LTE;
Evolved Universal Terrestrial Radio Access (E-UTRA);
User Equipment (UE) radio access capabilities
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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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x  the first digit:
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1 Scope

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

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non specific.
- For a specific reference, subsequent revisions do not apply.
- 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.

[8] IETF RFC 6846: "RObstust Header Compression (ROHC): A Profile for TCP/IP (ROHC-TCP)".
[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".
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 and the parent band combination support the same bandwidths for each band of the fallback 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:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
</table>

### 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].

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1xRTT</td>
<td>1x Radio Transmission Technology</td>
</tr>
<tr>
<td>ACK</td>
<td>Acknowledgement</td>
</tr>
<tr>
<td>ACDC</td>
<td>Application specific Congestion control for Data Communication</td>
</tr>
<tr>
<td>ANDSF</td>
<td>Access Network Discovery and Selection Function</td>
</tr>
<tr>
<td>BCCH</td>
<td>Broadcast Control Channel</td>
</tr>
<tr>
<td>CG</td>
<td>Cell Group</td>
</tr>
<tr>
<td>CRS</td>
<td>Cell-specific Reference Signal</td>
</tr>
<tr>
<td>CSG</td>
<td>Closed Subscriber Group</td>
</tr>
<tr>
<td>CSI</td>
<td>Channel State Information</td>
</tr>
<tr>
<td>DC</td>
<td>Dual Connectivity</td>
</tr>
<tr>
<td>DCI</td>
<td>Downlink Control Information</td>
</tr>
<tr>
<td>DL-SCH</td>
<td>Downlink Shared Channel</td>
</tr>
<tr>
<td>E-UTRA</td>
<td>Evolved Universal Terrestrial Radio Access</td>
</tr>
<tr>
<td>E-UTRAN</td>
<td>Evolved Universal Terrestrial Radio Access Network</td>
</tr>
<tr>
<td>FDD</td>
<td>Frequency Division Duplex</td>
</tr>
<tr>
<td>GERAN</td>
<td>GSM/EDGE Radio Access Network</td>
</tr>
<tr>
<td>HARQ</td>
<td>Hybrid Automatic Repeat Request</td>
</tr>
<tr>
<td>HRPD</td>
<td>High Rate Packet Data</td>
</tr>
<tr>
<td>IRC</td>
<td>Interference Rejection Combining</td>
</tr>
<tr>
<td>MAC</td>
<td>Medium Access Control</td>
</tr>
<tr>
<td>MMSE</td>
<td>Minimum Mean Squared Error</td>
</tr>
<tr>
<td>MRO</td>
<td>Mobility Robustness Optimisation</td>
</tr>
<tr>
<td>MTSI</td>
<td>Multimedia Telephony Service for IMS</td>
</tr>
<tr>
<td>MUST</td>
<td>MultiUser Superposition Transmission</td>
</tr>
<tr>
<td>NAICS</td>
<td>Network Assisted Interference Cancellation/Suppression</td>
</tr>
</tbody>
</table>
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 in TS 36.213 [22] in order to get the corresponding requirement.

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

- *ue-Category-NB* in NB-IoT (clause 4.1.1C)
- *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-WithoutHARQ-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)
- *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)
- *accessStratumRelease-r13* (clause 4.3.8.1A)
- *multipleDRB-r13* (clause 4.3.8.5)
- *earlyData-UP-r15* (clause 4.3.8.7)
- *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)

The UE radio access capabilities specified in Chapter 4 are not applicable in NB-IoT, unless they are listed above.
The following optional features without UE radio access capability parameters specified in Chapter 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)
- EDT for Control Plane CIoT EPS Optimization (clause 6.8.4)
- Enhanced PHR (clause 6.8.6)
- SC-PTM in Idle mode (clause 6.16.1)
- Relaxed monitoring (clause 6.17.1)
- DL channel quality reporting (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)

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

### 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>
<thead>
<tr>
<th>UE Category</th>
<th>Maximum number of DL-SCH transport block bits received within a TTI (Note 1)</th>
<th>Maximum number of bits of a DL-SCH transport block received within a TTI</th>
<th>Total number of soft channel bits</th>
<th>Maximum number of supported layers for spatial multiplexing in DL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>10296</td>
<td>10296</td>
<td>250368</td>
<td>1</td>
</tr>
<tr>
<td>Category 2</td>
<td>51024</td>
<td>51024</td>
<td>1237248</td>
<td>2</td>
</tr>
<tr>
<td>Category 3</td>
<td>102048</td>
<td>75376</td>
<td>1237248</td>
<td>2</td>
</tr>
<tr>
<td>Category 4</td>
<td>150752</td>
<td>75376</td>
<td>1827072</td>
<td>2</td>
</tr>
<tr>
<td>Category 5</td>
<td>299552</td>
<td>149776</td>
<td>3667200</td>
<td>4</td>
</tr>
<tr>
<td>Category 6</td>
<td>301504</td>
<td>149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)</td>
<td>3654144</td>
<td>2 or 4</td>
</tr>
<tr>
<td>Category 7</td>
<td>301504</td>
<td>149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)</td>
<td>3654144</td>
<td>2 or 4</td>
</tr>
<tr>
<td>Category 8</td>
<td>2998560</td>
<td>299856</td>
<td>35982720</td>
<td>8</td>
</tr>
<tr>
<td>Category 9</td>
<td>452256</td>
<td>149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)</td>
<td>5481216</td>
<td>2 or 4</td>
</tr>
<tr>
<td>Category 10</td>
<td>452256</td>
<td>149776 (4 layers, 64QAM) 75376 (2 layers, 64QAM)</td>
<td>5481216</td>
<td>2 or 4</td>
</tr>
<tr>
<td>Category 11</td>
<td>603008</td>
<td>149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM)</td>
<td>7308288</td>
<td>2 or 4</td>
</tr>
<tr>
<td>Category 12</td>
<td>603008</td>
<td>149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM)</td>
<td>7308288</td>
<td>2 or 4</td>
</tr>
</tbody>
</table>

**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 \textit{ue-Category}

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

Table 4.1-3: Total layer 2 buffer sizes set by the field \textit{ue-Category}

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

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

<table>
<thead>
<tr>
<th>UE Category</th>
<th>Maximum number of bits of a MCH transport block received within a TTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>10296</td>
</tr>
<tr>
<td>Category 2</td>
<td>51024</td>
</tr>
<tr>
<td>Category 3</td>
<td>75376</td>
</tr>
<tr>
<td>Category 4</td>
<td>75376</td>
</tr>
<tr>
<td>Category 5</td>
<td>75376</td>
</tr>
<tr>
<td>Category 6</td>
<td>75376</td>
</tr>
<tr>
<td>Category 7</td>
<td>75376</td>
</tr>
<tr>
<td>Category 8</td>
<td>75376</td>
</tr>
<tr>
<td>Category 9</td>
<td>75376</td>
</tr>
<tr>
<td>Category 10</td>
<td>75376</td>
</tr>
<tr>
<td>Category 11</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>Category 12</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
</tbody>
</table>
Table 4.1-5: Half-duplex FDD operation type set by the field *ue-Category* for a half-duplex FDD capable UE

<table>
<thead>
<tr>
<th>UE Category</th>
<th>Half-duplex FDD operation type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 2</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 3</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 4</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 5</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 6</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 7</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 8</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 9</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 10</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 11</td>
<td>Type A</td>
</tr>
<tr>
<td>Category 12</td>
<td>Type A</td>
</tr>
</tbody>
</table>

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. 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 \textit{ue-CategoryDL}
<table>
<thead>
<tr>
<th>UE DL Category</th>
<th>Maximum number of DL-SCH transport block bits received within a TTI (Note 1)</th>
<th>Maximum number of bits of a DL-SCH transport block received within a TTI</th>
<th>Total number of soft channel bits</th>
<th>Maximum number of supported layers for spatial multiplexing in DL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL Category M1</td>
<td>1000</td>
<td>1000</td>
<td>25344</td>
<td>1</td>
</tr>
<tr>
<td>DL Category M2</td>
<td>4008</td>
<td>4008</td>
<td>73152</td>
<td>1</td>
</tr>
<tr>
<td>DL Category 0 (Note 2)</td>
<td>1000</td>
<td>1000</td>
<td>25344</td>
<td>1</td>
</tr>
<tr>
<td>DL Category 1bis</td>
<td>10296</td>
<td>10296</td>
<td>250368</td>
<td>1</td>
</tr>
<tr>
<td>DL Category 4</td>
<td>150752</td>
<td>75376</td>
<td>1827072</td>
<td>2</td>
</tr>
<tr>
<td>DL Category 6</td>
<td>301504</td>
<td>149776 (4 layers, 64QAM)</td>
<td>3654144</td>
<td>2 or 4</td>
</tr>
<tr>
<td>DL Category 7</td>
<td>301504</td>
<td>149776 (4 layers, 64QAM)</td>
<td>3654144</td>
<td>2 or 4</td>
</tr>
<tr>
<td>DL Category 9</td>
<td>452256</td>
<td>149776 (4 layers, 64QAM)</td>
<td>5481216</td>
<td>2 or 4</td>
</tr>
<tr>
<td>DL Category 10</td>
<td>452256</td>
<td>149776 (4 layers, 64QAM)</td>
<td>5481216</td>
<td>2 or 4</td>
</tr>
<tr>
<td>DL Category 11</td>
<td>603008</td>
<td>149776 (4 layers, 64QAM)</td>
<td>7308288</td>
<td>2 or 4</td>
</tr>
<tr>
<td>DL Category 12</td>
<td>603008</td>
<td>149776 (4 layers, 64QAM)</td>
<td>7308288</td>
<td>2 or 4</td>
</tr>
<tr>
<td>DL Category 13</td>
<td>391632</td>
<td>195816 (4 layers, 64QAM)</td>
<td>3654144</td>
<td>2 or 4</td>
</tr>
<tr>
<td>DL Category 14</td>
<td>3916560</td>
<td>391656 (8 layers, 256QAM)</td>
<td>47431680</td>
<td>8</td>
</tr>
<tr>
<td>DL Category 15</td>
<td>749856-807744 (Note 3)</td>
<td>149776 (4 layers, 64QAM)</td>
<td>195816 (4 layers, 256QAM, if alternativeTBS-Index-r14 is not supported)</td>
<td>201936 (4 layers, 256QAM, if alternativeTBS-Index-r14 is supported)</td>
</tr>
<tr>
<td>DL Category 16</td>
<td>978960 -1051360 (Note 3)</td>
<td>149776 (4 layers, 64QAM)</td>
<td>195816 (4 layers, 256QAM, if alternativeTBS-Index-r14 is not supported)</td>
<td>201936 (4 layers, 256QAM, if alternativeTBS-Index-r14 is supported)</td>
</tr>
<tr>
<td>DL Category 17</td>
<td>25065984</td>
<td>391656 (8 layers, 256QAM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DL Category</td>
<td>1174752-1211616 (Note 3)</td>
<td>299856 (8 layers, 64QAM) 391656 (8 layers, 256QAM) 149776 (4 layers, 64QAM) 195816 (4 layers, 256QAM, if <code>alternativeTBS-Index-r14</code> is not supported) 201936 (4 layers, 256QAM, if <code>alternativeTBS-Index-r14</code> is supported) 75376 (2 layers, 64QAM) 97896 (2 layers, 256QAM, if <code>alternativeTBS-Index-r14</code> is not supported) 100752 (2 layers, 256QAM, if <code>alternativeTBS-Index-r14</code> is supported)</td>
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<td>1948064 - 2019360 (Note 3)</td>
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**NOTE 1:** In carrier aggregation operation, the DL-SCH processing capability can be shared by the UE with that of MCH received from a serving cell. If the total eNB scheduling for DL-SCH and an MCH in one serving cell at a given TTI is larger than the defined processing capability, the prioritization between DL-SCH and MCH is left up to UE implementation.

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

**NOTE 3:** The UE indicating category x shall reach the value within the defined range indicated by "Maximum number of DL-SCH transport block bits received within a TTI" of category x. The UE shall determine the required value within the defined range indicated by "Maximum number of DL-SCH transport block bits received within a TTI" of the corresponding category, based on its capabilities (i.e. CA band combination, MIMO, Modulation scheme). If the UE capability of CA band combination, MIMO and modulation scheme supported can exceed the upper limit of the defined range, the UE shall support the maximum value of the defined range indicated by "Maximum number of DL-SCH transport block bits received within a TTI" of the corresponding category.
Table 4.1A-2: Uplink physical layer parameter values set by the field ue-CategoryUL

<table>
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<th>UE UL Category</th>
<th>Maximum number of UL-SCH transport block bits transmitted within a TTI</th>
<th>Maximum number of bits of an UL-SCH transport block transmitted within a TTI</th>
<th>Support for 64QAM in UL</th>
<th>Support for 256QAM in UL</th>
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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 ce-PUSCH-NB-MaxTBS-r14. Otherwise the UE supports 1000 bits.
Table 4.1A-3: Total layer 2 buffer sizes set by the fields *ue-CategoryDL* and *ue-CategoryUL*
<table>
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<th>UE DL Category</th>
<th>UE UL Category</th>
<th>Total layer 2 buffer size [bytes]</th>
<th>With support for split bearers [bytes]</th>
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<td>25 200 000</td>
</tr>
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<td>47 000 000</td>
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</tr>
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<td>UL Category 24</td>
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<td>57 000 000</td>
</tr>
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<td>UL Category 25</td>
<td>35 000 000</td>
<td>59 900 000</td>
</tr>
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<td>DL Category 22</td>
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<td>UL Category 20</td>
<td>29 500 000</td>
<td>50 400 000</td>
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<td>28 500 000</td>
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<td>52 300 000</td>
</tr>
<tr>
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<td>57 900 000</td>
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<td>DL Category 23</td>
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<td>53 300 000</td>
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<td>59 900 000</td>
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<td>UL Category 25</td>
<td>38 000 000</td>
<td>62 900 000</td>
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<td>37 000 000</td>
<td>66 600 000</td>
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<td>DL Category 26</td>
<td>UL Category 22</td>
<td>31 500 000</td>
<td>52 000 000</td>
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<td>DL Category 26</td>
<td>UL Category 23</td>
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<td>55 300 000</td>
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<td>60 900 000</td>
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<td>DL Category 26</td>
<td>UL Category 25</td>
<td>39 000 000</td>
<td>63 900 000</td>
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<tr>
<td>DL Category 26</td>
<td>UL Category 26</td>
<td>42 000 000</td>
<td>71 500 000</td>
</tr>
</tbody>
</table>

**NOTE 1:** The UE supports “Total layer 2 buffer size” of 40 000 bytes if the UE indicates support of `ce-PUSCH-NB-MaxTBS-r14`. 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

<table>
<thead>
<tr>
<th>UE DL Category</th>
<th>Maximum number of bits of a MCH transport block received within a TTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL Category M1</td>
<td>NA</td>
</tr>
<tr>
<td>DL Category M2</td>
<td>NA</td>
</tr>
<tr>
<td>DL Category 0</td>
<td>4584</td>
</tr>
<tr>
<td>DL Category 1bis</td>
<td>10296</td>
</tr>
<tr>
<td>DL Category 4</td>
<td>75376</td>
</tr>
<tr>
<td>DL Category 6</td>
<td>75376</td>
</tr>
<tr>
<td>DL Category 7</td>
<td>75376</td>
</tr>
<tr>
<td>DL Category 9</td>
<td>75376</td>
</tr>
<tr>
<td>DL Category 10</td>
<td>75376</td>
</tr>
<tr>
<td>DL Category 11</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>DL Category 12</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>DL Category 13</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>DL Category 14</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>DL Category 15</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>DL Category 16</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>DL Category 17</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>DL Category 18</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>DL Category 19</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>DL Category 20</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
<tr>
<td>DL Category 21</td>
<td>75376 (64QAM) 97896 (256QAM)</td>
</tr>
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</table>
Table 4.1A-5: Half-duplex FDD operation type set by the field *ue-CategoryDL* for a half-duplex FDD capable UE

<table>
<thead>
<tr>
<th>UE DL Category</th>
<th>Half-duplex FDD operation type</th>
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</thead>
<tbody>
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<tr>
<td>DL Category M2</td>
<td>Type B</td>
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<tr>
<td>DL Category 0</td>
<td>Type B</td>
</tr>
<tr>
<td>DL Category 1bis</td>
<td>Type A</td>
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<tr>
<td>DL Category 4</td>
<td>Type A</td>
</tr>
<tr>
<td>DL Category 6</td>
<td>Type A</td>
</tr>
<tr>
<td>DL Category 7</td>
<td>Type A</td>
</tr>
<tr>
<td>DL Category 9</td>
<td>Type A</td>
</tr>
<tr>
<td>DL Category 10</td>
<td>Type A</td>
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<tr>
<td>DL Category 11</td>
<td>Type A</td>
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<td>DL Category 13</td>
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<td>DL Category 14</td>
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<tr>
<td>DL Category 15</td>
<td>Type A</td>
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<tr>
<td>DL Category 16</td>
<td>Type A</td>
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<tr>
<td>DL Category 17</td>
<td>Type A</td>
</tr>
<tr>
<td>DL Category 18</td>
<td>Type A</td>
</tr>
<tr>
<td>DL Category 19</td>
<td>Type A</td>
</tr>
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<td>DL Category 20</td>
<td>Type A</td>
</tr>
<tr>
<td>DL Category 21</td>
<td>Type A</td>
</tr>
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</table>
Table 4.1A-6: supported DL/UL Categories combinations and maximum UE channel bandwidth set by the fields \textit{ue-CategoryDL} and \textit{ue-CategoryUL} and UE categories to be indicated
<table>
<thead>
<tr>
<th>UE DL Category</th>
<th>UE UL Category</th>
<th>UE categories</th>
<th>Maximum UE channel bandwidth [MHz]</th>
</tr>
</thead>
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<td>UL Category M1</td>
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<td>UL Category M2</td>
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<td>5 (NOTE 2)</td>
</tr>
<tr>
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<td>UL Category 0</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>DL Category 1bis</td>
<td>UL Category 1bis</td>
<td>Category 1 (NOTE 1)</td>
<td></td>
</tr>
<tr>
<td>DL Category 4</td>
<td>UL Category 5</td>
<td>Category 4</td>
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</tr>
<tr>
<td>DL Category 6</td>
<td>UL Category 5</td>
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</tr>
<tr>
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</tr>
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<td>UL Category 13</td>
<td>Category 7, 4</td>
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<td>UL Category 18</td>
<td>Category 7, 4</td>
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<td>Category 9, 6, 4</td>
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<td>UL Category 16</td>
<td>Category 9, 6, 4</td>
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<td>UL Category 13</td>
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<td>UL Category 18</td>
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<td>UL Category 18</td>
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<td>UL Category 20</td>
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<td>Category 6, 4, 9 (if supported)</td>
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According to maximum channel bandwidth specified per band in TS 36.101 [6].
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<td>17</td>
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<td>15</td>
<td>Category 12, 10, 7, 4, DL Category 16, 12 and UL Category 13</td>
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<td>18</td>
<td>16</td>
<td>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</td>
</tr>
<tr>
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<td>UL Category 18</td>
<td>Category 12, 10, 7, 4 DL Category 12 and UL Category 13 DL Category 16 and UL Category 13</td>
</tr>
<tr>
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<td>UL Category 20</td>
<td>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</td>
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<td>UL Category 3</td>
<td>Category 11, 9, 6, 4 DL Category 16 and UL Category 3</td>
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<td>Category 11, 9, 6, 4 DL Category 16, 11 and UL Category 5</td>
</tr>
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<td>UL Category 7</td>
<td>Category 12, 10, 7, 4 DL Category 16 and UL Category 7</td>
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<td>UL Category 13</td>
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<td>UL Category 16</td>
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<tr>
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<td>UL Category 18</td>
<td>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</td>
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<td>DL Category 20</td>
<td>UL Category 5</td>
<td>Category 11, 9, 6, 4 DL Category 16, 11 and UL Category 5 DL Category 19 and UL Category 5</td>
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</table>
| 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 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 20  
| 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  

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ETS I
| 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 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 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 15  
| 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 22 | UL Category 20 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 22 | UL Category 22 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 22 | UL Category 22 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 22 | UL Category 23 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 22 | UL Category 24 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 22 | UL Category 25 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 22 | UL Category 26 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 23 | UL Category 20 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 23 | UL Category 22 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 23 | UL Category 23 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 23 | UL Category 24 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 23 | UL Category 25 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 23 | UL Category 26 | DL Category 20 and UL  
|                |               | Category 20  
| DL Category 24 | UL Category 20 | DL Category 20 and UL  
|                |               | Category 20  
<p>|</p>
<table>
<thead>
<tr>
<th>DL Category</th>
<th>UL Category</th>
<th>DL Category 20 and UL Category 20 (NOTE3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL Category 24</td>
<td>UL Category 22</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 24</td>
<td>UL Category 23</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 24</td>
<td>UL Category 24</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 24</td>
<td>UL Category 25</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 24</td>
<td>UL Category 26</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 20</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 22</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 23</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 24</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 25</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 26</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 27</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 28</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 29</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 30</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
<tr>
<td>DL Category 25</td>
<td>UL Category 31</td>
<td>DL Category 20 and UL Category 20 (NOTE3)</td>
</tr>
</tbody>
</table>

**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:** The minimum of 5 MHz and the maximum channel bandwidth specified per band in TS 36.101 [6].

**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.

### 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, UE SL-C-TX (sidelink communication and V2X sidelink communication) category and UE 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

<table>
<thead>
<tr>
<th>UE SL-C-RX Category</th>
<th>Maximum number of SL-SCH transport block bits received within a TTI</th>
<th>Maximum number of bits of a SL-SCH transport block received within a TTI</th>
<th>Total number of soft channel bits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL-C-RX Category 1</td>
<td>25456</td>
<td>25456</td>
<td></td>
</tr>
<tr>
<td>SL-C-RX Category 2</td>
<td>31704</td>
<td>31704</td>
<td>737280</td>
</tr>
<tr>
<td>SL-C-RX Category 3</td>
<td>48936</td>
<td>48936</td>
<td>995328</td>
</tr>
<tr>
<td>SL-C-RX Category 4</td>
<td>73488</td>
<td>48936</td>
<td>1492992</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>UE SL-C-TX Category</th>
<th>Maximum number of SL-SCH transport block bits transmitted within a TTI</th>
<th>Maximum number of bits of a SL-SCH transport block transmitted within a TTI</th>
<th>Maximum number of supported layers for spatial multiplexing in SL-C-TX</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL-C-TX Category 1</td>
<td>25456</td>
<td>25456</td>
<td>1</td>
</tr>
<tr>
<td>SL-C-TX Category 2</td>
<td>31704</td>
<td>31704</td>
<td>1</td>
</tr>
<tr>
<td>SL-C-TX Category 3</td>
<td>49272</td>
<td>32856</td>
<td>1</td>
</tr>
<tr>
<td>SL-C-TX Category 4</td>
<td>48936</td>
<td>48936</td>
<td>1</td>
</tr>
<tr>
<td>SL-C-TX Category 5</td>
<td>73488</td>
<td>48936</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4.1B-3: Reception and transmission physical parameter values set by ue-CategorySL-D

<table>
<thead>
<tr>
<th>UE SL-D Category</th>
<th>Maximum number of SL-DCH transport block bits received within a TTI</th>
<th>Maximum number of bits of a SL-DCH transport block received within a TTI</th>
<th>Maximum number of SL-DCH transport block bits transmitted within a TTI</th>
<th>Maximum number of bits of a SL-DCH transport block transmitted within a TTI</th>
<th>Maximum number of supported layers for spatial multiplexing in SL-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL-D Category 1</td>
<td>11600</td>
<td>232</td>
<td>232</td>
<td>232</td>
<td>1</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>UE Category</th>
<th>Maximum number of DL-SCH transport block bits received within a TTI</th>
<th>Maximum number of bits of a DL-SCH transport block received within a TTI</th>
<th>Total number of soft channel bits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category NB1</td>
<td>680</td>
<td>680</td>
<td>2112</td>
</tr>
<tr>
<td>Category NB2</td>
<td>2536</td>
<td>2536</td>
<td>6400</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>UE Category</th>
<th>Maximum number of UL-SCH transport block bits transmitted within a TTI</th>
<th>Maximum number of bits of an UL-SCH transport block transmitted within a TTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category NB1</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Category NB2</td>
<td>2536</td>
<td>2536</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>UE Category</th>
<th>Total layer 2 buffer size [bytes]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category NB1</td>
<td>4000</td>
</tr>
<tr>
<td>Category NB2</td>
<td>8000</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>UE Category</th>
<th>Half-duplex FDD operation type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category NB1</td>
<td>Type B</td>
</tr>
<tr>
<td>Category NB2</td>
<td>Type B</td>
</tr>
</tbody>
</table>

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 \texttt{ue-Category} and \texttt{ue-CategoryDL} / \texttt{ue-CategoryUL}

4.3.1 PDCP Parameters

4.3.1.1 \texttt{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 \texttt{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 \texttt{ue-Category-NB}.

4.3.1.2 \texttt{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, UE can only support one operator defined dictionary.

4.3.1.7  pdcp-Duplication-r15
This field defines whether the UE supports PDCP duplication.

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-15 indicates whether the UE supports IMS voice over NR PDCP for MCG bearer.

IMS-VoiceOverNR-PDCP-SCG-Bearer-15 indicates whether the UE supports IMS voice over NR PDCP for SCG bearer.

NOTE: In this release, IMS voice over split bearer is not supported for 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  **ttdd-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 (PCell).

4.3.4.29  **csi-SubframeSet-r12**

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

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

This field defines whether the UE supports TDD UL/DL reconfiguration for TDD serving cell(s) via monitoring PDCCH with eIMTA-RNTI on a FDD PCell, and HARQ feedback according to UL and DL HARQ reference configurations.
4.3.4.31  \textit{phy-TDD-ReConfig-TDD-PCell-r12}

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

4.3.4.32  \textit{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  \textit{enhanced-4TxCodebook-r12}

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

4.3.4.34  \textit{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  \textit{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 \textit{numberOfNAICSCapableCC} and \textit{numberOfAggregatedPRB}.

4.3.4.36  \textit{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  \textit{Void}

4.3.4.38  \textit{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 \textit{crs-DiscoverySignalsMeas-r12}.

4.3.4.39  \textit{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  \textit{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 \textit{supportedMIMO-CapabilityDL-r12} than given by the "maximum number of supported layers for spatial multiplexing in DL" derived from the \textit{ue-Category} or \textit{ue-CategoryDL} in the \textit{UE-EUTRA-Capability} IE is only applicable to transmission mode 9 and transmission mode 10.

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

4.3.4.43  fdd-HARQ-TimingTDD-r13
This field defines whether FDD HARQ timing for TDD SCell when configured with TDD PCell as specified in TS 36.213 [22] is supported by the UE.

4.3.4.44  maxNumberUpdatedCSI-Proc-r13
This field defines the maximum number of CSI processes to be updated per UE for which aperiodic CSI is requested for CA with more than 5CCs as specified in TS 36.213 [22] which is supported by the UE.

4.3.4.45  pucch-Format4-r13
This field defines whether PUCCH format 4 as specified in TS 36.213 [22] is supported by the UE. It is mandatory for UEs of this release of the specification if TDD carrier aggregation with more than 5 DL component carriers is supported. It is mandatory for UEs of this release of the specification if FDD carrier aggregation with more than [FFS] DL component carriers is supported.

4.3.4.46  pucch-Format5-r13
This field defines whether PUCCH format 5 as specified in TS 36.213 [22] is supported by the UE.

4.3.4.47  pucch-SCell-r13
This field defines whether PUCCH transmission on SCell in CA is supported by the UE.

4.3.4.48  supportedBlindDecoding-r13
This field defines blind decoding capabilities supported by the UE as specified in TS 36.213 [22].

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

4.3.4.48.2  pdcch-CandidateReductions-r13
This field defines whether the UE supports PDCCH candidate reduction on UE specific search space as specified in TS 36.213 [22], 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. 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  \textit{ul-256QAM-r14}\[2.5ex]
This field indicates UL 256QAM support by the UE on a single component carrier within a band combination (i.e. bandwidth class A).

4.3.4.74  \textit{alternativeTBS-Index-r14}\[2.5ex]
This field defines whether alternative TBS index $I_{\text{TBS}}$ 33B as specified in TS 36.213 [22] is supported by the UE. Support of the alternative TBS index $I_{\text{TBS}}$ 33B is applied for the UE supporting 256QAM in DL.

4.3.4.75  \textit{multiCarrier-NPRACH-r14}\[2.5ex]
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 \textit{ue-Category-NB}. It is mandatory for UEs of this release of the specification.

4.3.4.76  \textit{multiCarrierPaging-r14}\[2.5ex]
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 \textit{ue-Category-NB}. It is mandatory for UEs of this release of the specification.

4.3.4.77  \textit{ul-256QAM-perCC-InfoList-r14}\[2.5ex]
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  \textit{unicast-fembmsMixedSCell-r14}\[2.5ex]
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  \textit{emptyUnicastRegion-r14}\[2.5ex]
This field defines whether 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  \textit{interferenceRandomisation-r14}\[2.5ex]
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 \textit{ue-Category-NB}. It is mandatory for UEs of this release of the specification.

4.3.4.81  \textit{must-CapabilityPerBand-r14}\[2.5ex]
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  \textit{must-TM234-UpTo2Tx-r14}\[2.5ex]
This field indicates that the UE supports MUST operation for TM2/3/4 using up to 2Tx.

4.3.4.81.2  \textit{must-TM89-UpToOneInterferingLayer-r14}\[2.5ex]
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. $ssp10\text{-}CRS\text{-}LessDwPTS$) 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 \textit{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 \textit{CA-MIMO-ParametersUL-r15}, the reported maximum number of layers shall not exceed the value indicated by this field.

4.3.4.92 \textit{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 \textit{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 $X*68$.

4.3.4.95 \textit{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 \textit{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 \textit{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 \textit{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 \textit{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 \textit{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 \textit{maxNumberCCs-SPT-r15} applies to all the FS-type(s) \textit{frameStructureType-SPT-r15} supported in a given band combination.

4.3.4.101 \textit{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 \textit{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, 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 SPUCH 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*. 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 \textit{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 \textit{ce-PUSCH-FlexibleStartPRB-CE-ModeB-r15} shall also indicate support of \textit{ce-ModeB-r13}.

4.3.4.125 \textit{ce-CRS-IntfMitig-r15}

This field indicates whether the UE supports CRS interference mitigation, i.e., value \textit{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 \textit{ce-CRS-IntfMitig-r15} shall also indicate support of \textit{ce-ModeA-r13}.

4.3.4.126 \textit{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 \textit{ce-PDSCH-64QAM-r15} shall also indicate support of \textit{ce-ModeA-r13}.

4.3.4.127 \textit{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 \textit{ce-CQI-AlternativeTable-r15} shall also indicate support of \textit{ce-ModeA-r13}.

4.3.4.128 \textit{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 \textit{ce-PUSCH-SubPRB-Allocation-r15} shall also indicate support of \textit{ce-ModeA-r13}.

4.3.4.129 \textit{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 \textit{ce-ModeA-r13}.

4.3.4.130 \textit{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 \textit{wakeUpSignalMinGap-eDRX-TDD-r15} shall also indicate support of \textit{wakeUpSignal-TDD-r15}. This feature is only applicable if the UE supports \textit{ce-ModeA-r13}.

4.3.4.131 \textit{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 \textit{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 \textit{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  \textit{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  \textit{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  \textit{spdcch-Reuse-r15} \\
This field indicates whether the UE supports L1 based SPDCCH reuse.

4.3.4.148  \textit{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  \textit{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  \textit{sTTI-SPT-Supported-r15} \\
This field indicates whether the UE supports short TTI and/or short processing time features.

4.3.4.151  \textit{tm8-slotPDSCH-r15} \\
This field indicates whether the UE supports configuration and decoding of TM8 for slot PDSCH in TDD.

4.3.4.152  \textit{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  \textit{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  \textit{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  \textit{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-AsyncHarqSharingDiff-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-RepSubslot-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 *semiStaticCFIPattern-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*. 

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*ETSI*
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 6.10.3.1 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.

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

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

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

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

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.

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 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, UE supports the configuration of maxLayersMIMO for these two 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.

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 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.

4.3.6 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  \textit{timerT312-r12} \\
This field defines whether the UE supports T312 as specified in TS 36.331 [5].

4.3.6.4  \textit{alternativeTimeToTrigger-r12} \\
This field defines whether the UE supports alternativeTimeToTrigger as specified in TS 36.331 [5].

4.3.6.5  \textit{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 $\textit{measCycleSCell}$ of less than 640ms, as specified in TS 36.133 [16].

4.3.6.6  \textit{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 \textit{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  \textit{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  \textit{extendedMaxMeasId-r12} \\
This field defines whether the UE supports extended number of measurement identities as defined by $\textit{maxMeasId-r12}$ in TS 36.331 [5].

It is mandatory for UEs of this release of the specification if $\textit{incMonEUTRA-r12}$ or $\textit{incMonUTRA-r12}$ or $\textit{dc-Support-r12}$ or $\textit{extendedMaxObjectId-r13}$ is supported.

4.3.6.9  \textit{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  \textit{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 $\textit{crs-DiscoverySignalsMeas-r12}$.

4.3.6.11  \textit{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  \textit{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 \textit{rsrq-OnAllSymbols-r12} and \textit{rsrqMeasWideband} it shall also support the RSRQ measurement on all OFDM symbols with wider bandwidth.

4.3.6.13 \textit{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 \textit{whiteCellList-r13}

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

4.3.6.15 \textit{extendedFreqPriorities-r13}

This field defines whether the UE supports extended E-UTRA frequency priorities as specified in TS 36.331 [5] and indicated by \textit{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 \textit{CellReselectionSubPriority} field.

4.3.6.16 \textit{extendedMaxObjectId-r13}

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

4.3.6.17 \textit{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 \textit{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 \textit{multiBandInfoReport-r13}

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

4.3.6.21 Void

4.3.6.22 Void

4.3.6.23 \textit{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 \textit{ceMeasurements-r14}. A UE indicating support of \textit{ceMeasurements-r14} shall also indicate support of \textit{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) as specified in TS 36.133 [16].

4.3.6.27 nonUniformGap-r14
This field defines whether the UE supports measurement non uniform Pattern Id 1, 2, 3 and 4 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 validity area 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 support 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.

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 
\textit{RRCConnectionRelease} upon redirection.
A UE that supports CS fallback to GERAN shall support e-Redirection to GERAN.

4.3.7.24  \textit{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 \textit{RRCConnectionRelease}.

4.3.7.27  cdma2000-NW-Sharing-r11
Only applicable if the UE supports CDMA2000 1xRTT or CDMA2000 HRPD. This parameter defines whether the UE 
supports per PLMN CDMA2000 interworking in E-UTRAN shared networks as specified in TS 36.331 [5].

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

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

4.3.8  General parameters

4.3.8.1  \textit{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  \textit{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 \textit{ue-Category-NB}.

4.3.8.2  \textit{deviceType}
This field defines whether the device does not benefit from NW-based battery consumption optimisation.
4.3.8.5  **multipleDRB-r13**

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

4.3.9  Void

4.3.10  CSG Proximity Indication parameters

4.3.10.1  **intraFreqProximityIndication**

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

4.3.10.2  **interFreqProximityIndication**

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

4.3.10.3  **utran-ProximityIndication**

This parameter defines whether the UE supports proximity indication for UTRAN cells whose CSG IDs are in the UE's CSG Whitelist.
4.3.11 Neighbour cell SI acquisition parameters

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

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

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

4.3.11.4 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 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 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.

4.3.12 SON parameters

4.3.12.1 rach-Report
This parameter defines whether the UE supports delivery of *rachReport* upon request from the network.
4.3.13 UE-based network performance measurement parameters

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

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

4.3.13.3 Void

4.3.13.4 loggedMBSFNMeasurements-r12
This parameter defines whether the UE supports logged MBSFN measurement in RRC_IDLE and RRC_CONNECTED upon request from the network. A UE that supports logged MBSFN measurements shall also support a minimum of 64kB memory for log storage. A UE that supports logged MBSFN measurements shall also support logged measurements in RRC_IDLE upon request from the network.

4.3.13.5 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.

4.3.14 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 NTAoffset 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 EN-DC operation as specified in TS 36.331 [5]. A UE that supports in-device coexistence indication for 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.

4.3.16 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  fembsMixedCell-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  fembsDedicatedCell-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.

4.3.17.7  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.

4.3.18  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-ANSDS-Policies-r12

This parameter defines whether the UE supports RAN-assisted WLAN interworking based on ANSDSF policies specified in TS 24.312 [21]. A UE that supports RAN-assisted WLAN interworking based on ANSDSF 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 fields 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 SCell configured in activated SCell state, as defined in TS 36.321 [4] and TS 36.331 [5].

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].

4.3.20  **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  \textit{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  \textit{ue-AutonomousWithPartialSensing-r14}  
This parameter 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  \textit{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  \textit{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  \textit{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  \textit{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  \textit{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  \textit{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  \textit{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  \textit{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  \textit{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.

4.3.22  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 \(lwip\text{-Aggregation-UL-r14}\)

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 \(lwip\text{-Aggregation-DL-r14}\)

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 \(lwa\text{-r13}\)

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 \(lwa\text{-SplitBearer-r13}\)

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 \(lwa\text{-BufferSize-r13}\)

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 \(wlan\text{-MAC-Address-r13}\)

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

4.3.25.5 \(lwa\text{-HO-WithoutWT-Change-r14}\)

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 \(lwa\text{-UL-r14}\)

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 \(wlan\text{-SupportedDataRate-r14}\)

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 \(lwa\text{-RLC-UM-r14}\)

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.
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:

$$\sum_{i \in \text{configured CCs}} w_i \cdot l_i \leq \text{totalWeightedLayers}$$
where:

- totalWeightedLayers is total number of weighted layers as indicated by totalWeightedLayers in ca-ParametersEUTRA, if present, for EN-DC band combination (see TS 38.331 [35] and TS 38.306 [32]); otherwise as indicated by totalWeightedLayers-r13,

- \( I_i \) is the maximum number of DL layers configured for CC \( i \), and

\[
\begin{align*}
\omega_i = & \begin{cases} 
\text{relWeightTwoLayers}, & \text{if CC } i \text{ is configured with FD-MIMO and } I_i = 2 \\
\text{relWeightFourLayers}, & \text{if CC } i \text{ is configured with FD-MIMO and } I_i = 4 \\
\text{relWeightEightLayers}, & \text{if CC } i \text{ is configured with FD-MIMO and } I_i = 8 \\
1, & \text{if CC } i \text{ is not configured with FD-MIMO.}
\end{cases}
\end{align*}
\]

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).

4.3.29  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.
4.3.30  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].

4.3.31  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.

4.3.33  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].
4.3.34 Inter-RAT Parameters NR

4.3.34.1 \textit{en-DC-r15}

This field indicates whether UE supports E-UTRA NR Dual Connectivity as specified in TS 36.331 [5] and TS 38.331 [35].

4.3.34.2 \textit{supportedBandListEN-DC-r15}

Only applicable if the UE supports 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].

4.3.34.3 \textit{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].

4.3.34.4 \textit{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 \textit{eutra-5GC-r15}.

4.3.34.5 \textit{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 \textit{eutra-5GC-r15}.

4.3.34.6 \textit{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 \textit{eutra-5GC-r15}.

4.3.34.7 \textit{eutra-5GC-HO-ToNR-TDD-FR2-r15}

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

4.3.34.8 \textit{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 \textit{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 \textit{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 \textit{eutra-EPC-HO-ToNR-TDD-FR2-r15}

This field indicates whether the UE supports handover from E-UTRA/EPC to NR TDD FR2. 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.

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.

4.3.35 **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.

---

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

6.1 **CSG features**

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

6.4 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.

6.8 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 EDT for Control Plane CIoT EPS Optimization

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

6.9 Void

6.10 SON features

6.10.1 Radio Link Failure Report for inter-RAT MRO

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

6.11 Mobility state features

6.11.1 Mobility history information storage

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

6.12 Void

6.13 Sidelink features

6.13.1 Sidelink Relay UE operation

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

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

6.13.4 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].

6.14 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.

6.17 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
It is optional for UE to support DL channel quality reporting of the serving cell 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 RRCConnectionRestablishmentComplete-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.

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-MPRc, see TS 36.101 [6]).

7.4 Inter-RAT Mobility features

7.4.1 High Priority CSFB redirection

It is mandatory to support the \texttt{RRCConnectionRelease} indicating \texttt{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].

\textbf{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 \texttt{RRCConnectionRelease} with \texttt{extendedWaitTime} and \texttt{RRCConnectionReject} with \texttt{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 DL SDAP HD

It is mandatory to support DL SDAP HD for UEs which are reflectiveQoS 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

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<th>UE Category / ue-Category</th>
<th>Maximum number of PDCP SDUs per TTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
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</tr>
<tr>
<td>Category 1bis</td>
<td>10</td>
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<td>Category 2</td>
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### Change history

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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.
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