**3GPP TSG-RAN4 Meeting # *R4-2114348***

**Electronic Me**e**ting, 16th– 27th August 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **36.101** | **CR** |  | **rev** | **-** | **Current version:** | **17.2.0** |  |
|  | | | | | | | | |
| *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 |  | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | CR on adding B24 for Cat-M1/M2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Ligado Networks | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_bands\_R17\_M1\_M2\_NB1\_NB2 | | | | |  | ***Date:*** | | | 2021-8-16 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Adding B24 for CAT-M1/M2 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Adding B24 for CAT-M1/M2 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | No B24 support to CAT-M1/M2 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.5E, 6.2.4E,7.3.1E | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 36.521 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## < start of changes >

5.5E Operating bands for UE category 0, UE category M1 and M2 and UE category 1bis

UE category 0 is designed to operate in the E-UTRA operating bands 2, 3, 4, 5, 8, 13, 20, 25, 26 and 28 in both half duplex FDD mode and full-duplex FDD mode and in bands 39, 40 and 41 in TDD mode. The E-UTRA bands are defined in Table 5.5-1.

UE category M1 and M2 is designed to operate in the E-UTRA operating bands 1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31, 66, 71, 72, 73, 74, 85, 87 and 88 in both half duplex FDD mode and full-duplex FDD mode, and in bands 39, 40, 41, 42 and 43 in TDD mode. The E-UTRA bands are defined in Table 5.5-1.

UE category 1bis is designed to operate in the E-UTRA operating bands 1, 2, 3, 4, 5, 7, 8, 12, 13, 18, 20, 26, 28, 31, 66 and 72 in full duplex FDD mode and in bands 34, 39, 40 and 41 in TDD mode. The E-UTRA bands are defined in Table 5.5-1

## << Unchanged part is omitted>>

### 6.2.4E UE maximum output power with additional requirements for category M1 and M2 UE

Additional ACLR and spectrum emission requirements can be signalled by the network to indicate that the UE shall also meet additional requirements in a specific deployment scenario. To meet these additional requirements, Additional Maximum Power Reduction (A-MPR) is allowed for the output power as specified in Table 6.2.2E-1 and Table 6.2.4E-2. Unless stated otherwise, an A-MPR of 0 dB shall be used.

For UE Power Class 3 and 5 the specific requirements and identified subclauses are specified in Table 6.2.4E-1 and Table 6.2.4E-2 along with the allowed A-MPR values that may be used to meet these requirements. The allowed A-MPR values specified below in Table 6.2.4E-1 and Table 6.2.4E-2 and from 6.2.4-2 to 6.2.4-15 are in addition to the allowed MPR requirements specified in subclause 6.2.3E.

Table 6.2.4E-1: Additional Maximum Power Reduction (A-MPR) for category M1 UE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Network Signalling value | Requirements (subclause) | E-UTRA Band | Resources Blocks (*N*RB) | A-MPR (dB) |
| NS\_01 | 6.6.2.1.1 | Table 5.5-1 | Table 5.6-1 | N/A |
| NS\_03 | 6.6.2.2.1 | 2, 4 | Table 5.6-1 | N/A |
| NS\_04 | 6.6.2.2.2 | 41 | Table 6.2.4E-3 | |
| NS\_05 | 6.6.3.3.1 | 1 | Table 5.6-1 | N/A |
| NS\_06 | 6.6.2.2.3 | 12, 13, 14, 85 | Table 5.6-1 | N/A |
| NS\_07 | 6.6.2.2.3  6.6.3.3.2 | 13 | Table 6.2.4E-4 | |
| NS\_08 | 6.6.3.3.3 | 19 | Table 5.6-1 | N/A |
| NS\_09 | 6.6.3.3.4 | 21, 74 | Table 5.6-1 | N/A |
| NS\_10 |  | 20 | Table 5.6-1 | N/A |
| NS\_12 | 6.6.3.3.5 | 26 | Table 6.2.4E-5 | |
| NS\_13 | 6.6.3.3.6 | 26 | Table 5.6-1 | N/A |
| NS\_14 | 6.6.3.3.7 | 26 | Table 5.6-1 | N/A |
| NS\_15 | 6.6.3.3.8 | 26 | Table 6.2.4-9 | |
| NS\_16 | 6.6.3.3.9 | 27 | Table 5.6-1 | N/A |
| NS\_17 | 6.6.3.3.10 | 28 | Table 5.6-1 | N/A |
| NS\_18 | 6.6.3.3.11 | 28 | Table 5.6-1 | N/A |
| NS\_22 | 6.6.3.3.16 | 42, 43 | Table 5.6-1 | N/A |
| NS\_23 | 6.6.3.3.17 | 42, 43 | Table 5.6-1 | N/A |
| NS\_32 | - | - | - | - |
| NS\_35 | 6.6.2.2.7 | 71 | Table 5.6-1 | N/A |
| NS\_38 | 6.6.3.3.29 | 74 | Table 5.6-1 | N/A |
| NS\_39 | 6.6.3.3.30 | 74 | Table 5.6-1 | N/A |

Table 6.2.4E-2: Additional Maximum Power Reduction (A-MPR) for category M2 UE

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Network Signalling value | Requirements (subclause) | E-UTRA Band | Narrowband bandwidth | Resources Blocks (*N*RB) | A-MPR (dB) |
| NS\_01 | 6.6.2.1.1 | Table 5.5-1 | 1.4, 3, 5 | Table 5.6-1 | N/A |
| NS\_03 | 6.6.2.2.1 | 2, 4 | 3,5 | Table 6.2.4-1 | |
| NS\_04 | 6.6.2.2.2 | 41 | 5 | Table 6.2.4-1 | |
| NS\_05 | 6.6.3.3.1 | 1 | 1.4, 3, 5 | Table 6.2.4-18E | |
| NS\_06 | 6.6.2.2.3 | 12, 13, 14, 85 | 1.4, 3, 5 | Table 5.6-1 | N/A |
| NS\_07 | 6.6.2.2.3  6.6.3.3.2 | 13 |  | [TBD] | |
| NS\_08 | 6.6.3.3.3 | 19 | 1.4, 3, 5 | Table 5.6-1 | N/A |
| NS\_09 | 6.6.3.3.4 | 21 | 1.4, 3, 5 | Table 5.6-1 | N/A |
| NS\_10 |  | 20 | 1.4, 3, 5 | Table 5.6-1 | N/A |
| NS\_12 | 6.6.3.3.5 | 26 | 1.4, 3, 5 | Table 6.2.4-1 | |
| NS\_13 | 6.6.3.3.6 | 26 | 5 | Table 6.2.4-1 | |
| NS\_14 | 6.6.3.3.7 | 26 | N/A | Table 5.6-1 | N/A |
| NS\_15 | 6.6.3.3.8 | 26 | 1.4, 3, 5 | Table 5.6-1 | |
| NS\_16 | 6.6.3.3.9 | 27 | 3,5 | Table 6.2.4-1 | |
| NS\_17 | 6.6.3.3.10 | 28 | 5 | Table 6.2.4-1 | |
| NS\_18 | 6.6.3.3.11 | 28 | 5 | Table 6.2.4-1 | |
| NS\_22 | 6.6.3.3.16 | 42, 43 | 1.4, 3, 5 | Table 5.6-1 | N/A |
| NS\_23 | 6.6.3.3.17 | 42, 43 | 1.4, 3, 5 | Table 5.6-1 | N/A |
| NS\_32 | - | - |  | - | - |
| NS\_35 | 6.6.2.2.7 | 71 | 1.4, 3, 5 | Table 5.6-1 | N/A |
| NS\_56 | 6.6.3.3.35 | 24 | 5 | Table 6.2.4-1 | |

## << Unchanged part is omitted>>

### 7.3.1E Minimum requirements (QPSK) for UE category 0, M1, M2 and 1bis

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.3.1E-1A/Table 7.3.1E-1B and Table 7.3.1E-2 for category 0, Table 7.3.1E-3/Table 7.3.1E-4 for category M1, and Table 7.3.1E-6/Table 7.3.1E-7 for category 1bis, and Table 7.3.1E-8/Table 7.3.1E-9 for category M2.

Table 7.3.1E-1A: Reference sensitivity for FDD and TDD UE category 0 QPSK PREFSENS

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | |
| E-UTRA Band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex Mode |
| 2 | -100.2 | -97.2 | -95.5 | -92.5 | -90.7 | -89.5 | FDD |
| 3 | -99.2 | -96.2 | -94.5 | -91.5 | -89.7 | -88.5 | FDD |
| 4 | -102.2 | -99.2 | -97.5 | -94.5 | -92.7 | -91.5 | FDD |
| 5 | -100.7 | -97.7 | -95.5 | -92.5 |  |  | FDD |
| 8 | -99.7 | -96.7 | -94.5 | -91.5 |  |  | FDD |
| 13 |  |  | -94 | -91 |  |  | FDD |
| 20 |  |  | -94.5 | -91.5 | -88.2 | -87 | FDD |
| 25 | -98.7 | -95.7 | -94 | -91 | -89.2 | -88 | FDD |
| 26 | -100.2 | -97.2 | -953 | -923 | -90.23 |  | FDD |
| 28 |  | -97.7 | -96 | -93 | -91.2 | -88.5 | FDD |
| 39 |  |  | -97.5 | -94.5 | -92.7 | -91.5 | TDD |
| 40 |  |  | -97.5 | -94.5 | -92.7 | -91.5 | TDD |
| 41 |  |  | -95.5 | -92.5 | -90.7 | -89.5 | TDD |
| NOTE 1: The transmitter shall be set to PUMAX as defined in subclause 6.2.5  NOTE 2: Reference measurement channel is A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1  NOTE 3: The requirement is modified by -0.5 dB when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz | | | | | | | |

Table 7.3.1E-1B: Reference sensitivity for HD-FDD UE category 0 QPSK PREFSENS

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | |
| E-UTRA Band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex Mode |
| 2 | -101 | -98 | -96.3 | -93.3 | -91.5 | -90.3 | HD-FDD |
| 3 | -100 | -97 | -95.3 | -92.3 | -90.5 | -89.3 | HD-FDD |
| 4 | -103 | -100 | -98.3 | -95.3 | -93.5 | -92.3 | HD-FDD |
| 5 | -101.5 | -98.5 | -96.3 | -93.3 |  |  | HD-FDD |
| 8 | -100.5 | -97.5 | -95.3 | -92.3 |  |  | HD-FDD |
| 13 |  |  | -95.3 | -92.3 |  |  | HD-FDD |
| 20 |  |  | -95.3 | -92.3 | -89.5 | -88.3 | HD-FDD |
| 25 | -99.5 | -96.5 | -94.8 | -91.8 | -90 | -88.8 | HD-FDD |
| 26 | -101 | -98 | -95.8 | -92.8 |  |  | HD-FDD |
| 28 |  | -98.5 | -96.8 | -93.8 | -92 | -89.3 | HD-FDD |
| NOTE 1: The transmitter shall be set to PUMAX as defined in subclause 6.2.5  NOTE 2: Reference measurement channel is A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 | | | | | | | |

The reference receive sensitivity (REFSENS) requirement specified in Table 7.3.1E-1A/Table 7.3.1E-1B shall be met for an uplink transmission bandwidth less than or equal to that specified in Table 7.3.1E-2.

Unless given by Table 7.3.1-3, the minimum requirements specified in Table 7.3.1E-1A/Table 7.3.1E-1B shall be verified with the network signalling value NS\_01 (Table 6.2.4E-1) configured.

NOTE: Table 7.3.1E-2 is intended for conformance tests and does not necessarily reflect the operational conditions of the network, where the number of uplink and downlink allocated resource blocks will be practically constrained by other factors. Typical receiver sensitivity performance with HARQ retransmission enabled and using a residual BLER metric relevant for e.g. Speech Services is given in the Annex G (informative).

Table 7.3.1E-2: FDD and TDD UE category 0 Uplink configuration for reference sensitivity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth / NRB / Duplex mode | | | | | | | |
| E-UTRA Band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex Mode |
| 2 | 6 | 15 | 25 | 361 | 361 | 361 | FDD and HD-FDD |
| 3 | 6 | 15 | 25 | 361 | 361 | 361 | FDD and HD-FDD |
| 4 | 6 | 15 | 25 | 361 | 361 | 361 | FDD and HD-FDD |
| 5 | 6 | 15 | 25 | 251 |  |  | FDD and HD-FDD |
| 8 | 6 | 15 | 25 | 251 |  |  | FDD and HD-FDD |
| 13 |  |  | 201 | 201 |  |  | FDD and HD-FDD |
| 20 |  |  | 25 | 201 | 202 | 202 | FDD and HD-FDD |
| 25 | 6 | 15 | 25 | 361 | 361 | 361 | FDD and HD-FDD |
| 26 | 6 | 15 | 25 | 251 | 251 |  | FDD and HD-FDD |
| 28 |  | 15 | 25 | 251 | 251 | 251 | FDD and HD-FDD |
| 39 |  |  | 25 | 361 | 361 | 361 | TDD |
| 40 |  |  | 25 | 361 | 361 | 361 | TDD |
| 41 |  |  | 25 | 361 | 361 | 361 | TDD |
| NOTE 1: 1 refers to the UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.6-1).  NOTE 2: 2 refers to Band 20; in the case of 15MHz channel bandwidth, the UL resource blocks shall be located at RBstart 11 and in the case of 20MHz channel bandwidth, the UL resource blocks shall be located at RBstart 16. | | | | | | | |

Table 7.3.1E-3: Reference sensitivity for FDD and TDD UE category M1 QPSK PREFSENS

|  |  |  |
| --- | --- | --- |
| E-UTRA Band | REFSENS (dBm) | Duplex Mode |
| 1 | -102.2 | FDD |
| 2 | -100.2 | FDD |
| 3 | -99.2 | FDD |
| 4 | -102.2 | FDD |
| 5 | -100.7 | FDD |
| 7 | -100.2 | FDD |
| 8 | -99.7 | FDD |
| 11 | -102.23 | FDD |
| 12 | -99.2 | FDD |
| 13 | -98.7 | FDD |
| 14 | -98.7 | FDD |
| 18 | -102.24 | FDD |
| 19 | -102.2 | FDD |
| 20 | -99.7 | FDD |
| 21 | -102.23 | FDD |
| 24 | [-102.7] | FDD |
| 25 | -98.7 | FDD |
| 26 | -100.2 | FDD |
| 27 | -100.7 | FDD |
| 28 | -100.7 | FDD |
| 31 | -96.5 | FDD |
| … |  |  |
| 39 | -103.7 | TDD |
| 40 | -103.7 | TDD |
| 41 | -101.7 | TDD |
| 42 | -102.7 | TDD |
| 43 | -102.7 | TDD |
| … |  |  |
| 71 | 99.4 | FDD |
| 72 | -96.5 | FDD |
| 73 | -96.5 | FDD |
| 74 | -101.78 | FDD |
| 85 | -99.2 | FDD |
| 87 | -96.5 | FDD |
| 88 | -96.5 | FDD |
| NOTE 1: The transmitter shall be set to PUMAX as defined in subclause 6.2.5  NOTE 2: Reference measurement channel is A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1  NOTE 3: For the UE which supports both Band 11 and Band 21 the reference sensitivity level is FFS.  NOTE 4: For a UE that support both Band 18 and Band 26, the reference sensitivity level for Band 26 applies for the applicable channel bandwidths.  NOTE 5: For cat M1 the same reference sensitivity requirement applies for all applicable channel bandwidths (Table 5.6.1-1)  NOTE 6: The reference receive sensitivity shall be met for an uplink transmission bandwidth less than or equal to 6 RB except for band 31 and 72. For band 31 and 72; in the case of 3 MHz channel bandwidth 5 RB applies and the UL resource blocks shall be located at RBstart 9. In case of 5 MHz channel bandwidth 5 RB applies and the UL resource blocks shall be located at RBstart 10.  NOTE 7: The UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth.  NOTE 8: 8 indicates that the requirement is modified by -0.5 dB when the assigned E-UTRA channel bandwidth is confined within 1475.9-1510.9 MHz. | | |

Table 7.3.1E-4: Reference sensitivity for HD-FDD UE category M1 QPSK PREFSENS

|  |  |  |
| --- | --- | --- |
| E-UTRA Band | REFSENS (dBm) | Duplex Mode |
| 1 | -103 | HD-FDD |
| 2 | -101 | HD-FDD |
| 3 | -100 | HD-FDD |
| 4 | -103 | HD-FDD |
| 5 | -101.5 | HD-FDD |
| 7 | -101 | HD-FDD |
| 8 | -100.5 | HD-FDD |
| 11 | -1033 | HD-FDD |
| 12 | -100 | HD-FDD |
| 13 | -100 | HD-FDD |
| 14 | -100 | HD-FDD |
| 18 | -1034 | HD-FDD |
| 19 | -103 | HD-FDD |
| 20 | -100.5 | HD-FDD |
| 21 | -1033 | HD-FDD |
| 24 | [-103.5] | HD-FDD |
| 25 | -99.5 | HD-FDD |
| 26 | -101 | HD-FDD |
| 27 | -101.5 | HD-FDD |
| 28 | -101.5 | HD-FDD |
| 31 | -97.3 | HD-FDD |
| … |  |  |
| 71 | -100.2 | HD-FDD |
| 72 | -97.3 | HD-FDD |
| 73 | -97.3 | HD-FDD |
| 74 | -103 | HD-FDD |
| 85 | -100 | HD-FDD |
| 87 | -97.3 | HD-FDD |
| 88 | -97.3 | HD-FDD |
| NOTE 1: The transmitter shall be set to PUMAX as defined in subclause 6.2.5  NOTE 2: Reference measurement channel is A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1  NOTE 3: For the UE which supports both Band 11 and Band 21 the reference sensitivity level is FFS.  NOTE 4: For a UE that support both Band 18 and Band 26, the reference sensitivity level for Band 26 applies for the applicable channel bandwidths.  NOTE 5: For cat M1 the same reference sensitivity requirement applies for all applicable channel bandwidths (Table 5.6.1-1) | | |

The reference receive sensitivity (REFSENS) requirement specified in Table 7.3.1E-3/Table 7.3.1E-4 shall be met for an uplink transmission bandwidth less than or equal to that specified in Table 7.3.1E-5.

NOTE: Table 7.3.1E-5 is intended for conformance tests and does not necessarily reflect the operational conditions of the network, where the number of uplink and downlink allocated resource blocks will be practically constrained by other factors. Typical receiver sensitivity performance with HARQ retransmission enabled and using a residual BLER metric relevant for e.g. Speech Services is given in the Annex G (informative).

Table 7.3.1E-5: FDD and TDD UE category M1 Uplink configuration for reference sensitivity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| E-UTRA Band | | NRB | | Duplex Mode | |
| 1 | | 61 | | FDD and HD-FDD | |
| 2 | | 61 | | FDD and HD-FDD | |
| 3 | | 61 | | FDD and HD-FDD | |
| 4 | | 61 | | FDD and HD-FDD | |
| 5 | | 61 | | FDD and HD-FDD | |
| 7 | | 61 | | FDD and HD-FDD | |
| 8 | | 61 | | FDD and HD-FDD | |
| 11 | | 61 | | FDD and HD-FDD | |
| 12 | | 61 | | FDD and HD-FDD | |
| 13 | | 61 | | FDD and HD-FDD | |
| 14 | | 61 | | FDD and HD-FDD | |
| 18 | | 61 | | FDD and HD-FDD | |
| 19 | | 61 | | FDD and HD-FDD | |
| 20 | | 61 | | FDD and HD-FDD | |
| 21 | | 61 | | FDD and HD-FDD | |
| 25 | | 61 | | FDD and HD-FDD | |
| 26 | | 61 | | FDD and HD-FDD | |
| 27 | | 61 | | FDD and HD-FDD | |
| 28 | | 61 | | FDD and HD-FDD | |
| 31 | | 61 | | FDD and HD-FDD | |
| … | |  | |  | |
| 39 | | 61 | | TDD | |
| 40 | | 61 | | TDD | |
| 41 | | 61 | | TDD | |
| 42 | | 61 | | TDD | |
| 43 | | 61 | | TDD | |
| … | |  | |  | |
| 71 | | 61 | | FDD and HD-FDD | |
| 72 | | 61 | | FDD and HD-FDD | |
| 73 | | 61 | | FDD and HD-FDD | |
| 74 | | 61 | | FDD and HD-FDD | |
| 85 | | 61 | | FDD and HD-FDD | |
| 87 | | 61 | | FDD and HD-FDD | |
| 88 | | 61 | | FDD and HD-FDD | |
| NOTE 1: 1 refers to the UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.6-1). | | | | | |

Table 7.3.1E-6: Reference sensitivity for FDD and TDD UE category 1bis QPSK PREFSENS

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | |
| E-UTRA Band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex Mode |
| 1 |  |  | -97.5 | -94 | -92.2 | -91 | FDD |
| 2 | -100.2 | -97.2 | -95.5 | -92 | -90.2 | -89 | FDD |
| 3 | -99.2 | -96.2 | -94.5 | -91 | -89.2 | -88 | FDD |
| 4 | -102.2 | -99.2 | -97.5 | -94 | -92.2 | -91 | FDD |
| 5 | -100.7 | -97.7 | -95.5 | -92.5 |  |  | FDD |
| 7 |  |  | -95.5 | -92 | -90.2 | -89 | FDD |
| 8 | -99.7 | -96.7 | -94.5 | -91.5 |  |  | FDD |
| 12 | -98.7 | -95.7 | -94 | -91 |  |  | FDD |
| 13 |  |  | -94 | -91 |  |  | FDD |
| 18 |  |  | -97.5 | -94.5 | -92.7 |  | FDD |
| 20 |  |  | -94.5 | -91.5 | -88.2 | -87 | FDD |
| 26 | -100.2 | -97.2 | -95.03 | -92.03 | -90.23 |  | FDD |
| 28 |  | -97.7 | -96.0 | -93.0 | -91.2 | -88.5 | FDD |
| 31 | -96.5 | -92.5 | -90.5 |  |  |  | FDD |
| 34 |  |  | -97.5 | -94.5 | -92.7 |  |  |
| 39 |  |  | -97.5 | -94.5 | -92.7 | -91.5 | TDD |
| 40 |  |  | -97.5 | -94.5 | -92.7 | -91.5 | TDD |
| 41 |  |  | -95.5 | -92.5 | -90.7 | -89.5 | TDD |
| 66 | -101.7 | -98.7 | -97 | -93.5 | -91.7 | -90.5 | FDD |
| 72 | -96.5 | -92.5 | -90.5 |  |  |  | FDD |
| NOTE 1: The transmitter shall be set to PUMAX as defined in subclause 6.2.5  NOTE 2: Reference measurement channel is A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1  NOTE 3: 3 indicates that the requirement is modified by -0.5 dB when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz. | | | | | | | |

Table 7.3.1E-7: FDD and TDD UE category 1bis Uplink configuration for reference sensitivity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth / NRB / Duplex mode | | | | | | | |
| E-UTRA Band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex Mode |
| 1 |  |  | 25 | 50 | 75 | 100 | FDD |
| 2 | 6 | 15 | 25 | 50 | 501 | 501 | FDD |
| 3 | 6 | 15 | 25 | 50 | 501 | 501 | FDD |
| 4 | 6 | 15 | 25 | 50 | 75 | 100 | FDD |
| 5 | 6 | 15 | 25 | 251 |  |  | FDD |
| 7 |  |  | 25 | 50 | 75 | 751 | FDD |
| 8 | 6 | 15 | 25 | 251 |  |  | FDD |
| 12 | 6 | 15 | 201 | 201 |  |  | FDD |
| 13 |  |  | 201 | 201 |  |  | FDD |
| 18 |  |  | 25 | 25 | 25 |  | FDD |
| 20 |  |  | 25 | 201 | 202 | 202 | FDD |
| 26 | 6 | 15 | 25 | 251 | 251 |  | FDD |
| 28 |  | 15 | 25 | 251 | 251 | 251 | FDD |
| 31 | 6 | 53 | 53 |  |  |  | FDD |
| 34 |  |  | 25 | 50 | 75 |  |  |
| 39 |  |  | 25 | 50 | 75 | 100 | TDD |
| 40 |  |  | 25 | 50 | 75 | 100 | TDD |
| 41 |  |  | 25 | 50 | 75 | 100 | TDD |
| 66 | 6 | 15 | 25 | 50 | 75 | 100 | FDD |
| 72 | 6 | 53 | 53 |  |  |  | FDD |
| NOTE 1: 1 refers to the UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.6-1).  NOTE 2: 2 refers to Band 20; in the case of 15MHz channel bandwidth, the UL resource blocks shall be located at RBstart 11 and in the case of 20MHz channel bandwidth, the UL resource blocks shall be located at RBstart 16.  NOTE 3: 3 refers to Bands 31 and 72; in the case of 3 MHz channel bandwidth, the UL resource blocks shall be located at RBstart 9 and in the case of 5 MHz channel bandwidth, the UL resource blocks shall be located at RBstart 10. | | | | | | | |

Table 7.3.1E-8: Reference sensitivity for FDD /TDD UE category M2 QPSK PREFSENS

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | |
| E-UTRA Band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex Mode |
| 1 |  |  | -97.7 | -97.7 | -97.7 | -97.7 | FDD |
| 2 | -100.2 | -97.2 | -95.7 | -95.7 | -95.7 | -95.7 | FDD |
| 3 | -99.2 | -96.2 | -94.7 | -94.7 | -94.7 | -94.7 | FDD |
| 4 | -102.2 | -99.2 | -97.7 | -97.7 | -97.7 | -97.7 | FDD |
| 5 | -100.7 | -97.7 | -95.7 | -95.7 |  |  | FDD |
| 7 |  |  | -95.7 | -95.7 | -95.7 | -95.7 | FDD |
| 8 | -99.7 | -96.7 | -94.7 | -94.7 |  |  | FDD |
| 11 |  |  | -97.7 | -97.7 |  |  |  |
| 12 | -99.2 | -96.2 | -94.7 | -94.7 |  |  | FDD |
| 13 |  |  | -94.2 | -94.2 |  |  | FDD |
| … |  |  |  |  |  |  |  |
| 18 |  |  | -97.7 | -97.7 | -97.7 |  | FDD |
| 19 |  |  | -97.7 | -97.7 | -97.7 |  | FDD |
| 20 |  |  | -94.7 | -94.7 | -94.7 | -94.7 | FDD |
| 21 |  |  | -97.7 | -97.7 | -97.7 |  | FDD |
| 24 |  |  | [-96.7] | [-96.7] |  |  | FDD |
| 25 | -98.7 | -95.7 | -94.2 | -94.2 | -94.2 | -94.2 | FDD |
| 26 | -100.2 | -97.2 | -95.2 | -95.2 | -95.2 |  | FDD |
| 27 | -100.7 | -97.7 | -95.7 | -95.7 |  |  | FDD |
| 28 |  | -97.7 | -96.2 | -96.2 | -96.2 | -96.2 | FDD |
| 31 | -96.5 | -93.2 | -91.2 |  |  |  | FDD |
| … |  |  |  |  |  |  |  |
| 39 |  |  | -97.7 | -97.7 | -97.7 | -97.7 | TDD |
| 40 |  |  | -97.7 | -97.7 | -97.7 | -97.7 | TDD |
| 41 |  |  | -95.7 | -95.7 | -95.7 | -95.7 | TDD |
| 42 |  |  | -96.7 | -96.7 | -96.7 | -96.7 | TDD |
| 43 |  |  | -96.7 | -96.7 | -96.7 | -96.7 | TDD |
| 66 | -101.7 | -98.7 | -97.2 | -97.2 | -97.2 | -97.2 | FDD |
| … |  |  |  |  |  |  |  |
| 71 | [-99.4] | [-95.4] | [-93.4] | [-93.4] | [-93.4] | [-93.4] | FDD |
| 72 | [-96.5] | [-92.5] | [-90.5] |  |  |  | FDD |
| 73 | [-96.5] | [-92.5] | [-90.5] |  |  |  | FDD |
| 85 |  |  | -94.7 | -94.7 |  |  | FDD |
| 87 | -96.5 | -92.5 | -90.5 |  |  |  | FDD |
| 88 | -96.5 | -92.5 | -90.5 |  |  |  | FDD |
| NOTE 1: The transmitter shall be set to PUMAX as defined in subclause 6.2.5  NOTE 2: Reference measurement channel is A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1  NOTE 3: For the UE which supports both Band 11 and Band 21 the reference sensitivity level is FFS.  NOTE 4: For a UE that support both Band 18 and Band 26, the reference sensitivity level for Band 26 applies for the applicable channel bandwidths.  NOTE 5: The UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth. | | | | | | | |

Table 7.3.1E-9: Reference sensitivity for HD-FDD category M2 QPSK PREFSENS

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Channel bandwidth | | | | | | | |
| E-UTRA Band | 1.4 MHz (dBm) | 3 MHz (dBm) | 5 MHz (dBm) | 10 MHz (dBm) | 15 MHz (dBm) | 20 MHz (dBm) | Duplex Mode |
| 1 |  |  | -97 | -97 | -97 | -97 | HD-FDD |
| 2 | -101 | -97 | -95 | -95 | -95 | -95 | HD-FDD |
| 3 | -100 | -96 | -94 | -94 | -94 | -94 | HD-FDD |
| 4 | -103 | -99 | -97 | -97 | -97 | -97 | HD-FDD |
| 5 | -101.5 | -97.5 | -95.5 | -95.5 |  |  | HD-FDD |
| 7 |  |  | -95 | -95 | -95 | -95 | HD-FDD |
| 8 | -100.5 | -96.5 | -94.5 | -94.5 |  |  | HD-FDD |
| 11 |  |  | -97 | -97 |  |  | HD-FDD |
| 12 | -100 | -96 | -94 | -94 |  |  | HD-FDD |
| 13 |  |  | -94 | -94 |  |  | HD-FDD |
| 14 |  |  | -94 | -94 |  |  | HD-FDD |
| 18 |  |  | -97 | -97 | -97 |  | HD-FDD |
| 19 |  |  | -97 | -97 | -97 |  | HD-FDD |
| 20 |  |  | -94.5 | -94.5 | -94.5 | -94.5 | HD-FDD |
| 21 |  |  | -97 | -97 | -97 |  | HD-FDD |
| 24 |  |  | [-97.5] | [-97.5] |  |  | HD-FDD |
| 25 | -99.5 | -95.5 | -93.5 | -93.5 | -93.5 | -93.5 | HD-FDD |
| 26 | -101 | -97 | -95 | -95 | -95 |  | HD-FDD |
| 27 | -101.5 | -97.5 | -95.5 | -95.5 |  |  | HD-FDD |
| 28 |  | -97.5 | -95.5 | -95.5 | -95.5 | -95.5 | HD-FDD |
| 31 | -97.3 | -93.3 | -91.3 |  |  |  | HD-FDD |
| 71 | -100.2 | -96.2 | -94.2 | -94.2 | -94.2 | -94.2 | HD-FDD |
| 72 | -97.3 | -93.3 | -91.3 |  |  |  | HD-FDD |
| 73 | -97.3 | -93.3 | -91.3 |  |  |  | HD-FDD |
| 85 |  |  | -94 | -94 |  |  | HD-FDD |
| 87 | -97.3 | -93.3 | -91.3 |  |  |  | HD-FDD |
| 88 | -97.3 | -93.3 | -91.3 |  |  |  | HD-FDD |
| NOTE 1: The transmitter shall be set to PUMAX as defined in subclause 6.2.5  NOTE 2: Reference measurement channel is A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1  NOTE 3: For the UE which supports both Band 11 and Band 21 the reference sensitivity level is FFS.  NOTE 4: For a UE that support both Band 18 and Band 26, the reference sensitivity level for Band 26 applies for the applicable channel bandwidths. | | | | | | | |

Table 7.3.1E-10: FDD/HD-FDD and TDD UE category M2 Uplink configuration for reference sensitivity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA Band / Channel bandwidth / NRB / Duplex mode | | | | | | | |
| E-UTRA Band | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | Duplex Mode |
| 1 |  |  | 24 | 24 | 24 | 24 | FDD/HD-FDD |
| 2 | 6 | 15 | 24 | 24 | 24 | 24 | FDD/HD-FDD |
| 3 | 6 | 15 | 24 | 24 | 24 | 24 | FDD/HD-FDD |
| 4 | 6 | 15 | 24 | 24 | 24 | 24 | FDD/HD-FDD |
| 5 | 6 | 15 | 24 | 24 |  |  | FDD/HD-FDD |
| 7 |  |  | 24 | 24 | 24 | 24 | FDD/HD-FDD |
| 8 | 6 | 15 | 24 | 24 |  |  | FDD/HD-FDD |
| 11 |  |  | 24 | 24 |  |  | FDD/HD-FDD |
| 12 | 6 | 15 | 201 | 201 |  |  | FDD/HD-FDD |
| 13 |  |  | 201 | 201 |  |  | FDD/HD-FDD |
| 14 |  |  | 151 | 151 |  |  | FDD/HD-FDD |
| 18 |  |  | 24 | 24 | 24 |  | FDD/HD-FDD |
| 19 |  |  | 24 | 24 | 24 |  | FDD/HD-FDD |
| 20 |  |  | 24 | 201 | 203 | 203 | FDD/HD-FDD |
| 21 |  |  | 24 | 241 | 241 |  | FDD/HD-FDD |
| 24 |  |  | 24 | 241 |  |  | FDD/HD-FDD |
| 25 | 6 | 15 | 24 | 24 | 24 | 24 | FDD/HD-FDD |
| 26 | 6 | 15 | 24 | 24 | 24 |  | FDD/HD-FDD |
| 27 | 6 | 15 | 24 | 24 |  |  | FDD/HD-FDD |
| 28 |  | 15 | 24 | 24 | 24 | 24 | FDD/HD-FDD |
| 31 | 6 | 54 | 54 |  |  |  | FDD/HD-FDD |
| … |  |  |  |  |  |  |  |
| 39 |  |  |  | 24 | 24 | 24 | TDD |
| 40 |  |  |  | 24 | 24 | 24 | TDD |
| 41 |  |  |  | 24 | 24 | 24 | TDD |
| 42 |  |  |  | 24 | 24 | 24 | TDD |
| 43 |  |  |  | 24 | 24 | 24 | TDD |
| … |  |  |  |  |  |  |  |
| 71 | 6 | 15 | 24 | 24 | 24 | 24 | FDD/HD-FDD |
| 72 | 6 | 54 | 54 |  |  |  | FDD/HD-FDD |
| 73 | 6 | 54 | 54 |  |  |  | FDD/HD-FDD |
| 85 |  |  | 201 | 201 |  |  | FDD/HD-FDD |
| 87 | 6 | 54 | 54 |  |  |  | FDD/HD-FDD |
| 88 | 6 | 54 | 54 |  |  |  | FDD/HD-FDD |
| NOTE 1: 1 refers to the UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.6-1).  NOTE 2: For the UE which supports both Band 11 and Band 21 the uplink configuration for reference sensitivity is FFS.  NOTE 3: 3 refers to Band 20; in the case of 15MHz channel bandwidth, the UL resource blocks shall be located at RBstart 11 and in the case of 20MHz channel bandwidth, the UL resource blocks shall be located at RBstart 16  NOTE 4: 4 refers to Bands 31, 72 and 73; in the case of 3 MHz channel bandwidth, the UL resource blocks shall be located at RBstart 9 and in the case of 5 MHz channel bandwidth, the UL resource blocks shall be located at RBstart 10. | | | | | | | |

## < end of changes >