**3GPP TSG-RAN WG2 Meeting #110 electronic *draft*R2-2005828**

**Online, June 1 – June 12 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **36.306** | **CR** | **1752** | **rev** | **3** | **Current version:** | **16.0.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | Update of UE capabilities for eMTC | | | | | | | | | |
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| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_eMTC5-Core | | | | |  | ***Date:*** | | | 2020-06-12 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Update of UE capabilities related to additional enhancements for eMTC in Rel-16 according to agreements in RAN2#109-e, RAN2#109bis-e, RAN2#110-e | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Added missing capabilities and corrected existing capabitlies according to agreements.  Miscellaneous small corrections added. | | | | | | | | |
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| ***Consequences if not approved:*** | | WI cannot be completed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.1A, 4.3.4.114, 4.3.4.130, 4.3.4.184, 4.3.4.185, 4.3.4.186, 4.3.4.187, 4.3.4.188, 4.3.4.188a (new), 4.3.4.189, 4.3.4.189a (new), 4.3.4.189b (new), 4.3.4.189c (new), 4.3.4.190, 4.3.4.xa - 4.3.4.xs (new), 4.3.4.xt (new), 4.3.6.37, 4.3.6.a (new), 4.3.8.12, 4.3.8.13, 4.3.34..a (new), 4.3.34.b (new), 4.3.34.c (new), 4.3.34.d (new), 4.3.36.x (new), 4.3.x (new), 4.3.x.a - 4.3.x.n (new), 6.8.4, 6.16.x (new), 6.16.y (new), 6.17.2, 6.17.x (new), 6.18.1, 6.18.2, 6.18.i (new), 6.18.j (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS 36.331 CR 4239 | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| FIRST CHANGE |

## 4.1A *ue-CategoryDL* and *ue-CategoryUL*

The fields *ue-CategoryDL* and *ue-CategoryUL* define downlink/uplink capability respectively. The parameters set by the UE DL/UL Categories are defined in clause 4.2. Tables 4.1A-1 and 4.1A-2 define the downlink and, respectively, uplink physical layer parameter values for each UE DL/UL Category.Table 4.1A-4 defines the minimum capability for the maximum number of bits of a MCH transport block received within a TTI for an MBMS capable UE capable of reception via MBSFN. Table 4.1A-6 defines the only combinations for UE UL and DL Categories that are allowed to be signalled with *ue-CategoryDL* and *ue-CategoryUL*. Table 4.1A-6 also defines which UE Categories a UE shall indicate in addition to the combinations for UE UL and DL Categories. For a BL UE, Table 4.1A-x defines the only combinations for UE UL and DL Categories that are allowed to be signalled with *ue-CategoryDL* and *ue-CategoryUL*, and which UE Categories a UE shall indicate in addition to the combinations for UE UL and DL Categories. A UE indicating DL category 13 may indicate category 9 or 10 in *ue-Category-v1170*. A UE indicating Category M2 shall also indicate Category M1.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| UE DL Category | Maximum number of DL-SCH transport block bits received within a TTI (Note 1) | Maximum number of bits of a DL-SCH transport block received within a TTI | Total number of soft channel bits | Maximum number of supported layers for spatial multiplexing in DL |
| DL Category M1 | 1000 | 1000 | 25344 | 1 |
| DL Category M2 | 4008 | 4008 | 73152 | 1 |
| DL Category 0 (Note 2) | 1000 | 1000 | 25344 | 1 |
| DL Category 1bis | 10296 | 10296 | 250368 | 1 |
| DL Category 4 | 150752 | 75376 | 1827072 | 2 |
| DL Category 6 | 301504 | 149776 (4 layers, 64QAM)  75376 (2 layers, 64QAM) | 3654144 | 2 or 4 |
| DL Category 7 | 301504 | 149776 (4 layers, 64QAM)  75376 (2 layers, 64QAM) | 3654144 | 2 or 4 |
| DL Category 9 | 452256 | 149776 (4 layers, 64QAM)  75376 (2 layers, 64QAM) | 5481216 | 2 or 4 |
| DL Category 10 | 452256 | 149776 (4 layers, 64QAM)  75376 (2 layers, 64QAM) | 5481216 | 2 or 4 |
| DL Category 11 | 603008 | 149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM) | 7308288 | 2 or 4 |
| DL Category 12 | 603008 | 149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM) | 7308288 | 2 or 4 |
| DL Category 13 | 391632 | 195816 (4 layers, 256QAM)  97896 (2 layers, 256QAM) | 3654144 | 2 or 4 |
| DL Category 14 | 3916560 | 391656 (8 layers, 256QAM) | 47431680 | 8 |
| DL Category 15 | 749856-807744 (Note 3) | 149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported) | 9744384 | 2 or 4 |
| DL Category 16 | 978960 -1051360 (Note 3) | 149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported) | 12789504 | 2 or 4 |
| DL Category 17 | 25065984 | 391656 (8 layers, 256QAM) | 303562752 | 8 |
| DL Category 18 | 1174752-1211616 (Note 3) | 299856 (8 layers, 64QAM)  391656 (8 layers, 256QAM)  149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported) | 14616576 | 2 or 4 or 8 |
| DL Category 19 | 1566336 -1658272 (Note 3) | 299856 (8 layers, 64QAM)  391656 (8 layers, 256QAM)  149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported) | 19488768 | 2 or 4 or 8 |
| DL Category 20 | 1948064 - 2019360 (Note 3) | 299856 (8 layers, 64QAM)  391656 (8 layers, 256QAM),  502624 (8 layers, 1024QAM)  149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  251640 (4 layers, 1024QAM)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  125808 (2 layers, 1024QAM) | 24360960 | 2 or 4 or 8 |
| DL Category 21 | 1348960 - 1413120 (Note 3) | 149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported) | 17052672 | 2 or 4 |
| DL Category 22 | 2349504 – 2562784 | 299856 (8 layers, 64QAM)  391656 (8 layers, 256QAM)  502624 (8 layers, 1024QAM)  149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  251640 (4 layers, 1024QAM)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  125808 (2 layers, 1024QAM) | 29233152 | 2 or 4 or 8 |
| DL Category 23 | 2695968 – 2869920 | 299856 (8 layers, 64QAM)  391656 (8 layers, 256QAM)  502624 (8 layers, 1024QAM)  149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  251640 (4 layers, 1024QAM)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  125808 (2 layers, 1024QAM) | 34105344 | 2 or 4 or 8 |
| DL Category 24 | 2936880 – 3028608 | 299856 (8 layers, 64QAM)  391656 (8 layers, 256QAM)  502624 (8 layers, 1024QAM)  149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  251640 (4 layers, 1024QAM)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  125808 (2 layers, 1024QAM) | 36541440 | 2 or 4 or 8 |
| DL Category 25 | 3132672 – 3316544 | 299856 (8 layers, 64QAM)  391656 (8 layers, 256QAM)  502624 (8 layers, 1024QAM)  149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  251640 (4 layers, 1024QAM)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  125808 (2 layers, 1024QAM) | 38977536 | 2 or 4 or 8 |
| DL Category 26 | 3422400– 3531888 | 299856 (8 layers, 64QAM)  391656 (8 layers, 256QAM)  502624 (8 layers, 1024QAM)  149776 (4 layers, 64QAM)  195816 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  201936 (4 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  251640 (4 layers, 1024QAM)  75376 (2 layers, 64QAM)  97896 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is not supported)  100752 (2 layers, 256QAM, if *alternativeTBS-Index-r14* is supported)  125808 (2 layers, 1024QAM) | 42631680 | 2 or 4 or 8 |
| NOTE 1: In carrier aggregation operation, the DL-SCH processing capability can be shared by the UE with that of MCH received from a serving cell. If the total eNB scheduling for DL-SCH and an MCH in one serving cell at a given TTI is larger than the defined processing capability, the prioritization between DL-SCH and MCH is left up to UE implementation.  NOTE 2: Within one TTI, a UE indicating category 0 shall be able to receive up to 1000 bits for a transport block associated with C-RNTI/Semi-Persistent Scheduling C-RNTI/P-RNTI/SI-RNTI/RA-RNTI and up to 2216 bits for another transport block associated with P-RNTI/SI-RNTI/RA-RNTI.  NOTE 3: The UE indicating category x shall reach the value within the defined range indicated by "Maximum number of DL-SCH transport block bits received within a TTI" of category x. The UE shall determine the required value within the defined range indicated by "Maximum number of DL-SCH transport block bits received within a TTI" of the corresponding category, based on its capabilities (i.e. CA band combination, MIMO, Modulation scheme). If the UE capability of CA band combination, MIMO and modulation scheme supported can exceed the upper limit of the defined range, the UE shall support the maximum value of the defined range indicated by "Maximum number of DL-SCH transport block bits received within a TTI" of the corresponding category. | | | | |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| UE UL Category | Maximum number of UL-SCH transport block bits transmitted within a TTI | Maximum number of bits of an UL-SCH transport block transmitted within a TTI | Support for 64QAM in UL | Support for 256QAM in UL |
| UL Category M1  (Note 1) | 1000 or 2984 | 1000 or 2984 | No | No |
| UL Category M2 | 6968 | 6968 | No | No |
| UL Category 0 | 1000 | 1000 | No | No |
| UL Category 1bis | 5160 | 5160 | No | No |
| UL Category 3 | 51024 | 51024 | No | No |
| UL Category 5 | 75376 | 75376 | Yes | No |
| UL Category 7 | 102048 | 51024 | No | No |
| UL Category 8 | 1497760 | 149776 | Yes | No |
| UL Category 13 | 150752 | 75376 | Yes | No |
| UL Category 14 | 9585664 | 149776 | Yes | No |
| UL Category 15 | 226128 | 75376 | Yes | No |
| UL Category 16 | 105528 | 105528 | Yes | Yes |
| UL Category 17 | 2119360 | 211936 | Yes | Yes |
| UL Category 18 | 211056 | 105528 | Yes | Yes |
| UL Category 19 | 13563904 | 211936 | Yes | Yes |
| UL Category 20 | 316584 | 105528 | Yes | Yes |
| UL Category 21 | 301504 | 75376 | Yes | No |
| UL Category 22 | 422112 | 105528 | Yes | Yes |
| UL Category 23 | 527640 | 105528 | Yes | Yes |
| UL Category 24 | 633168 | 105528 | Yes | Yes |
| UL Category 25 | 738696 | 105528 | Yes | Yes |
| UL Category 26 | 844224 | 105528 | Yes | Yes |
| NOTE 1: The UE supports "Maximum number of UL-SCH transport block bits transmitted within a TTI" and "Maximum number of bits of an UL-SCH transport block transmitted within a TTI" of 2984 bits if the UE indicates support of *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*

|  |  |  |  |
| --- | --- | --- | --- |
| UE DL Category | UE UL Category | Total layer 2 buffer size [bytes] | With support for split bearers [bytes] |
| DL Category M1 (Note 1) | UL Category M1 | 20 000 or 40 000 | N/A |
| DL Category M2 | UL Category M2 | 100 000 | N/A |
| DL Category 0 | UL Category 0 | 20 000 | N/A |
| DL Category 1bis | UL Category 1bis | 150 000 | 230 000 |
| DL Category 4 | UL Category 5 | 2 200 000 | 3 300 000 |
| DL Category 6 | UL Category 5 | 3 500 000 | 6 000 000 |
| DL Category 6 | UL Category 16 | 3 800 000 | 6 300 000 |
| DL Category 7 | UL Category 13 | 4 200 000 | 6 700 000 |
| DL Category 7 | UL Category 18 | 4 800 000 | 7 300 000 |
| DL Category 9 | UL Category 5 | 5 000 000 | 7 400 000 |
| DL Category 9 | UL Category 16 | 5 200 000 | 7 700 000 |
| DL Category 10 | UL Category 13 | 5 700 000 | 8 100 000 |
| DL Category 10 | UL Category 18 | 6 200 000 | 8 700 000 |
| DL Category 11 | UL Category 5 | 6 400 000 | 11 300 000 |
| DL Category 11 | UL Category 16 | 6 600 000 | 11 500 000 |
| DL Category 12 | UL Category 13 | 7 100 000 | 12 000 000 |
| DL Category 12 | UL Category 15 | 7 700 000 | 12 600 000 |
| DL Category 12 | UL Category 18 | 7 600 000 | 12 500 000 |
| DL Category 12 | UL Category 20 | 8 600 000 | 13 500 000 |
| DL Category 13 | UL Category 3 | 4 200 000 | 7 300 000 |
| DL Category 13 | UL Category 5 | 4 400 000 | 7 600 000 |
| DL Category 13 | UL Category 7 | 4 700 000 | 7 800 000 |
| DL Category 13 | UL Category 13 | 5 100 000 | 8 300 000 |
| DL Category 13 | UL Category 16 | 4 700 000 | 7 800 000 |
| DL Category 13 | UL Category 18 | 5 700 000 | 8 800 000 |
| DL Category 14 | UL Category 8 | 50 800 000 | 76 200 000 |
| DL Category 14 | UL Category 17 | 56 600 000 | 82 000 000 |
| DL Category 15 | UL Category 3 | 8 000 000 | 13 000 000 |
| DL Category 15 | UL Category 5 | 8 200 000 | 13 400 000 |
| DL Category 15 | UL Category 7 | 8 500 000 | 13 600 000 |
| DL Category 15 | UL Category 13 | 8 900 000 | 14 100 000 |
| DL Category 15 | UL Category 16 | 8 500 000 | 13 700 000 |
| DL Category 15 | UL Category 18 | 9 500 000 | 14 700 000 |
| DL Category 16 | UL Category 3 | 10 000 000 | 17 000 000 |
| DL Category 16 | UL Category 5 | 10 600 000 | 17 400 000 |
| DL Category 16 | UL Category 7 | 10 800 000 | 17 600 000 |
| DL Category 16 | UL Category 13 | 11 000 000 | 18 100 000 |
| DL Category 16 | UL Category 15 | 12 000 000 | 18 800 000 |
| DL Category 16 | UL Category 16 | 8 500 000 | 13 700 000 |
| DL Category 16 | UL Category 18 | 11 800 000 | 18 700 000 |
| DL Category 16 | UL Category 20 | 12 800 000 | 19 700 000 |
| DL Category 17 | UL Category 14 | 330 000 000 | 530 000 000 |
| DL Category 17 | UL Category 19 | 360 000 000 | 530 000 000 |
| DL Category 18 | UL Category 3 | 11 800 000 | 21 600 000 |
| DL Category 18 | UL Category 5 | 12 000 000 | 21 800 000 |
| DL Category 18 | UL Category 7 | 12 300 000 | 22 100 000 |
| DL Category 18 | UL Category 13 | 12 700 000 | 22 500 000 |
| DL Category 18 | UL Category 15 | 13 400 000 | 23 200 000 |
| DL Category 18 | UL Category 16 | 12 300 000 | 22 100 000 |
| DL Category 18 | UL Category 18 | 13 300 000 | 23 100 000 |
| DL Category 18 | UL Category 20 | 14 300 000 | 24 100 000 |
| DL Category 19 | UL Category 3 | 16 000 000 | 28 300 000 |
| DL Category 19 | UL Category 5 | 16 300 000 | 28 500 000 |
| DL Category 19 | UL Category 7 | 16 500 000 | 28 800 000 |
| DL Category 19 | UL Category 13 | 17 000 000 | 29 200 000 |
| DL Category 19 | UL Category 15 | 17 700 000 | 29 900 000 |
| DL Category 19 | UL Category 16 | 16 500 000 | 28 800 000 |
| DL Category 19 | UL Category 18 | 17 500 000 | 29 800 000 |
| DL Category 19 | UL Category 20 | 18 500 000 | 30 800 000 |
| DL Category 19 | UL Category 21 | 18 400 000 | 30 600 000 |
| DL Category 20 | UL Category 3 | 19 400 000 | 35 800 000 |
| DL Category 20 | UL Category 5 | 19 600 000 | 36 000 000 |
| DL Category 20 | UL Category 7 | 19 900 000 | 36 300 000 |
| DL Category 20 | UL Category 13 | 20 300 000 | 36 800 000 |
| DL Category 20 | UL Category 15 | 21 100 000 | 37 500 000 |
| DL Category 20 | UL Category 16 | 19 900 000 | 36 300 000 |
| DL Category 20 | UL Category 18 | 20 900 000 | 37 300 000 |
| DL Category 20 | UL Category 20 | 21 900 000 | 38 300 000 |
| DL Category 20 | UL Category 21 | 21 800 000 | 38 200 000 |
| DL Category 21 | UL Category 3 | 13 700 000 | 23 500 000 |
| DL Category 21 | UL Category 5 | 13 900 000 | 23 700 000 |
| DL Category 21 | UL Category 7 | 14 200 000 | 24 000 000 |
| DL Category 21 | UL Category 13 | 14 600 000 | 24 400 000 |
| DL Category 21 | UL Category 15 | 15 300 000 | 25 200 000 |
| DL Category 21 | UL Category 16 | 14 200 000 | 24 000 000 |
| DL Category 21 | UL Category 18 | 15 200 000 | 25 000 000 |
| DL Category 21 | UL Category 20 | 16 200 000 | 26 000 000 |
| DL Category 22 | UL Category 20 | 26 600 000 | 47 000 000 |
| DL Category 22 | UL Category 22 | 27 500 000 | 48 000 000 |
| DL Category 22 | UL Category 23 | 30 500 000 | 51 300 000 |
| DL Category 22 | UL Category 24 | 32 400 000 | 57 000 000 |
| DL Category 22 | UL Category 25 | 35 000 000 | 59 900 000 |
| DL Category 22 | UL Category 26 | 38 000 000 | 67 600 000 |
| DL Category 23 | UL Category 20 | 29 500 000 | 50 400 000 |
| DL Category 23 | UL Category 22 | 28 500 000 | 49 000 000 |
| DL Category 23 | UL Category 23 | 31 500 000 | 52 300 000 |
| DL Category 23 | UL Category 24 | 33 300 000 | 57 900 000 |
| DL Category 23 | UL Category 25 | 36 000 000 | 60 900 000 |
| DL Category 23 | UL Category 26 | 39 000 000 | 68 600 000 |
| DL Category 24 | UL Category 20 | 31 400 000 | 56 000 000 |
| DL Category 24 | UL Category 22 | 29 500 000 | 50 000 000 |
| DL Category 24 | UL Category 23 | 32 400 000 | 53 300 000 |
| DL Category 24 | UL Category 24 | 34 300 000 | 58 900 000 |
| DL Category 24 | UL Category 25 | 37 000 000 | 61 900 000 |
| DL Category 24 | UL Category 26 | 40 000 000 | 69 500 000 |
| DL Category 25 | UL Category 20 | 34 100 000 | 58 900 000 |
| DL Category 25 | UL Category 22 | 30 500 000 | 51 000 000 |
| DL Category 25 | UL Category 23 | 33 400 000 | 54 300 000 |
| DL Category 25 | UL Category 24 | 35 300 000 | 59 900 000 |
| DL Category 25 | UL Category 25 | 38 000 000 | 62 900 000 |
| DL Category 25 | UL Category 26 | 41 000 000 | 70 500 000 |
| DL Category 26 | UL Category 20 | 37 000 000 | 66 600 000 |
| DL Category 26 | UL Category 22 | 31 500 000 | 52 000 000 |
| DL Category 26 | UL Category 23 | 34 400 000 | 55 300 000 |
| DL Category 26 | UL Category 24 | 36 300 000 | 60 900 000 |
| DL Category 26 | UL Category 25 | 39 000 000 | 63 900 000 |
| DL Category 26 | UL Category 26 | 42 000 000 | 71 500 000 |
| NOTE 1: The UE supports "Total layer 2 buffer size" of 40 000 bytes if the UE indicates support of *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

|  |  |
| --- | --- |
| UE DL Category | Maximum number of bits of a MCH transport block received within a TTI |
| DL Category M1 | NA |
| DL Category M2 | NA |
| DL Category 0 | 4584 |
| DL Category 1bis | 10296 |
| DL Category 4 | 75376 |
| DL Category 6 | 75376 |
| DL Category 7 | 75376 |
| DL Category 9 | 75376 |
| DL Category 10 | 75376 |
| DL Category 11 | 75376 (64QAM)  97896 (256QAM) |
| DL Category 12 | 75376 (64QAM)  97896 (256QAM) |
| DL Category 13 | 75376 (64QAM)  97896 (256QAM) |
| DL Category 14 | 75376 (64QAM)  97896 (256QAM) |
| DL Category 15 | 75376 (64QAM)  97896 (256QAM) |
| DL Category 16 | 75376 (64QAM)  97896 (256QAM) |
| DL Category 17 | 75376 (64QAM)  97896 (256QAM) |
| DL Category 18 | 75376 (64QAM)  97896 (256QAM) |
| DL Category 19 | 75376 (64QAM)  97896 (256QAM) |
| DL Category 20 | 75376 (64QAM)  97896 (256QAM) |
| DL Category 21 | 75376 (64QAM)  97896 (256QAM) |

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

|  |  |
| --- | --- |
| UE DL Category | Half-duplex FDD operation type |
| DL Category M1 | Type B |
| DL Category M2 | Type B |
| DL Category 0 | Type B |
| DL Category 1bis | Type A |
| DL Category 4 | Type A |
| DL Category 6 | Type A |
| DL Category 7 | Type A |
| DL Category 9 | Type A |
| DL Category 10 | Type A |
| DL Category 11 | Type A |
| DL Category 12 | Type A |
| DL Category 13 | Type A |
| DL Category 14 | Type A |
| DL Category 15 | Type A |
| DL Category 16 | Type A |
| DL Category 17 | Type A |
| DL Category 18 | Type A |
| DL Category 19 | Type A |
| DL Category 20 | Type A |
| DL Category 21 | Type A |

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

|  |  |  |  |
| --- | --- | --- | --- |
| UE DL Category | UE UL Category | UE categories | Maximum UE channel bandwidth [MHz] |
|  |  |  |  |
|  |  |  |  |
| DL Category 0 | UL Category 0 | N/A | According to maximum channel bandwidth specified per band in TS 36.101 [6]. |
| DL Category 1bis | UL Category 1bis | Category 1 (NOTE 1) |
| DL Category 4 | UL Category 5 | Category 4 |
| DL Category 6 | UL Category 5 | Category 6, 4 |
| DL Category 6 | UL Category 16 | Category 6, 4  DL Category 6 and UL Category 5 |
| DL Category 7 | UL Category 13 | Category 7, 4 |
| DL Category 7 | UL Category 18 | Category 7, 4  DL Category 7 and UL Category 13 |
| DL Category 9 | UL Category 5 | Category 9, 6, 4 |
| DL Category 9 | UL Category 16 | Category 9, 6, 4  DL Category 9 and UL Category 5 |
| DL Category 10 | UL Category 13 | Category 10, 7, 4 |
| DL Category 10 | UL Category 18 | Category 10, 7, 4  DL Category 10 and UL Category 13 |
| DL Category 11 | UL Category 5 | Category 11, 9, 6, 4 |
| DL Category 11 | UL Category 16 | Category 11, 9, 6, 4  DL Category 11 and UL Category 5 |
| DL Category 12 | UL Category 13 | Category 12, 10, 7, 4 |
| DL Category 12 | UL Category 15 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13 |
| DL Category 12 | UL Category 18 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13 |
| DL Category 12 | UL Category 20 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 12 and UL Category 15 |
| DL Category 13 | UL Category 3 | Category 6, 4, 9 (if supported) |
| DL Category 13 | UL Category 5 | Category 6, 4, 9 (if supported) |
| DL Category 13 | UL Category 7 | Category 7, 4, 10 (if supported) |
| DL Category 13 | UL Category 13 | Category 7, 4, 10 (if supported) |
| DL Category 13 | UL Category 16 | Category 6, 4  DL Category 13 and UL Category 5 |
| DL Category 13 | UL Category 18 | Category 7, 4  DL Category 13 and UL Category 13 |
| DL Category 14 | UL Category 8 | Category 8, 5 |
| DL Category 14 | UL Category 17 | Category 8, 5  DL Category 14 and UL Category 8 |
| DL Category 15 | UL Category 3 | Category 11, 9, 6, 4 |
| DL Category 15 | UL Category 5 | Category 11, 9, 6, 4  DL Category 11 and UL Category 5 |
| DL Category 15 | UL Category 7 | Category 12, 10, 7, 4 |
| DL Category 15 | UL Category 13 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13 |
| DL Category 15 | UL Category 16 | Category 11, 9, 6, 4  DL Category 11 and UL Category 5  DL Category 15 and UL Category 5 |
| DL Category 15 | UL Category 18 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 15 and UL Category 13 |
| DL Category 16 | UL Category 3 | Category 11, 9, 6, 4 |
| DL Category 16 | UL Category 5 | Category 11, 9, 6, 4  DL Category 11 and UL Category 5 |
| DL Category 16 | UL Category 7 | Category 12, 10, 7, 4 |
| DL Category 16 | UL Category 13 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13 |
| DL Category 16 | UL Category 15 | Category 12, 10, 7, 4  DL Category 16,12 and UL Category 13 |
| DL Category 16 | UL Category 16 | Category 11, 9, 6, 4  DL Category 11 and UL Category 5  DL Category 16 and UL Category 5 |
| DL Category 16 | UL Category 18 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13 |
| DL Category 16 | UL Category 20 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13  DL Category 16 and UL Category 15 |
| DL Category 17 | UL Category 14 | Category 8, 5  DL Category 14 and UL Category 8 |
| DL Category 17 | UL Category 19 | Category 8, 5  DL Category 14 and UL Category 8  DL Category 17 and UL Category 14 |
| DL Category 18 | UL Category 3 | Category 11, 9, 6, 4  DL Category 16 and UL Category 3 |
| DL Category 18 | UL Category 5 | Category 11, 9, 6, 4  DL Category 16, 11 and UL Category 5 |
| DL Category 18 | UL Category 7 | Category 12, 10, 7, 4  DL Category 16 and UL Category 7 |
| DL Category 18 | UL Category 13 | Category 12, 10, 7, 4  DL Category 16, 12 and UL Category 13 |
| DL Category 18 | UL Category 15 | Category 12, 10, 7, 4  DL Category 16,12 and UL Category 13 |
| DL Category 18 | UL Category 16 | Category 11, 9, 6, 4  DL Category 11 and UL Category 5  DL Category 16 and UL Category 5  DL Category 18 and UL Category 5 |
| DL Category 18 | UL Category 18 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13 |
| DL Category 18 | UL Category 20 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13  DL Category 18 and UL Category 15 |
| DL Category 19 | UL Category 3 | Category 11, 9, 6, 4  DL Category 16 and UL Category 3 |
| DL Category 19 | UL Category 5 | Category 11, 9, 6, 4  DL Category 16, 11 and UL Category 5 |
| DL Category 19 | UL Category 7 | Category 12, 10, 7, 4  DL Category 16 and UL Category 7 |
| DL Category 19 | UL Category 13 | Category 12, 10, 7, 4  DL Category 16, 12 and UL Category 13 |
| DL Category 19 | UL Category 15 | Category 12, 10, 7, 4  DL Category 16,12 and UL Category 13 |
| DL Category 19 | UL Category 16 | Category 11, 9, 6, 4  DL Category 11 and UL Category 5  DL Category 16 and UL Category 5  DL Category 19 and UL Category 5 |
| DL Category 19 | UL Category 18 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13  DL Category 19 and UL Category 13 |
| DL Category 19 | UL Category 20 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13  DL Category 19 and UL Category 15 |
| DL Category 19 | UL Category 21 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13  DL Category 19 and UL Category 15 |
| DL Category 20 | UL Category 3 | Category 11, 9, 6, 4  DL Category 16 and UL Category 3  DL Category 19 and UL Category 3 |
| DL Category 20 | UL Category 5 | Category 11, 9, 6, 4  DL Category 16, 11 and UL Category 5  DL Category 19 and UL Category 5 |
| DL Category 20 | UL Category 7 | Category 12, 10, 7, 4  DL Category 16 and UL Category 7  DL Category 19 and UL Category 7 |
| DL Category 20 | UL Category 13 | Category 12, 10, 7, 4  DL Category 16, 12 and UL Category 13  DL Category 19 and UL Category 13 |
| DL Category 20 | UL Category 15 | Category 12, 10, 7, 4  DL Category 16,12 and UL Category 13  DL Category 19 and UL Category 13  DL Category 19 and UL Category 15 |
| DL Category 20 | UL Category 16 | Category 11, 9, 6, 4  DL Category 11 and UL Category 5  DL Category 16 and UL Category 5  DL Category 19 and UL Category 5  DL Category 19 and UL Category 16 |
| DL Category 20 | UL Category 18 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13  DL Category 19 and UL Category 13  DL Category 19 and UL Category 18 |
| DL Category 20 | UL Category 20 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13  DL Category 19 and UL Category 15  DL Category 19 and UL Category 20 |
| DL Category 20 | UL Category 21 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13  DL Category 19 and UL Category 15  DL Category 19 and UL Category 21 |
| DL Category 21 | UL Category 3 | Category 11, 9, 6, 4  DL Category 16 and UL Category 3  DL Category 18 and UL Category 3 |  |
| DL Category 21 | UL Category 5 | Category 11, 9, 6, 4  DL Category 16, 11 and UL Category 5  DL Category 18 and UL Category 5 |
| DL Category 21 | UL Category 7 | Category 12, 10, 7, 4  DL Category 16 and UL Category 7  DL Category 18 and UL Category 7 |
| DL Category 21 | UL Category 13 | Category 12, 10, 7, 4  DL Category 16, 12 and UL Category 13  DL Category 18 and UL Category 13 |
| DL Category 21 | UL Category 15 | Category 12, 10, 7, 4  DL Category 16,12 and UL Category 13  DL Category 18 and UL Category 13  DL Category 18 and UL Category 15 |
| DL Category 21 | UL Category 16 | Category 11, 9, 6, 4  DL Category 11 and UL Category 5  DL Category 16 and UL Category 5  DL Category 18 and UL Category 5  DL Category 18 and UL Category 16 |
| DL Category 21 | UL Category 18 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13  DL Category 18 and UL Category 13  DL Category 18 and UL Category 18 |
| DL Category 21 | UL Category 20 | Category 12, 10, 7, 4  DL Category 12 and UL Category 13  DL Category 16 and UL Category 13  DL Category 18 and UL Category 15  DL Category 18 and UL Category 20 |
| DL Category 22 | UL Category 20 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 22 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 22 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 22 | UL Category 23 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 22 | UL Category 24 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 22 | UL Category 25 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 22 | UL Category 26 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 23 | UL Category 20 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 23 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 23 | UL Category 23 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 23 | UL Category 24 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 23 | UL Category 25 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 23 | UL Category 26 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 24 | UL Category 20 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 24 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 24 | UL Category 23 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 24 | UL Category 24 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 24 | UL Category 25 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 24 | UL Category 26 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 25 | UL Category 20 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 25 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 25 | UL Category 23 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 25 | UL Category 24 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 25 | UL Category 25 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 25 | UL Category 26 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 26 | UL Category 20 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 26 | UL Category 22 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 26 | UL Category 23 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 26 | UL Category 24 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 26 | UL Category 25 | DL Category 20 and UL Category 20 (NOTE3) |  |
| DL Category 26 | UL Category 26 | DL Category 20 and UL Category 20 (NOTE3) |  |
| NOTE 1: The UE indicating DL category 1bis is only required to support 1Rx antenna even though the UE indicates UE category 1 for legacy compatibility.  NOTE 2: Void.  NOTE 3: The UE indicating DL Category 20 and UL Category 20 also indicates Category 12, 10, 7, 4, DL Category 12 and UL Category 13, DL Category 16 and UL Category 13, DL Category 19 and UL Category 15, DL Category 19 and UL Category 20. | | | |

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

|  |  |  |  |
| --- | --- | --- | --- |
| UE DL Category | UE UL Category | UE categories | Maximum UE channel bandwidth [MHz] |
| DL Category M1 | UL Category M1 | N/A | 1.4 |
| DL Category M2 | UL Category M2 | DL Category M1 and UL Category M1 | 5  (NOTE) |
| NOTE: The minimum of 5 MHz and the maximum channel bandwidth specified per band in TS 36.101 [6]. | | | |

|  |
| --- |
| NEXT CHANGE |

#### 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 w*akeUpSignal-r15* or *groupWakeUpSignal-r16*. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

|  |
| --- |
| NEXT CHANGE |

#### 4.3.4.130 *wakeUpSignalMinGap-eDRX-TDD-r15*

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

|  |
| --- |
| NEXT CHANGE |

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

This field indicates whether the UE supports multiple TB scheduling for unicast in the uplink when the UE is operating in coverage enhancement mode A as specified in TS 36.213 [22]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

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

This field indicates whether the UE supports multiple TB scheduling for unicast in the downlink when the UE is operating in coverage enhancement mode A as specified in TS 36.213 [22]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

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

This field indicates whether the UE supports multiple TB scheduling for unicast in the uplink when the UE is operating in coverage enhancement mode B as specified in TS 36.213 [22]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

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

This field indicates whether the UE supports multiple TB scheduling for unicast in the downlink when the UE is operating in coverage enhancement mode B as specified in TS 36.213 [22]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

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

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

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

This field indicates whether the UE supports codebook subset restriction for CSI-RS-based feedback when the UE is operating in coverage enhancement mode A, as specified in TS 36.213 [22]. If a UE indicating support of *ce-CSI-RS-FeedbackCodebookRestriction-r16* shall also indicate support of ce-*CSI-RS-Feedback-r16.* This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.189 *mpdcch-InLTE-ControlRegion-CE-ModeA-r16*

This field indicates whether the UE supports MPDCCH reception in the LTE control channel region when the UE is operating in coverage enhancement mode A as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.189a *mpdcch-InLTE-ControlRegion-CE-ModeB-r16*

This field indicates whether the UE supports MPDCCH reception in the LTE control channel region when the UE is operating in coverage enhancement mode B as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

#### 4.3.4.189b *pdsch-InLTE-ControlRegion-CE-ModeA-r16*

This field indicates whether the UE supports PDSCH reception in the LTE control channel region when the UE is operating in coverage enhancement mode A as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.189c *pdsch-InLTE-ControlRegion-CE-ModeB-r16*

This field indicates whether the UE supports PDSCH reception in the LTE control channel region when the UE is operating in coverage enhancement mode B as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

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

This field indicates whether the UE supports MPDCCH performance improvement with precoder cycling when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

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

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

#### 4.3.4.xa *groupWakeUpSignal-r16*

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

#### 4.3.4.xb *groupWakeUpSignal-TDDr16*

This field indicates whether the UE supports Group WUS without group resource alternation for TDD in RRC\_IDLE as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.304 [14]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xc *groupWakeUpSignalAlternation-r16*

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

#### 4.3.4.xd *groupWakeUpSignalAlternationTDD-r16*

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

#### 4.3.4.xe *subframeResourceResvUL-CE-ModeA-r16*

This field indicates whether the UE supports UL resource reservation with subframe-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xf *subframeResourceResvUL-CE-ModeB-r16*

This field indicates whether the UE supports UL resource reservation with subframe-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

#### 4.3.4.xg *subframeResourceResvDL-CE-ModeA-r16*

This field indicates whether the UE supports DL resource reservation with subframe-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xh *subframeResourceResvDL-CE-ModeB-r16*

This field indicates whether the UE supports DL resource reservation with subframe-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

#### 4.3.4.xi *slotSymbolResourceResvUL-CE-ModeA-r16*

This field indicates whether the UE supports UL resource reservation with slot/symbol-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xj *slotSymbolResourceResvUL-CE-ModeB-r16*

This field indicates whether the UE supports UL resource reservation with slot/symbol-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

#### 4.3.4.xk *slotSymbolResourceResvDL-CE-ModeA-r16*

This field indicates whether the UE supports DL resource reservation with slot/symbol-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xl *slotSymbolResourceResvDL-CE-ModeB-r16*

This field indicates whether the UE supports DL resource reservation with slot/symbol-level granularity e.g. for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

#### 4.3.4.xm *subcarrierPuncturing-CE-ModeA-r16*

This field indicates whether the UE supports DL subcarrier puncturing e.g. for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xn *subcarrierPuncturing-CE-ModeB-r16*

This field indicates whether the UE supports DL subcarrier puncturing e.g. for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

#### 4.3.4.xo *ce-MultiTB-Interleaving-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with TB interleaving as specified in TS 36.213 [22]. A UE indicating support of *multiTB-Interleaving-r16* shall also indicate support of *multiTB-PUSCH-CE-ModeA-r16* or *multiTB-PDSCH-CE-ModeA-r16* or *multiTB-PUSCH-CE-ModeB-r16* or *multiTB-PDSCH-CE-ModeB-r16.* This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xp *ce-MultiTB-HARQ-AckBundling-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with HARQ bundling as specified in TS 36.213 [22]. A UE indicating support of *multiTB-HARQ-Bundling-r16* shall also indicate support of *pusch-MultiTB-CE-ModeA-r16* or *pdsch-MultiTB-CE-ModeA-r16* or *pusch-MultiTB-CE-ModeB-r16* or *pdsch-MultiTB-CE-ModeB-r16 .* This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xq *ce-MultiTB-SubPRB-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with UL sub-PRB as specified in TS 36.213 [22]. A UE indicating support of *multiTB-Sub-PRB-r16* shall also indicate support of (*pusch-MultiTB-CE-ModeA-r16* or *pusch-MultiTB-CE-ModeB-r16 )* and *ce-PUSCH-SubPRB-Allocation-r15.* This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xr *ce-MultiTB-EarlyTermination-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with UL early termination as specified in TS 36.213 [22]. A UE indicating support of *multiTB-EarlyTermination-r16* shall also indicate support of *pusch-MultiTB-CE-ModeA-r16 o*r *pusch-MultiTB-CE-ModeB-r16 .* This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xs *ce-MultiTB-64QAM-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with 64QAM in the downlink when the UE is operating in coverage enhancement mode A as specified in TS 36.213 [22]. A UE indicating support of *multiTB-64QAM-r16* shall also indicate support of *pdsch-MultiTB-CE-ModeA-r16* and *pdsch-64QAM-r15.* This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xt *ce-MultiTB-FrequencyHopping-r16*

This field indicates whether the UE supports multiple TB scheduling for unicast with frequency hopping as specified in TS 36.213 [22]. A UE indicating support of *multiTB-FrequencyHopping-r16* shall also indicate support of *pusch-MultiTB-CE-ModeA-r16* or *pdsch-MultiTB-CE-ModeA-r16* or *pusch-MultiTB-CE-ModeB-r16* or *pdsch-MultiTB-CE-ModeB-r16 .* This feature is only applicable if the UE supports *ce-ModeA-r13*.

|  |
| --- |
| NEXT CHANGE |

#### 4.3.6.37 *dl-ChannelQualityReporting-r16 / ce-DL-ChannelQualityReporting-r16*

*This field indicates whe*ther the UE supports DL channel quality reporting of the serving cell when the UE is operating in coverage enhancement mode A or B, or of the configured carrier for NB-IoT FDD, in RRC\_CONNECTED as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

#### 4.3.6.a *ce-MeasRSS-Dedicated-r16*

This field indicates whether the UE supports improved DL RSRP measurement accuracy through use of RSS in RRC\_CONNECTED when the UE is operating in coverage enhancement mode A or B as specified in 36.133 [16]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

|  |
| --- |
| NEXT CHANGE |

#### 4.3.8.12 void

#### 4.3.8.13 void

|  |
| --- |
| NEXT CHANGE |

#### 4.3.19.22 *rai-SupportEnh-r16*

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

|  |
| --- |
| NEXT CHANGE |

#### 4.3.29.13 *etws-CMAS-RxInConn-CE-ModeA-r16*

This field indicates whether the UE supports ETWS/CMAS indication reception in RRC\_CONNECTED state when the UE is operating in coverage enhancement mode A as specified in TS 36.331 [5]. This feature is only applicable if the UE supports a UE Category other than Category M1 and M2 and supports *ce-ModeA-r13*.

#### 4.3.29.14 *etws-CMAS-RxInConn-CE-ModeB-r16*

This field indicates whether the UE supporting CE Mode B supports ETWS/CMAS indication reception in RRC\_CONNECTED state when the UE is operating in coverage enhancement mode B as specified in TS 36.331 [5]. This feature is only applicable if the UE supports a UE Category other than Category M1 and M2 and supports *ce-ModeB-r13*.

|  |
| --- |
| NEXT CHANGE |

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

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

#### 4.3.34.a *ce-EUTRA-5GC-HO-ToNR-FDD-FR1-r16*

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

#### 4.3.34.b *ce-EUTRA-5GC-HO-ToNR-TDD-FR1-r16*

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

#### 4.3.34.c *ce-EUTRA-5GC-HO-ToNR-FDD-FR2-r16*

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

#### 4.3.34.d *ce-EUTRA-5GC-HO-ToNR-TDD-FR2-r16*

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

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| NEXT CHANGE |

#### 4.3.36.10 *ce-RRC-INACTIVE-r16*

This field indicates whether the UE supports RRC\_INACTIVE state with extended DRX cycles up to 10.24s without PTW when the UE is operating in coverage enhancement mode A or B as specified in TS 36.331 [5] . This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.36.x *ce-EUTRA-5GC-r16*

This field indicates whether the UE supports E-UTRA/5GC when the UE is operating in coverage enhancement mode A or B as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

### 4.3.x PUR Parameters

#### 4.3.x.a *pur-CP-EPC-CE-ModeA-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for Control Plane CIoT EPS optimisation when the UE is operating in coverage enhancement mode A, as specified in TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.x.b *pur-CP-EPC-CE-ModeB-r16*

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

#### 4.3.x.c *pur-UP-EPC-CE-ModeA-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for User Plane CIoT EPS optimisation when the UE is operating in coverage enhancement mode A, as specified in TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.x.d *pur-UP-EPC-CE-ModeB-r16*

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

#### 4.3.x.e *pur-CP-5GC-CE-ModeA-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for Control Plane CIoT 5GS optimisation when the UE is operating in coverage enhancement mode A, as specified in TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.x.f *pur-CP-5GC-CE-ModeB-r16*

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

#### 4.3.x.g *pur-UP-5GC-CE-ModeA-r16*

This field indicates whether the UE supports transmission in preconfigured UL resources (PUR) for full-PRB for User Plane CIoT 5GS optimisation when the UE is operating in coverage enhancement mode A, as specified in TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.x.h *pur-UP-5GC-CE-ModeB-r16*

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

#### 4.3.x.i *pur-PUSCH-NB-MaxTBS-r16*

This field indicates whether the UE supports Combination of PUR for full-PRB with maximum uplink TBS of 2984 bits when the UE is operating in coverage enhancement mode A, as specified in TS 36.213 [22]. A UE indicating support of *pur-PUSCH-NB-MaxTBS-r16* shall also indicate support of (*pur-CP-EPC-CE-ModeA-r16* or *pur-CP-5GC-CE-ModeA-r16* or *pur-UP-EPC-CE-ModeA-r16* or *pur-UP-5GC-CE-ModeA-r16*) and *ce-PUSCH-NB-MaxTBS-r14*. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.x.j *pur-SubPRB-CE-ModeA-r16*

This field indicates whether the UE supports Combination of PUR for sub-PRB when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. A UE indicating support of *pur-Sub-PRB-CE-ModeA-r16* shall also indicate support of (*pur-CP-EPC-CE-ModeA-r16* or *pur-CP-5GC-CE-ModeA-r16* or *pur-UP-EPC-CE-ModeA-r16* or *pur-UP-5GC-CE-ModeA-r16*) and *ce-PUSCH-SubPRB-Allocation-r15*. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.x.k *pur-SubPRB-CE-ModeB-r16*

This field indicates whether the UE supports Combination of PUR for sub-PRB when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. A UE indicating support of *pur-Sub-PRB-CE-ModeB-r16* shall also indicate support of (*pur-CP-EPC-CE-ModeB-r16* or *pur-CP-5GC-CE-ModeB-r16* or *pur-UP-EPC-CE-ModeB-r16* or *pur-UP-5GC-CE-ModeB-r16*) and *ce-PUSCH-SubPRB-Allocation-r15*. This feature is only applicable if the UE supports *ce-ModeB-r13*.

#### 4.3.x.l *pur-RSRP-Validation-r16*

This field indicates whether the UE supports PUR with serving cell RSRP TA validation, as specified in TS 36.331 [5]. A UE indicating support of *pur-RSRP-Validation-r16* shall also indicate support of *pur-CP-EPC-CE-ModeA-r16* or *pur-CP-5GC-CE-ModeA-r16* or *pur-UP-EPC-CE-ModeA-r16* or *pur-UP-5GC-CE-ModeA-r16*. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.x.m *pur-CP-L1Ack-r16*

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

#### 4.3.x.n *pur-FrequencyHopping-r16*

This field indicates whether the UE supports PUR frequency hopping, as specified in TS 36.213 [22]. A UE indicating support of *pur-FrequencyHopping-r16* shall also indicate support of (*pur-CP-EPC-CE-ModeA-r16* or *pur-CP-5GC-CE-ModeA-r16* or *pur-UP-EPC-CE-ModeA-r16* or *pur-UP-5GC-CE-ModeA-r16*). This feature is only applicable if the UE supports *ce-ModeA-r13*.

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| NEXT CHANGE |

### 6.8.4 MO-EDT for Control Plane CIoT EPS Optimization

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

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| NEXT CHANGE |

## 6.16 SC-PTM features

### 6.16.1 SC-PTM in Idle mode

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

### 6.16.x Multiple TB scheduling for SC-PTM in Idle mode

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

### 6.16.y Multiple TB scheduling for SC-PTM in Idle mode for CE Mode B

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

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| NEXT CHANGE |

## 6.17 Idle mode measurements

### 6.17.1 Relaxed monitoring

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

### 6.17.2 DL channel quality reporting in Msg3

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

### 6.17.3 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*.

### 6.17.6 RRM measurements on non-anchor paging carriers

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

### 6.17.x DL channel quality reporting in Msg3

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

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| NEXT CHANGE |

## 6.18 E-UTRA/5GC features

### 6.18.1 Void

### 6.18.2 Void

### 6.18.i MO-EDT for Control Plane CIoT 5GS Optimisation

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

### 6.18.j AS RAI

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

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| END OF CHANGES |