RP-62 | RP-131986 | 0160 | - | Introduction of capability bit for UTRA MFBI | 11.5.0 |
| | RP-62 | RP-132003 | 0161 | 1 | Capturing mandatory/optional agreements on Rel-11 UE features | 11.5.0 |
| | RP-62 | RP-131991 | 0163 | - | Clarification on eRedirection to UMTS TDD with multiple UMTS TDD frequencies | 11.5.0 |
| | RP-62 | RP-131984 | 0165 | - | Addition of inter-frequency RSTD measurement capability indicator for OTDOA | 11.5.0 |
| | RP-62 | RP-131789 | 0166 | 1 | MBMS reception on any configured or configurable SCell | 11.5.0 |
| | RP-62 | RP-131993 | 0167 | - | Enabling SRVCC from GERAN without forwarding UE-EUTRA-Capability | 11.5.0 |
| 03/2014 | RP-63 | RP-140364 | 0168 | 1 | New UE categories for DL 450Mbps class | 11.6.0 |
| | RP-63 | RP-140349 | 0170 | - | SS and common channel interference handling | 11.6.0 |
| | RP-63 | RP-140354 | 0176 | 1 | IoT indication for inter-band TDD CA with different UL/DL configuration | 11.6.0 |
| | RP-63 | RP-140353 | 0173 | 1 | Corrections to UE capability and feature descriptions | 12.0.0 |
| 06/2014 | RP-64 | RP-140887 | 0181 | - | Support of the enhancement for TTI bundling for FDD | 12.1.0 |
| | RP-64 | RP-140888 | 0185 | 3 | Alternative 1: Introduction of FDD/TDD CA full duplex support to 36.306 | 12.1.0 |
| | RP-64 | RP-140892 | 0190 | 1 | Extended RLC LI field | 12.1.0 |
| | RP-64 | RP-140873 | 0194 | 1 | Network-requested CA Band Combination Capability Signalling | 12.1.0 |
| | RP-64 | RP-140892 | 0196 | 1 | Introduction of RRC Connection Establishment failure temporary Goffset handling | 12.1.0 |
| | RP-64 | RP-141028 | 0198 | 3 | eMBMS reception on SCell and Non-Serving Cell | 12.1.0 |
| 09/2014 | RP-65 | RP-141498 | 0218 | 1 | The PDCP SDU number limitation for Category 9-10 UE | 12.2.0 |
| | RP-65 | RP-141505 | 0215 | - | UE capabilities for Hetnet mobility in TS 36.306 | 12.2.0 |
| | RP-65 | RP-141499 | 0212 | - | Introduction of UE eIMTA capabilities | 12.2.0 |
| | RP-65 | RP-141493 | 0205 | - | Corrections to UE capabilities and features | 12.2.0 |
| | RP-65 | RP-141507 | 0209 | - | Introduction of MBSFN MDT capability | 12.2.0 |
| | RP-65 | RP-141506 | 0207 | 2 | Introduction of Category 0 for low complexity UEs | 12.2.0 |
| 12.2014 | RP-66 | RP-142129 | 0225 | - | Clarification on DL parallel reception of category 0 UEs | 12.3.0 |
| | RP-66 | RP-142125 | 0228 | - | Optional features for Hetnet mobility in TS 36.306 | 12.3.0 |
| | RP-66 | RP-142123 | 0230 | - | Corrections to eIMTA capabilities | 12.3.0 |
| | RP-66 | RP-142140 | 0243 | - | Introduction of extended RSRQ value range and new RSRQ definition | 12.3.0 |
| | RP-66 | RP-142132 | 0232 | - | Support of Discovery Signals in TS 36.306 | 12.3.0 |
| | RP-66 | RP-142140 | 0247 | - | Prohibit timer for SR | 12.3.0 |
| | RP-66 | RP-142128 | 0241 | 1 | UE capability for IncMon | 12.3.0 |
| | RP-66 | RP-142115 | 0227 | 1 | Introduction of capability for serving cell interruptions | 12.3.0 |
| | RP-66 | RP-142134 | 0239 | - | Introduction of missing Rel-12 UE capabilities | 12.3.0 |
| | RP-66 | RP-142130 | 0245 | 1 | Optionality support of UE mandatory features for Category 0 UEs | 12.3.0 |
| | RP-66 | RP-142135 | 0238 | 1 | Introduction of Dual Connectivity | 12.3.0 |
| | RP-66 | RP-142139 | 0237 | 2 | NAICS Capability | 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 | 12.3.0 |
| | RP-66 | RP-141981 | 0248 | - | UE capability signaling for WLAN/3GPP radio interworking | 12.3.0 |
| | RP-66 | RP-142232 | 0233 | 2 | Support of 256QAM in TS 36.306 | 12.3.0 |
| 03/2015 | RP-67 | RP-150378 | 0265 | - | UE capability for modified MPR behavior | 12.4.0 |
| | RP-67 | RP-150373 | 0257 | - | Correction to UE capabilities for Low Complexity UEs | 12.4.0 |
| | RP-67 | RP-150373 | 0259 | - | Clarification of TDD DC capability | 12.4.0 |
| | RP-67 | RP-150373 | 0258 | - | Extended number of measurement identities capability | 12.4.0 |
| | RP-67 | RP-150373 | 0253 | - | Introduction of total L2 buffer sizes for UEs supporting split bearers <i>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.</i> | 12.4.0 |
| | RP-67 | RP-150374 | 0267 | - | Introduction of ProSe | 12.4.0 |
| | RP-67 | RP-150376 | 0266 | 1 | Change related to configuration of the priority for frequency bands in mFBI | 12.4.0 |
| | RP-67 | RP-150379 | 0261 | 1 | Introduction of UL64QAM based on split of DL and UL categories | 12.4.0 |
| 06/2015 | RP-68 | RP-150921 | 0269 | - | Dual Connectivity L2 buffer size for category combinations with UL64QAM | 12.5.0 |
| | RP-68 | RP-150917 | 0272 | 1 | Corrections on MIMO capabilities | 12.5.0 |
| | RP-68 | RP-150923 | 0277 | - | Clarification on UL 64QAM capability | 12.5.0 |
| | RP-68 | RP-150917 | 0276 | - | UE support of CA fallback configurations | 12.5.0 |
| | RP-68 | RP-150921 | 0283 | 1 | Corrections on requirements of sidelink reception in TS 36.306 | 12.5.0 |
| | RP-68 | RP-150951 | 0280 | 1 | Introduction of new DL UE categories 15&16 | 12.5.0 |
| 09/2015 | RP-69 | RP-151438 | 0287 | - | Remove support of additionalSpectrumEmissionPCell | 12.6.0 |
| | RP-69 | RP-151442 | 0288 | - | Capturing PCell support for FDD-TDD CA | 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 | 12.6.0 |
| | RP-69 | RP-151442 | 0293 | - | Capturing mandatory/optional features of Rel-12 UEs | 12.6.0 |
| | RP-69 | RP-151439 | 0298 | - | CR for IDC signalling enhancement for UL CA | 12.6.0 |

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| | RP-69 | RP-151441 | 0289 | 1 | Corrections on UE sidelink capabilities in TS 36.306 | 12.6.0 |
| | RP-69 | RP-151467 | 0290 | 2 | Additional MIMO/CSI capability for intra-band contiguous CA | 12.6.0 |
| | RP-69 | RP-151597 | 0296 | 3 | Capability for 4-layer MIMO with TM3 and TM4 | 12.6.0 |
| 12/2015 | RP-70 | RP-152053 | 0309 | - | Definitions of sidelink terminologies in TS 36.306 | 12.7.0 |
| | RP-70 | RP-152055 | 0310 | - | Correction on categories in supportedBandCombination | 12.7.0 |
| | RP-70 | RP-152048 | 0303 | 1 | Clarification on support of extended wait time | 12.7.0 |
| | RP-70 | RP-152053 | 0312 | 1 | Clarification on tdd-FDD-CA-PCellDuplex | 12.7.0 |
| | RP-70 | RP-152049 | 0299 | 2 | Alternative new maximum transport block sizes for DL 64QAM and 256QAM in TM9/10 | 12.7.0 |
| | RP-70 | RP-152048 | 0318 | - | Enabling multiple NS and P-Max operation per cell | 12.7.0 |
| | RP-70 | RP-152055 | 0315 | 1 | Correction on capability rsrq-OnAllSymbols | 12.7.0 |
| | RP-70 | RP-152053 | 0313 | 1 | Clarification on Pcell support | 12.7.0 |
| 12/2015 | RP-70 | RP-152074 | 0301 | 1 | Introduction of DC enhancement | 13.0.0 |
| | RP-70 | RP-152078 | 0319 | - | Introduction of Licensed-Assisted Access using LTE | 13.0.0 |
| | RP-70 | RP-152075 | 0308 | 1 | Introduction of RS-SINR measurements | 13.0.0 |
| | RP-70 | RP-152080 | 0304 | 1 | Introduction of SC-PTM | 13.0.0 |
| | RP-70 | RP-152066 | 0314 | - | Introduction of Application specific Congestion control for Data Communication in LTE | 13.0.0 |
| | RP-70 | RP-152084 | 0311 | 1 | White-list of cells for EUTRA measurement reporting | 13.0.0 |
| | RP-70 | RP-152071 | 0305 | 2 | Introduction of CA enhancement | 13.0.0 |
| | RP-70 | RP-152076 | 0322 | - | Introducing extended DRX | 13.0.0 |
| 03/2016 | RP-71 | RP-160470 | 0323 | 1 | Capture the UE capability for the extension of the MeasObjectId to 64 | 13.1.0 |
| | RP-71 | RP-160470 | 0330 | - | Miscellaneous corrections to TS 36.306 | 13.1.0 |
| | RP-71 | RP-160460 | 0333 | 1 | MDT enhancements support | 13.1.0 |
| | RP-71 | RP-160460 | 0334 | 1 | The introduction of UE capability concerning extended E-UTRA frequency priorities | 13.1.0 |
| | RP-71 | RP-160459 | 0335 | 3 | Introduction of LWIP UE capabilities | 13.1.0 |
| | RP-71 | RP-160457 | 0337 | 2 | Introducing LWA and RCLWI UE capabilities | 13.1.0 |
| | RP-71 | RP-160460 | 0338 | 1 | Leftover UE capabilities for LAA | 13.1.0 |
| | RP-71 | RP-160470 | 0339 | 1 | Minor corrections for CA enhancements | 13.1.0 |
| | RP-71 | RP-160462 | 0341 | 1 | Reference errors for inter-RAT capabilities | 13.1.0 |
| | RP-71 | RP-160453 | 0342 | 1 | UE capabilities for LC and CE | 13.1.0 |
| | RP-71 | RP-160454 | 0343 | 2 | Introduction of eD2D Capability | 13.1.0 |
| | RP-71 | RP-160464 | 0344 | 2 | Modification of network requested CA band combination retrieval for intra-band non-contiguous CA | 13.1.0 |
| | RP-71 | RP-160467 | 0346 | 1 | Correction on capability phy-TDD-ReConfig-FDD(TDD)-Pcell | 13.1.0 |
| | RP-71 | RP-160470 | 0347 | 1 | ANR in case of MFBI | 13.1.0 |
| | RP-71 | RP-160455 | 0348 | - | 36.306 CR on TM10 CRS-IM UE capability report signalling introduction | 13.1.0 |
| | RP-71 | RP-160470 | 0349 | - | Introduction of capability on PDSCH collision handling | 13.1.0 |
| | RP-71 | RP-160470 | 0350 | 1 | Corrections on SC-PTM | 13.1.0 |
| | RP-71 | RP-160470 | 0351 | - | SC-PTM reception on non-Pcell | 13.1.0 |
| | RP-71 | RP-160460 | 0352 | 1 | Additional Layer 1 capabilities for Rel-13 CA enhancements | 13.1.0 |
| 06/2016 | RP-72 | RP-161080 | 1321 | - | Correction to WLAN measurement support for LWIP | 13.2.0 |
| | RP-72 | RP-161080 | 1322 | - | Introducing EBF/FD-MIMO capabilities | 13.2.0 |
| | RP-72 | RP-161080 | 1315 | - | Clarifications on LWA capability | 13.2.0 |
| | RP-72 | RP-161080 | 1326 | - | MBMS reception via MBSFN or SC-PTM | 13.2.0 |
| | RP-72 | RP-161080 | 1329 | - | Corrections on capability linking for measurement object extension | 13.2.0 |
| | RP-72 | RP-161080 | 1327 | 2 | Capturing a new capability signalling format for Rel-13 CA enhancements | 13.2.0 |
| | RP-72 | RP-161080 | 1330 | - | Correction on the value of maximum channel bandwidth | 13.2.0 |
| | RP-72 | RP-161080 | 1334 | 2 | UE capabilities for eMTC | 13.2.0 |
| | RP-72 | RP-161080 | 1333 | 1 | UE Power Class in UE capability signaling | 13.2.0 |
| | RP-72 | RP-161080 | 1314 | 2 | Miscellaneous corrections to TS 36.306 | 13.2.0 |
| | RP-72 | RP-161080 | 1323 | 1 | Clarification on eD2D capability | 13.2.0 |
| | RP-72 | RP-161076 | 1317 | - | Clarification on maximum number of DL-SCH transport block bits for DL Category 15 and 16 | 13.2.0 |
| | RP-72 | RP-161076 | 1318 | - | UE capability of an additional Rx and Tx requirement for a CA band combination | 13.2.0 |
| | RP-72 | RP-161081 | 1328 | 2 | Introduction of NB-IoT UE capabilities | 13.2.0 |
| | RP-72 | RP-161076 | 1320 | 2 | Definition of a fallback band combination | 13.2.0 |
| 09/2016 | RP-73 | RP-161761 | 1338 | 1 | Support of CAT 9/10 and CAT 13 | 13.3.0 |
| | RP-73 | RP-161760 | 1346 | 2 | Introduction of 1.2Gbps and 1.6Gbps UE categories in Rel-13 | 13.3.0 |
| | RP-73 | RP-161826 | 1347 | 2 | Continuous uplink transmission in eMTC | 13.3.0 |
| | RP-73 | RP-161751 | 1350 | 1 | Indication of the maxLayersMIMO | 13.3.0 |
| | RP-73 | RP-161759 | 1352 | 1 | Supporting new UE Rx – Tx time difference mapping table | 13.3.0 |
| | RP-73 | RP-161761 | 1353 | - | Introducing UE capability of Rel 13 CCH IM | 13.3.0 |
| | RP-73 | RP-161761 | 1354 | - | Introducing UE capability of CRS-IM for TM 1-9 | 13.3.0 |
| 09/2016 | RP-73 | RP-161745 | 1348 | - | Introduction of enhanced LAA for LTE | 14.0.0 |
| 12/2016 | RP-74 | RP-162327 | 1361 | 1 | Capability for LWIP aggregation | 14.1.0 |
| | RP-74 | RP-162327 | 1364 | 1 | Miscellaneous corrections to TS 36.306 | 14.1.0 |
| | RP-74 | RP-162318 | 1367 | - | Clarification on UE power class 2 indication | 14.1.0 |
| | RP-74 | RP-162317 | 1369 | 1 | Correction on simultaneous transmission of PUCCH and PUSCH for B5C | 14.1.0 |
| | RP-74 | RP-162321 | 1370 | 1 | Correction on simultaneous transmission of PUCCH and PUSCH for eLAA | 14.1.0 |

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| | RP-74 | RP-162327 | 1371 | - | | Extension of PollByte | 14.1.0 |
| | RP-74 | RP-162317 | 1373 | - | | Definition of cch-InterfMitigation-MaxNumCCs | 14.1.0 |
| | RP-74 | RP-162310 | 1377 | - | | Clarification on UE category requirement | 14.1.0 |
| | RP-74 | RP-162329 | 1383 | 1 | | UE capabilities for Latency Reduction | 14.1.0 |
| | RP-74 | RP-162314 | 1393 | - | | Correction on channel bandwidth definition for NB-IoT | 14.1.0 |
| | RP-74 | RP-162321 | 1397 | - | | Introduction of capabilities for eLAA | 14.1.0 |
| | RP-74 | RP-162555 | 1399 | 1 | | Introduction of new UL UE category 15 for 225Mbps | 14.1.0 |
| 03/2017 | RP-75 | RP-170630 | 1382 | 2 | B | Introduction of mobility enhancement UE capabilities | 14.2.0 |
| | RP-75 | RP-170639 | 1402 | 1 | A | Introduction of 1Rx UE category | 14.2.0 |
| | RP-75 | RP-170628 | 1403 | 1 | B | Capability for extended reporting of WLAN measurements | 14.2.0 |
| | RP-75 | RP-170668 | 1404 | - | B | Introduction of a new special subframe configuration | 14.2.0 |
| | RP-75 | RP-170637 | 1406 | 2 | B | Introduction of UE capabilities for NB-IoT enhancements | 14.2.0 |
| | RP-75 | RP-170636 | 1407 | 2 | B | Introduction of UE capabilities for feMTC enhancements | 14.2.0 |
| | RP-75 | RP-170657 | 1410 | - | A | Support of multiple DRBs for S1-U data transfer | 14.2.0 |
| | RP-75 | RP-170642 | 1416 | 1 | B | Introduction of data inactivity timer | 14.2.0 |
| | RP-75 | RP-170652 | 1419 | 1 | A | IOT indication for unicast MPDCCH/PDSCH/PUSCH frequency hopping | 14.2.0 |
| | RP-75 | RP-170638 | 1423 | 1 | B | Introduction of Voice and Video enhancements for LTE | 14.2.0 |
| | RP-75 | RP-170646 | 1424 | 1 | B | Introduction of SRS switching capability | 14.2.0 |
| | RP-75 | RP-170628 | 1425 | 1 | B | Introduction of Enhanced LTE-WLAN Aggregation (eLWA) | 14.2.0 |
| | RP-75 | RP-170632 | 1426 | 2 | B | Introduction of new UL UE categories for UL 256QAM support | 14.2.0 |
| | RP-75 | RP-170634 | 1429 | 2 | B | CR for introduction of measurement gap enhancement | 14.2.0 |
| | RP-75 | RP-170642 | 1430 | 1 | C | Functional modification of retrieving different UE capabilities for a fallback band combination | 14.2.0 |
| | RP-75 | RP-170636 | 1431 | - | B | FeMTC UE CE mode and maximum PDSCH/PUSCH BW preference indication | 14.2.0 |
| | RP-75 | RP-170806 | 1434 | 1 | A | Feature optionality for Cat.1bis UE | 14.2.0 |
| 06/2017 | RP-76 | RP-171231 | 1437 | 1 | F | Correction on UE capabilities for eLAA | 14.3.0 |
| | RP-76 | RP-171225 | 1438 | 2 | B | Introduction of new Transport Block Size for DL 256QAM | 14.3.0 |
| | RP-76 | RP-171236 | 1439 | 4 | F | UE capabilities for eLWA | 14.3.0 |
| | RP-76 | RP-171248 | 1442 | 2 | A | Entry-Level UE Support UL 64QAM | 14.3.0 |
| | RP-76 | RP-171224 | 1443 | 2 | F | Miscellaneous corrections to TS 36.306 | 14.3.0 |
| | RP-76 | RP-171222 | 1445 | 1 | F | CR for introduction of non-uniform gap in measurement gap enhancement | 14.3.0 |
| | RP-76 | RP-171247 | 1446 | 1 | B | Introduction of a new UL UE category for 300Mbps with 64QAM | 14.3.0 |
| | RP-76 | RP-171223 | 1448 | 2 | F | Corrections to capabilities for feMTC | 14.3.0 |
| | RP-76 | RP-171223 | 1452 | 1 | C | CE mode configuration/deconfiguration without handover | 14.3.0 |
| | RP-76 | RP-171241 | 1458 | 1 | A | Optional feature without UE capability bit for VoLTE | 14.3.0 |
| | RP-76 | RP-171243 | 1461 | 2 | A | LAA/WiFi sharing indication | 14.3.0 |
| | RP-76 | RP-171225 | 1462 | 1 | F | Update of ROHC profile referenc | 14.3.0 |
| | RP-76 | RP-171225 | 1463 | - | B | UE Capabilitites to enable Uplink-Only RoHC operations | 14.3.0 |
| | RP-76 | RP-171224 | 1464 | - | F | Corrections to capabilities for NB-IoT | 14.3.0 |
| | RP-76 | RP-171234 | 1465 | - | F | UL 256QAM capability clarification | 14.3.0 |
| | RP-76 | RP-171221 | 1470 | - | B | Introduction of FeMBMS to 36.306 | 14.3.0 |
| | RP-76 | RP-171223 | 1475 | - | F | Correction on the description of ce-srsEnhancement for FeMTC | 14.3.0 |
| | RP-76 | RP-171223 | 1476 | - | F | Minor correction on TS 36.306 for FeMTC | 14.3.0 |
| | RP-76 | RP-171407 | 1478 | 2 | B | Introduction of UE capability for V2X in 36.306 | 14.3.0 |
| | RP-76 | RP-171223 | 1479 | 2 | B | Introduction of enhanced RLM measurement capabilities | 14.3.0 |
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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 | | |
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