## 6.2D Transmitter power for UL MIMO

### 6.2D.1 UE maximum output power for UL MIMO

Editor’s Note:

- No test points are defined for 2-layer UL MIMO since there is no CP-OFDM configuration satisfying MPR=0dB requirements in TS 38.101-1. Testing with minimum MPR has been covered in 6.2D.2.

- No test points are defined for Power Class 1.5 non-FWA UEs supporting UFPTx since there is no configuration satisfying MPR=0dB requirements in TS 38.101-1. Testing with minimum MPR has been covered in 6.2D.2.

- TP analysis needs to be updated regarding Note 3 in Table 6.2D.1.4.1-2

6.2D.1.1 Test purpose

To verify that the error of the UE maximum output power for UL MIMO does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2D.1.2 Test applicability

This test case applies to all types of NR Power Class 1.5 FWA UEs, Power Class 2 and Power Class 3 UE release 16 and forward that support UL full power transmission (ULFPTx).

6.2D.1.3 Minimum conformance requirements

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the maximum output power for any transmission bandwidth within the channel bandwidth is specified in Table 6.2D.1.3-1. The requirements shall be met with the UL MIMO configurations specified in Table 6.2D.1.3-2. For UE supporting UL MIMO, the maximum output power is defined as the sum of the maximum output power from both UE antenna connectors. The period of measurement shall be at least one sub frame (1ms).

The requirements shall be met with the UL MIMO configurations of using 2-layer UL MIMO transmission with codebook of. DCI Format for UE configured in PUSCH transmission mode for uplink single-user MIMO shall be used.

Table 6.2D.1.3-1: UE Power Class for UL MIMO in closed loop spatial multiplexing scheme

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Class 1 (dBm) | Tolerance (dB) | Class 1.5  (dBm) | Tolerance  (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| n1 |  |  |  |  | 26 | +2/-31 | 23 | +2/-3 |  |  |
| n2 |  |  |  |  |  |  | 23 | +2/-31 |  |  |
| n3 |  |  |  |  | 26 | +2/-31 | 23 | +2/-31 |  |  |
| n5 |  |  |  |  |  |  | 23 | +2/-31 |  |  |
| n7 |  |  |  |  |  |  | 23 | +2/-31 |  |  |
| n8 |  |  |  |  |  |  | 23 | +2/-31 |  |  |
| n24 |  |  |  |  |  |  | 23 | +2/-41 |  |  |
| n25 |  |  |  |  |  |  | 23 | +2/-31 |  |  |
| n28 |  |  |  |  |  |  | 23 | +2/-31 |  |  |
| n30 |  |  |  |  |  |  | 23 | +2/-3 |  |  |
| n34 |  |  |  |  | 26 | +2/-3 | 23 | +2/-3 |  |  |
| n38 |  |  |  |  |  |  | 23 | +2/-3 |  |  |
| n39 |  |  |  |  | 26 | +2/-3 | 23 | +2/-3 |  |  |
| n40 |  |  |  |  |  |  | 23 | +2/-3 |  |  |
| n41 |  |  | 29 | +2/-31 | 26 | +2/-31 | 23 | +2/-31 |  |  |
| n48 |  |  |  |  |  |  | 23 | +2/-3 |  |  |
| n66 |  |  |  |  |  |  | 23 | +2/-3 |  |  |
| n70 |  |  |  |  |  |  | 23 | +2/-3 |  |  |
| n71 |  |  |  |  |  |  | 23 | +2/-3 |  |  |
| n77 |  |  | 29 | +2/-3 | 26 | +2/-3 | 23 | +2/-3 |  |  |
| n78 |  |  | 29 | +2/-3 | 26 | +2/-3 | 23 | +2/-3 |  |  |
| n79 |  |  | 29 | +2/-3 | 26 | +2/-3 | 23 | +2/-3 |  |  |
| n97 |  |  |  |  |  |  | 23 | +2/-3 |  |  |
| NOTE 1: 1 refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB.  NOTE 2: Power class 3 is the default power class unless otherwise stated. | | | | | | | | | | |

Table 6.2D.1.3-2: UL MIMO configuration in closed-loop spatial multiplexing scheme

|  |  |  |  |
| --- | --- | --- | --- |
| Transmission scheme | DCI format | Number of layers | TPMI index |
| Codebook based uplink | DCI format 0\_1 | 2 | 0 |
| NOTE 1: The UE is configured with one SRS resource with the parameter *nrofSRS-Ports* set to 2. | | | |

For UEs supporting uplink full power transmission (ULFPTx) for UL MIMO, the maximum output power requirements specified in Table 6.2D.1.3-1 shall be met with the PUSCH configurations specified in Table 6.2D.1.3-3, based upon UE’s support of uplink full power transmission mode.

Table 6.2D.1.3-3: PUSCH Configuration for uplink full power transmission (ULFPTx)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ULFPTx Mode | Transmission scheme | DCI format | Modulation | Number of layers | Number of Tx Port | TPMI index |
| Mode-1 | Codebook based uplink | DCI format 0\_1 | DFT-s-OFDM, CP-OFDM NOTE3 | 1 | 2 | 2 |
| Mode-2 | Codebook based uplink | DCI format 0\_1 | DFT-s-OFDM, CP-OFDM | 1 | 2 | 0 or 1NOTE2 |
| Mode-full power | Codebook based uplink | DCI format 0\_1 | DFT-s-OFDM, CP-OFDM | 1 | 2 | 0,1 |
| NOTE 1: The UE is configured with one SRS resource with the parameter *nrofSRS-Ports* set to 2.  NOTE 2: TPMI index selected shall be based upon the full power TPMI reported by the UE [9].  NOTE 3: For PUSCH configured with ULFPTx Mode set to Mode-1, all the transmitter requirement for CP-OFDM based modulation is not needed to be verified if the requirement for UL MIMO has been validated. | | | | | | |

If the UE is scheduled for single antenna-port PUSCH transmission by DCI format 0\_0 or by DCI format 0\_1 for single antenna port codebook based transmission, the requirements in clause 6.2 apply for at least one antenna connector for the power class as indicated by the *ue-PowerClass* field in capability signalling with the following exception: for UEs indicating *txDiversity-r16*, the requirements in clause 6.2G for the power class indicated by the *ue-PowerClass*.

A UE indicating the feature *ul-FullPwrMode-r16* or *ul-FullPwrMode2-TPMIGroup-r16* for a band shall meet the requirement in clause 6.2 for at least one antenna connector when scheduled for single antenna-port transmission by DCI format 0\_0 or by DCI format 0\_1 for codebook-based transmission on a single antenna port.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2D.1.

6.2D.1.4 Test description

6.2D.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in Table 6.2D.1.4.1-1 and Table 6.2D.1.4.1-2. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2D.1.4.1-1: Test Configuration Table for 2-layer UL MIMO

NOTE: No test points are defined since there is no CP-OFDM configuration satisfying MPR=0dB requirements in TS 38.101-1.

Table 6.2D.1.4.1-2: Test Configuration Table for uplink full power transmission (ULFPTx) for Power Class 3, Power Class 2 and Power Class 1.5 FWA UEs

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Low range, Mid range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest, Highest | |
| Test Parameters | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A for maximum output | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 | power test case | DFT-s-OFDM PI/2 BPSK | Inner Full |
| 2 |  | DFT-s-OFDM PI/2 BPSK | Inner 1RB Left |
| 3 |  | DFT-s-OFDM PI/2 BPSK | Inner 1RB Right |
| 4 |  | DFT-s-OFDM QPSK | Inner Full |
| 5 |  | DFT-s-OFDM QPSK | Inner 1RB Left |
| 6 |  | DFT-s-OFDM QPSK | Inner 1RB Right |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: Only Test IDs 1, 2 and 3 apply to Power Class 2 UEs if TxD is indicated. | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.2 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2D.1.4.1-1 and Table 6.2D.1.4.1-2.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR,* Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2D.1.4.3.

6.2D.1.4.2 Test procedure

Sub-test for 2-Layer codebook based UL-MIMO:

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2D.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the sum of the mean power of the UE at each transmit antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms over all active uplink slots and in the uplink symbols. For TDD slots only slots consisting of only UL symbols are under.

Sub-test for ULFPTx

4. If the UE supports ULFPTx, repeat test steps 1~3 with UL RMC according to Table 6.2D.1.4.1-2. The PDCCH DCI format 0\_1 is specified with the condition ULFPTx\_Mode1, ULFPTx\_Mode2 or ULFPTx\_ModeFull in 38.508-1 [5] subclause 4.3.6.1.1.2 depending on the UE supported capability. Message contents are according to TS 38.508-1 [5] clause 4.6.3 Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED.

6.2D.1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 ensuring Table 4.6.3-182 with the condition 2TX\_UL\_MIMO.

6.2D.1.5 Test requirement

The maximum output power, derived in step 3 or step 4 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2D.1.5-1.

Table 6.2D.1.5-1: UE Power Class

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Class 1 (dBm) | Tolerance (dB) | Class 1.5 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| n1 |  |  |  |  | 26 | +2+TT/-31-TT | 23 | +2+TT/-3-TT |  |  |
| n2 |  |  |  |  |  |  | 23 | +2+TT/-31-TT |  |  |
| n3 |  |  |  |  | 26 | +2+TT/-31-TT | 23 | +2+TT/-31-TT |  |  |
| n5 |  |  |  |  |  |  | 23 | +2+TT/-31-TT |  |  |
| n7 |  |  |  |  |  |  | 23 | +2+TT/-31-TT |  |  |
| n8 |  |  |  |  |  |  | 23 | +2+TT/-31-TT |  |  |
| n24 |  |  |  |  |  |  | 23 | +2+TT/-41-TT |  |  |
| n25 |  |  |  |  |  |  | 23 | +2+TT/-31-TT |  |  |
| n28 |  |  |  |  |  |  | 23 | +2+TT/-31-TT |  |  |
| n30 |  |  |  |  |  |  | 23 | +2+TT/-3-TT |  |  |
| n34 |  |  |  |  | 26 | +2+TT/-3-TT | 23 | +2+TT/-3-TT |  |  |
| n38 |  |  |  |  |  |  | 23 | +2+TT/-3-TT |  |  |
| n39 |  |  |  |  | 26 | +2+TT/-3-TT | 23 | +2+TT/-3-TT |  |  |
| n40 |  |  |  |  |  |  | 23 | +2+TT/-3-TT |  |  |
| n41 |  |  | 29 | \_+2+TT/-31-TT | 26 | +2+TT/-31-TT | 23 | +2+TT/-31-TT |  |  |
| n48 |  |  |  |  |  |  | 23 | +2+TT/-3-TT |  |  |
| n66 |  |  |  |  |  |  | 23 | +2+TT/-3-TT |  |  |
| n70 |  |  |  |  |  |  | 23 | +2+TT/-3-TT |  |  |
| n71 |  |  |  |  |  |  | 23 | +2+TT/-3-TT |  |  |
| n77 |  |  | 29 | +2+TT/-3-TT | 26 | +2+TT/-3-TT | 23 | +2+TT/-3-TT |  |  |
| n78 |  |  | 29 | +2+TT/-3-TT | 26 | +2+TT/-3-TT | 23 | +2+TT/-3-TT |  |  |
| n79 |  |  | 29 | +2+TT/-3-TT | 26 | +2+TT/-3-TT | 23 | +2+TT/-3-TT |  |  |
| n97 |  |  |  |  |  |  | 23 | +2+TT/-3-TT |  |  |
| NOTE 1: 1 refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.1.5-2  NOTE 3: Power class 3 is the default power class unless otherwise stated | | | | | | | | | | |

Table 6.2D.1.5-2: Test Tolerance (UE maximum output power)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB |
| 40MHz < BW ≤ 100MHz | 1.0 dB | 1.0 dB |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2D.1\_1 UE maximum output power for SUL with UL MIMO

6.2D.1\_1.1 Test purpose

Same test purpose as in clause 6.2D.1.1.

6.2D.1\_1.2 Test applicability

This test applies to all types of NR UE release 17 and forward that support SUL and UL MIMO operating on the SUL bands.

6.2D.1\_1.3 Minimum conformance requirements

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the maximum output power for any transmission bandwidth within the channel bandwidth is specified in Table 6.2D.1\_1.3-1. The requirements shall be met with the UL MIMO configurations specified in Table 6.2D.1\_1.3-2. For UE supporting UL MIMO, the maximum output power is defined as the sum of the maximum output power from both UE antenna connectors. The period of measurement shall be at least one sub frame (1 ms).

The requirements shall be met with the UL MIMO configurations of using 2-layer UL MIMO transmission with codebook of. DCI Format for UE configured in PUSCH transmission mode for uplink single-user MIMO shall be used.

Table 6.2D.1\_1.3-1: UE Power Class for UL MIMO in closed loop spatial multiplexing scheme

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Class 1.5 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| n80 |  |  | 26 | +2/-31 | 23 | +2/-31 |  |  |
| n84 |  |  | 26 | +2/-31 | 23 | +2/-3 |  |  |
| n95 |  |  | 26 | +2/-3 | 23 | +2/-3 |  |  |
| n97 |  |  | 26 | +2/-3 | 23 | +2/-3 |  |  |
| n98 |  |  | 26 | +2/-3 | 23 | +2/-3 |  |  |
| n99 |  |  |  |  | 23 | +2/-41 |  |  |
| NOTE 1: The transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 2: Power class 3 is the default power class unless otherwise stated | | | | | | | | |

Table 6.2D.1\_1.3-2: UL MIMO configuration in closed-loop spatial multiplexing scheme

|  |  |  |  |
| --- | --- | --- | --- |
| Transmission scheme | DCI format | Number of layers | TPMI index |
| Codebook based uplink | DCI format 0\_1 | 2 | 0 |
| NOTE 1: The UE is configured with one SRS resource with the parameter *nrofSRS-Ports* set to 2. | | | |

For UE support uplink full power transmission (ULFPTx) for UL MIMO, the maximum output power requirements specified in Table 6.2D.1\_1.3-1 shall be met with the PUSCH configurations specified in Table 6.2D.1\_1.3-3, based upon UE’s support of uplink full power transmission mode.

Table 6.2D.1\_1.3-3: PUSCH Configuration for uplink full power transmission (ULFPTx)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ULFPTx Mode | Transmission scheme | DCI format | Modulation | Number of layers | Number of Tx Port | TPMI index |
| Mode-1 | Codebook based uplink | DCI format 0\_1 | DFT-s-OFDM, CP-OFDM NOTE3 | 1 | 2 | 2 |
| Mode-2 | Codebook based uplink | DCI format 0\_1 | DFT-s-OFDM, CP-OFDM | 1 | 2 | 0 or 1NOTE2 |
| Mode-full power | Codebook based uplink | DCI format 0\_1 | DFT-s-OFDM, CP-OFDM | 1 | 2 | 0,1 |
| NOTE 1: The UE is configured with one SRS resource with the parameter *nrofSRS-Ports* set to 2.  NOTE 2: TPMI index selected shall be based upon the full power TPMI reported by the UE [8, TS 38.213].  NOTE 3: For PUSCH configured with ULFPTxModes set to Mode-1, all the transmitter requirement for CP-OFDM based modulation is not needed to be verified if the requirement for UL MIMO has been validated. | | | | | | |

If the UE is scheduled for single antenna-port PUSCH transmission by DCI format 0\_0 or by DCI format 0\_1 for single antenna port codebook based transmission, the requirements in clause 6.2 apply for at least one antenna connector for the power class as indicated by the *ue-PowerClass* field in capability signalling with the following exception: for UEs indicating *txDiversity-r16*, the requirements in clause 6.2G for the power class indicated by the *ue-PowerClass*.

A UE indicating the feature *ul-FullPwrMode-r16* or *ul-FullPwrMode2-TPMIGroup-r16* for a band shall meet the requirement in clause 6.2 for at least one antenna connector when scheduled for single antenna-port transmission by DCI format 0\_0 or by DCI format 0\_1 for codebook-based transmission on a single antenna port.

The normative reference for this requirement is TS 38.101-1 [2] clauses 4.3 and 6.2D.1.

6.2D.1\_1.4 Test description

6.2D.1\_1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in Table 6.2D.1\_1.4.1-1 and Table 6.2D.1\_1.4.1-2. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2D.1\_1.4.1-1: Test Configuration Table for 2-layer UL MIMO on SUL

NOTE: No test points are defined since there is no configuration satisfying MPR=0dB requirements in TS 38.101-1.

Table 6.2D.1\_1.4.1-2: Test Configuration Table for uplink full power transmission on SUL(ULFPTx)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, Mid range, High range for SUL carrier  Mid range for NUL carrier | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Mid, Highest for SUL carrier  Lowest for NUL carrier | |
| Test SCS as specified in Table 5.5C-1 | | | Lowest supported SCS for NUL carrier  15kHz for SUL carrier | |
| Test Parameters | | | | |
| Test ID | DL config | UL config | SUL Configuration | |
|  |  |  | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 | N/A | N/A | DFT-s-OFDM PI/2 BPSK | Inner Full |
| 2 |  |  | DFT-s-OFDM PI/2 BPSK | Inner 1RB Left |
| 3 |  |  | DFT-s-OFDM PI/2 BPSK | Inner 1RB Right |
| 4 |  |  | DFT-s-OFDM QPSK | Inner Full |
| 5 |  |  | DFT-s-OFDM QPSK | Inner 1RB Left |
| 6 |  |  | DFT-s-OFDM QPSK | Inner 1RB Right |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1. | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure 3.1.1.5 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2 and G.3.0 with consideration of supplementary uplink physical channels.

4. The UL Reference Measurement Channel is set according to Table 6.2D.1\_1.4.1-1 and Table 6.2D.1\_1.4.1-2.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR,* Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2D.1\_1.4.3.

6.2D.1\_1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2D.1\_1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the sum of the mean power of the UE at each transmit antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms over all active uplink slots and in the uplink symbols. For TDD slots only slots consisting of only UL symbols are under.

4. If UE supports ULFPTx, repeat test steps 1~3 with UL RMC according to Table 6.2D.1\_1.4.1-2. The PDCCH DCI format 0\_1 is specified with the condition ULFPTx\_Mode1, ULFPTx\_Mode2 or ULFPTx\_ModeFull in 38.508-1 [5] subclause 4.3.6.1.1.2 depending on UE reported capability. Message contents are according to TS 38.508-1 [5] clause 4.6.3 Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED.

6.2D.1\_1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.3.6.1.1.2 ensuring UL/SUL indicator in Table 4.3.6.1.1.2-1 with condition SUL, subclause 4.6 ensuring Table 4.6.1-28 with condition SUL AND (RF OR RRM), Tables 4.6.3-14 with condition SUL\_SUL for SUL carrier, Table 4.6.3-167 with condition PUSCH\_PUCCH\_ON\_SUL, and Table 4.6.3-182 with the condition 2TX\_UL\_MIMO.

6.2D.1\_1.5 Test requirement

The maximum output power, derived in step 3 or step 4 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2D.1\_1.5-1.

Table 6.2D.1\_1.5-1: UE Power Class

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Class 1.5 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| n80 |  |  | 26 | +2+TT/-31-TT | 23 | +2+TT/-31-TT |  |  |
| n84 |  |  | 26 | +2+TT/-31-TT | 23 | +2+TT/-3-TT |  |  |
| n95 |  |  | 26 | +2+TT/-3-TT | 23 | +2+TT/-3-TT |  |  |
| n97 |  |  | 26 | +2+TT/-3-TT | 23 | +2+TT/-3-TT |  |  |
| n98 |  |  | 26 | +2+TT/-3-TT | 23 | +2+TT/-3-TT |  |  |
| n99 |  |  |  |  | 23 | +2+TT/-41-TT |  |  |
| NOTE 1: The transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 2: Power class 3 is the default power class unless otherwise stated | | | | | | | | |

Table 6.2D.1\_1.5-2: Test Tolerance (UE maximum output power)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB |
| 40MHz < BW ≤ 100MHz | 1.0 dB | 1.0 dB |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2D.2 UE maximum output power reduction for UL MIMO

6.2D.2.1 Test purpose

To verify that the power reduction of UE due to higher order modulations and transmit bandwidth configuration does not exceed the specified maximum power reduction.

6.2D.2.2 Test applicability

This test case applies to all types of NR Power Class 1.5, Power Class 2 and Power Class 3 UE release 15 and forward that support 2-layer codebook based UL MIMO.

This test case applies to all types of NR Power Class 1.5, Power Class 2 and Power Class 3 UE release 16 and forward that support UL full power transmission (ULFPTx).

NOTE: Test execution is not necessary if TS 38.521-1 6.5D.2.4.1 is executed.

6.2D.2.3 Minimum conformance requirements

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2D.1.3-1 is specified in Table 6.2.2.3-1 for PC3, Table 6.2D.2.3-1 for 2Tx PC2 when the UE does not indicate ul-FullPwrMode-r16 or ul-FullPwrMode2-TPMIGroup-r16 for the band and Table 6.2.2.3-2 for 2Tx PC2 when the UE indicates ul-FullPwrMode-r16 or ul-FullPwrMode2-TPMIGroup-r16 for the band, Table 6.2D.2.3-2 and Table 6.2D.2.3-3 for PC1.5 respectively. For UE power class 1.5, the allowed maximum power reduction (MPR) defined in Table 6.2D.2.3-3 is in accordance with the indicated *modifiedMPR-Behavior* specified in Table L.1-1 for channel bandwidths ≤ 100 MHz. The requirements shall be met with UL MIMO configurations defined in Table 6.2D.1.3-2. For UE supporting UL MIMO, the maximum output power is defined as the sum of the maximum output power from both antenna connectors.

For UE support uplink full power transmission (ULFPTx) for UL MIMO except the feature *ul-FullPwrMode-r16* or *ul-FullPwrMode2-TPMIGroup-r16*, the allowed MPR for the maximum output power in Table 6.2D.1.3-1 is specified in Table 6.2.2.3-1 for PC3, Table 6.2D.2.3-1 when *TxD* is indicated and Table 6.2.2.3-2 when *TxD* is not indicated for PC2 , Table 6.2D.2.3-2 and Table 6.2D.2.3-3 for PC1.5 respectively, and the requirements shall be met with the PUSCH configurations specified in Table 6.2D.1.3-3, based upon UE’s support of uplink full power transmission mode. A UE indicating the feature *ul-FullPwrMode-r16* or *ul-FullPwrMode2-TPMIGroup-r16* for a band shall meet the maximum output power requirement with MPR according to clause 6.2.2.3. When a UE that indicates PC1.5 for a given band is limited to PC2 by the rules in clause 6.2.1, the MPR requirements in Table 6.2.2-2 apply.

The same MPR requirements shall be applicable to UE with 1-layer UL MIMO transmission (either with or without ULPFTx) as with the UL MIMO configurations of using 2-layer UL MIMO transmission with codebook of .

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2D.4.3 apply.

If UE is scheduled for single antenna-port PUSCH transmission by DCI format 0\_0 or by DCI format 0\_1 for single antenna port codebook based transmission, the corresponding requirements in clause 6.2D.1.3 apply for the power class as indicated by the *ue-PowerClass* field in capability signalling. A UE indicating the feature *ul-FullPwrMode-r16* or *ul-FullPwrMode2-TPMIGroup-r16* for a band shall meet the requirement in clause 6.2 with MPR according to clause 6.2.2.3 for at least one antenna connector when scheduled for single antenna-port transmission by DCI format 0\_0 or by DCI format 0\_1 for codebook-based transmission on a single antenna port.

Table 6.2D.2.3-1: Maximum power reduction (MPR) for power class 2 with dual Tx

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Modulation | | MPR (dB) | | |
| Edge RB allocations | Outer RB allocations | Inner RB allocations |
| DFT-s-OFDM | Pi/2 BPSK | ≤ 3.5 | ≤ 1 | 0 |
| QPSK | ≤ 3.5 | ≤ 2 | 0.5 |
| 16 QAM | ≤ 3.5 | ≤ 2.5 | ≤ 1.5 |
| 64 QAM | ≤ 3.5 | ≤ 3 | |
| 256 QAM | ≤ 5.5 | | |
| CP-OFDM | QPSK | ≤ 4.0 | ≤ 3.5 | ≤ 2 |
| 16 QAM | ≤ 4.0 | ≤ 3.5 | ≤ 2.5 |
| 64 QAM | ≤ 4.5 | | |
| 256 QAM | ≤ 8.0 | | |

Table 6.2D.2.3-2: Maximum power reduction (MPR) for power class 1.5 with dual Tx

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Modulation | | MPR (dB) | | |
|  | | Edge RB allocations | Outer RB allocations | Inner RB allocations |
| DFT-s-OFDM | Pi/2 BPSK | ≤ 6 | ≤ [2] | ≤ 0.5 |
|  | QPSK | ≤ 6.5 | ≤ [2.5] | ≤ 0.5 |
|  | 16 QAM | ≤ 6.5 | ≤ [3.5] | ≤ 1.5 |
|  | 64 QAM | ≤ 6.5 | ≤ [4] | ≤ 3.5 |
|  | 256 QAM | ≤ 6.5 | ≤ 6.5 | ≤ [6.5] |
| CP-OFDM | QPSK | ≤ 6.5 | ≤ [4.5] | ≤ 2 |
|  | 16 QAM | ≤ 6.5 | ≤ [4.5] | ≤ 2.5 |
|  | 64 QAM | ≤ 6.5 | ≤ [5] | ≤ 4.5 |
|  | 256 QAM | ≤ 8.5 | ≤ 8.5 | ≤ [8.5] |

Table 6.2D.2.3-3: Maximum power reduction (MPR) for power class 1.5 FWA with dual Tx

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Modulation | | MPR (dB) | | |
|  | | Edge RB allocations | Outer RB allocations | Inner RB allocations |
| DFT-s-OFDM | Pi/2 BPSK | ≤ 6 | ≤ 1.5 | ≤ 0 |
|  | QPSK | ≤ 6.5 | ≤ 2 | ≤ 0 |
|  | 16 QAM | ≤ 6.5 | ≤ 3 | ≤ 1 |
|  | 64 QAM | ≤ 6.5 | ≤ 3.5 | ≤ 3 |
|  | 256 QAM | ≤ 6.5 | ≤ 5.5 | ≤ 5.5 |
| CP-OFDM | QPSK | ≤ 6.5 | ≤ 4 | ≤ 1.5 |
|  | 16 QAM | ≤ 6.5 | ≤ 4 | ≤ 2 |
|  | 64 QAM | ≤ 6.5 | ≤ 4.5 | ≤ 4 |
|  | 256 QAM | ≤ 7.5 | ≤ 7.5 | ≤ 7.5 |
| NOTE 1: This table is targeted to large FWA form factor with 20 dB or above antenna isolation. | | | | |

Inner, outer and edge allocations are as defined in section 6.2.2 except for PC1.5 edge allocations which is for LCRB ≤ 4 RBs instead of LCRB ≤ 2 RBs for other power classes. The normative reference for this requirement is TS 38.101-1 [2] clause 6.2D.2.

6.2D.2.4 Test description

6.2D.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2D.2.4.1-1, Table 6.2D.2.4.1-1a, Table 6.2D.2.4.1-2, Table 6.2D.2.4.1-2a, Table 6.2D.2.4.1-3 and Table 6.2D.2.4.1-3a. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2D.2.4.1-1: Test Configuration Table for Power Class 3 UEs supporting 2-layer codebook based UL MIMO

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest and Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A | Modulation | RB allocation (NOTE 1) |
| 1 | Default |  | CP-OFDM QPSK | Inner Full |
| 2 | Low |  | CP-OFDM QPSK | Edge\_1RB\_Left |
| 3 | High |  | CP-OFDM QPSK | Edge\_1RB\_Right |
| 4 | Default |  | CP-OFDM QPSK | Outer Full |
| 5 | Default |  | CP-OFDM 16 QAM | Inner Full |
| 6 | Low |  | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 7 | High |  | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 8 | Default |  | CP-OFDM 16 QAM | Outer Full |
| 9 | Low |  | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 10 | High |  | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 11 | Default |  | CP-OFDM 64 QAM | Outer Full |
| 12 | Low |  | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 13 | High |  | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 14 | Default |  | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: CP-OFDM 256 QAM test applies only for UEs which supports 256QAM in FR1. | | | | |

Table 6.2D.2.4.1-1a: Test Configuration Table for power class 3 UEs supporting ULFPTx

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A for Maximum Power Reduction (MPR) test case | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 14 | Default |  | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 24 | Low |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Left |
| 34 | High |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Right |
| 44 | Default |  | DFT-s-OFDM Pi/2 BPSK | Outer Full |
| 5 | Default |  | DFT-s-OFDM QPSK | Inner Full |
| 6 | Low |  | DFT-s-OFDM QPSK | Edge\_1RB\_Left |
| 7 | High |  | DFT-s-OFDM QPSK | Edge\_1RB\_Right |
| 8 | Default |  | DFT-s-OFDM QPSK | Outer Full |
| 9 | Default |  | DFT-s-OFDM 16 QAM | Inner Full |
| 10 | Low |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Left |
| 11 | High |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Right |
| 12 | Default |  | DFT-s-OFDM 16 QAM | Outer Full |
| 13 | Low |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Left |
| 14 | High |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Right |
| 15 | Default |  | DFT-s-OFDM 64 QAM | Outer Full |
| 16 | Low |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Left |
| 17 | High |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Right |
| 18 | Default |  | DFT-s-OFDM 256 QAM | Outer Full |
| 19 | Default |  | CP-OFDM QPSK | Inner Full |
| 20 | Low |  | CP-OFDM QPSK | Edge\_1RB\_Left |
| 21 | High |  | CP-OFDM QPSK | Edge\_1RB\_Right |
| 22 | Default |  | CP-OFDM QPSK | Outer Full |
| 23 | Default |  | CP-OFDM 16 QAM | Inner Full |
| 24 | Low |  | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 25 | High |  | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 26 | Default |  | CP-OFDM 16 QAM | Outer Full |
| 27 | Low |  | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 28 | High |  | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 29 | Default |  | CP-OFDM 64 QAM | Outer Full |
| 30 | Low |  | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 31 | High |  | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 32 | Default |  | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM Pi/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: Test ID 19 ~ 32 with CP-OFDM modulation are not needed if PDCCH DCI format 0\_1 indicates ULFPTx\_Mode1.  NOTE 4: UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79, or in TDD mode the IE *powerBoostPi2BPSK* is set to 0 for bands n40, n41, n77, n78 and n79. | | | | |

Table 6.2D.2.4.1-2: Test Configuration Table for Power Class 2 UEs supporting 2-layer codebook based UL MIMO

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest and Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A | Modulation | RB allocation (NOTE 1) |
| 1 | Default |  | CP-OFDM QPSK | Inner Full |
| 2 | Low |  | CP-OFDM QPSK | Edge\_1RB\_Left |
| 3 | High |  | CP-OFDM QPSK | Edge\_1RB\_Right |
| 4 | Default |  | CP-OFDM QPSK | Outer Full |
| 5 | Default |  | CP-OFDM 16 QAM | Inner Full |
| 6 | Low |  | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 7 | High |  | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 8 | Default |  | CP-OFDM 16 QAM | Outer Full |
| 9 | Low |  | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 10 | High |  | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 11 | Default |  | CP-OFDM 64 QAM | Outer Full |
| 12 | Low |  | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 13 | High |  | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 14 | Default |  | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: CP-OFDM 256 QAM test applies only for UEs which supports 256QAM in FR1. | | | | |

Table 6.2D.2.4.1-2a: Test Configuration Table for power class 2 UEs supporting ULFPTx

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A for Maximum Power | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 | Default | Reduction (MPR) test case | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 2 | Low |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Left |
| 3 | High |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Right |
| 4 | Default |  | DFT-s-OFDM Pi/2 BPSK | Outer Full |
| 5 | Default |  | DFT-s-OFDM QPSK | Inner Full |
| 6 | Low |  | DFT-s-OFDM QPSK | Edge\_1RB\_Left |
| 7 | High |  | DFT-s-OFDM QPSK | Edge\_1RB\_Right |
| 8 | Default |  | DFT-s-OFDM QPSK | Outer Full |
| 9 | Default |  | DFT-s-OFDM 16 QAM | Inner Full |
| 10 | Low |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Left |
| 11 | High |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Right |
| 12 | Default |  | DFT-s-OFDM 16 QAM | Outer Full |
| 13 | Low |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Left |
| 14 | High |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Right |
| 15 | Default |  | DFT-s-OFDM 64 QAM | Outer Full |
| 16 | Low |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Left |
| 17 | High |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Right |
| 18 | Default |  | DFT-s-OFDM 256 QAM | Outer Full |
| 19 | Default |  | CP-OFDM QPSK | Inner Full |
| 20 | Low |  | CP-OFDM QPSK | Edge\_1RB\_Left |
| 21 | High |  | CP-OFDM QPSK | Edge\_1RB\_Right |
| 22 | Default |  | CP-OFDM QPSK | Outer Full |
| 23 | Default |  | CP-OFDM 16 QAM | Inner Full |
| 24 | Low |  | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 25 | High |  | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 26 | Default |  | CP-OFDM 16 QAM | Outer Full |
| 27 | Low |  | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 28 | High |  | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 29 | Default |  | CP-OFDM 64 QAM | Outer Full |
| 30 | Low |  | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 31 | High |  | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 32 | Default |  | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM Pi/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: Test ID 19 ~ 32 with CP-OFDM modulation are not needed if PDCCH DCI format 0\_1 indicates ULFPTx\_Mode1. | | | | |

Table 6.2D.2.4.1-3: Test Configuration Table for Power Class 1.5 UEs supporting 2-layer codebook based UL MIMO

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest and Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A | Modulation | RB allocation (NOTE 1) |
| 1 | Default |  | CP-OFDM QPSK | Inner Full |
| 2 | Low |  | CP-OFDM QPSK | Edge\_1RB\_Left |
| 3 | High |  | CP-OFDM QPSK | Edge\_1RB\_Right |
| 4 | Default |  | CP-OFDM QPSK | Outer Full |
| 5 | Default |  | CP-OFDM 16 QAM | Inner Full |
| 6 | Low |  | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 7 | High |  | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 8 | Default |  | CP-OFDM 16 QAM | Outer Full |
| 9 | Low |  | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 10 | High |  | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 11 | Default |  | CP-OFDM 64 QAM | Outer Full |
| 12 | Low |  | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 13 | High |  | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 14 | Default |  | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: CP-OFDM 256 QAM test applies only for UEs which supports 256QAM in FR1. | | | | |

Table 6.2D.2.4.1-3a: Test Configuration Table for power class 1.5 UEs supporting ULFPTx except the feature *ul-FullPwrMode-r16* or *ul-FullPwrMode2-TPMIGroup-r16*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A for Maximum Power | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 | Default | Reduction (MPR) test case | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 2 | Low |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Left |
| 3 | High |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Right |
| 4 | Default |  | DFT-s-OFDM Pi/2 BPSK | Outer Full |
| 5 | Default |  | DFT-s-OFDM QPSK | Inner Full |
| 6 | Low |  | DFT-s-OFDM QPSK | Edge\_1RB\_Left |
| 7 | High |  | DFT-s-OFDM QPSK | Edge\_1RB\_Right |
| 8 | Default |  | DFT-s-OFDM QPSK | Outer Full |
| 9 | Default |  | DFT-s-OFDM 16 QAM | Inner Full |
| 10 | Low |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Left |
| 11 | High |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Right |
| 12 | Default |  | DFT-s-OFDM 16 QAM | Outer Full |
| 13 | Low |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Left |
| 14 | High |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Right |
| 15 | Default |  | DFT-s-OFDM 64 QAM | Outer Full |
| 16 | Low |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Left |
| 17 | High |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Right |
| 18 | Default |  | DFT-s-OFDM 256 QAM | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM Pi/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: Void | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.2 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2D.2.4.1-1, Table 6.2D.2.4.1-2 or Table 6.2D.2.4.1-3.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR,* Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2D.2.4.3.

6.2D.2.4.2 Test procedure

Sub-test for 2-Layer codebook based UL-MIMO

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2D.2.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the sum of the mean power of the UE from both transmit antenna connectors in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. For TDD symbol with transient periods are not under test.

Sub-test for ULFPTx

4. If UE supports ULFPTx, repeat test steps 1~3 with UL RMC according to Table 6.2D.2.4.1-1a, Table 6.2D.2.4.1-2a or Table 6.2D.2.4.1-3a. The PDCCH DCI format 0\_1 is specified with the condition ULFPTx\_Mode1, ULFPTx\_Mode2 or ULFPTx\_ModeFull in 38.508-1 [5] subclause 4.3.6.1.1.2 depending on UE reported capability. Message contents are according to TS 38.508-1 [5] clause 4.6.3 Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED.

NOTE 1: When switching to DFT-s-OFDM waveform, as specified in the test configuration Table 6.2D.2.4.1-1a, Table 6.2D.2.4.1-2a or Table 6.2D.2.4.1-3a, send an NR RRCReconfiguration message according to TS 38.508-1 [5] clause 4.6.3 Table 4.6.3-118 PUSCH-Config with TRANSFORM\_PRECODER\_ENABLED condition.

6.2D.2.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 ensuring Table 4.6.3-182 with the condition 2TX\_UL\_MIMO.

6.2D.2.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2D.2.5-1, Table 6.2D.2.5-2, Table 6.2D.2.5-2a, Table 6.2D.2.5-3, or Table 6.2D.2.5-4. The maximum output power, derived in step 4 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2D.2.5-1a, Table 6.2D.2.5-2b, Table 6.2D2.5-2c, Table 6.2D.2.5-3a, or Table 6.2D.2.5-4a.

Table 6.2D.2.5-1: UE Power Class test requirements (for Band n1, n2, n3, n5, n7, n8, n24, n25, n28, n30, n34, n38, n39, n40, n41, n48, n66, n70, n71, n77, n78, n79, n97) for Power Class 3 UEs supporting 2-layer codebook based UL MIMO

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 23 | 0 | 1.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 (44) | 25.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 2 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 3 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 4 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 5 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 | （5.02） | 3 (44) | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 6 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 7 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 8 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 9 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 3 (44) | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 10 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 3 (44) | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 11 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 3 (44) | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 12 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 3 (44) | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 13 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 3 (44) | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 14 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 3 (44) | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n2, n3, n7, n8, n25, n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2D.2.5-5.  NOTE 4: Applicable for band n24. | | | | | | | | | | | | | |

Table 6.2D.2.5-1a: UE Power Class test requirements (for Band n1, n2, n3, n5, n7, n8, n24, n25, n28, n30, n34, n38, n41, n48, n66, n70, n71, n77, n78, n79) for Power Class 3 supporting ULFPTx

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 23 | 0 | 0 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | (5.02) | 3 (44) | 25.0 + TT | 20.0 - TT  (19.0 – TT5) | （16.5 - TT2） |
| 2 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 (44) | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 3 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 (44) | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 4 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 (44) | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 5 | 23 | 0 | 0 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | (5.02) | 3 (44) | 25.0 + TT | 20.0 - TT  (19.0 – TT5) | （16.5 - TT2） |
| 6 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | (6.02) | 3 (44) | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 7 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | (6.02) | 3 (44) | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 8 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | (6.02) | 3 (44) | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 9 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | (6.02) | 3 (44) | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 10 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 3 (44) | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 11 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 3 (44) | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 12 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 3 (44) | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 13 | 23 | 0 | 2.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | (5.02) | 3 (44) | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 14 | 23 | 0 | 2.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | (5.02) | 3 (44) | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 15 | 23 | 0 | 2.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | (5.02) | 3 (44) | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 16 | 23 | 0 | 4.5 | 0 | （1.52） | 18.5 | （17.02） | 5.0 |  | 3 (44) | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 17 | 23 | 0 | 4.5 | 0 | （1.52） | 18.5 | （17.02） | 5.0 |  | 3 (44) | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 18 | 23 | 0 | 4.5 | 0 | （1.52） | 18.5 | （17.02） | 5.0 |  | 3 (44) | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 19 | 23 | 0 | 1.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | (6.02) | 3 (44) | 25.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 20 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | (5.02) | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 21 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | (5.02) | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 22 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | (5.02) | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 23 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 3 (44) | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 24 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | (5.02) | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 25 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | (5.02) | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 26 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | (5.02) | 3 (44) | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 27 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 3 (44) | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 28 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 3 (44) | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 29 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 3 (44) | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 30 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | (6.02) | 3 (44) | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 31 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | (6.02) | 3 (44) | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 32 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | (6.02) | 3 (44) | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n2, n3, n7, n8, n25 and n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2D.2.5-3.  NOTE 4: Only applicable for band n24.  NOTE 5: For band n24 when transmission bandwidths **are not** confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high. | | | | | | | | | | | | | |

Table 6.2D.2.5-2: UE Power Class test requirements (for Bands n1, n3, n41, n77, n78, n79) for Power Class 2 UEs supporting 2-layer codebook based UL MIMO without indicating ul-FullPwrMode-r16 or ul-FullPwrMode2-TPMIGroup-r16

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 26 | 0 | 2 | 0 | （1.52） | 24.0 | （22.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | （17.5 - TT2） |
| 2 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 3 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 4 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 5 | 26 | 0 | 2.5 | 0 | （1.52） | 23.5 | （22.02） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.5 - TT | （17.0 - TT2） |
| 6 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 7 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 8 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 9 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 10 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 11 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 12 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 |  | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| 13 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 |  | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| 14 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 |  | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For n1, n3, and Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2D.2.5-5. | | | | | | | | | | | | | |

Table 6.2D.2.5-2a: UE Power Class test requirements (for Bands n41, n77, n78, n79) for Power Class 2 UEs supporting 2-layer codebook based UL MIMO and indicating ul-FullPwrMode-r16 or ul-FullPwrMode2-TPMIGroup-r16

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 26 | 0 | 1.5 | 0 | （1.52） | 24.5 | （23.02） | 3.0 | （3.02） | 3 | 28.0 + TT | 21.5 - TT | （20.0 - TT2） |
| 2 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 | （5.02） | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 3 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 | （5.02） | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 4 | 26 | 0 | 3 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.0 - TT | （16.6 - TT2） |
| 5 | 26 | 0 | 2 | 0 | （1.52） | 24.0 | （22.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | （17.6 - TT2） |
| 6 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 | （5.02） | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 7 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 | （5.02） | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 8 | 26 | 0 | 3 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.0 - TT | （16.5 - TT2） |
| 9 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 | （5.02） | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 10 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 | （5.02） | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 11 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 | （5.02） | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 12 | 26 | 0 | 6.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 3 | 28.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 13 | 26 | 0 | 6.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 3 | 28.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 14 | 26 | 0 | 6.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 3 | 28.0 + TT | 14.5 - TT | （13.0 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2D.2.5-5. | | | | | | | | | | | | | |

Table 6.2D.2.5-2b: UE Power Class test requirements (for Bands n1, n3, n41, n77, n78, n79) for Power Class 2 UEs supporting ULFPTx and *ul-FullPwrMode1-TPMIGroup-r1* and indicating TxD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 26 | 0 | 0 | 0 | （1.52） | 26.0 | （24.52） | 3.0 |  | 3 | 28.0 + TT | 23.0 - TT | （21.5 - TT2） |
| 2 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 3 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0- TT2） |
| 4 | 26 | 0 | 1.0 | 0 | （1.52） | 25.0 | （23.52） | 3.0 |  | 3 | 28.0 + TT | 22.0 - TT | （20.5 - TT2） |
| 5 | 26 | 0 | 0.5 | 0 | （1.52） | 25.5 | （24.02） | 3.0 |  | 3 | 28.0 + TT | 22.5 - TT | （21.0 - TT2） |
| 6 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 7 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 8 | 26 | 0 | 2 | 0 | （1.52） | 24.0 | （22.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | （17.5 - TT2） |
| 9 | 26 | 0 | 1.5 | 0 | （1.52） | 24.5 | （23.02） | 3.0 |  | 3 | 28.0 + TT | 21.5 - TT | （20.0 - TT2） |
| 10 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 11 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 12 | 26 | 0 | 2.5 | 0 | （1.52） | 23.5 | （22.02） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.5 - TT | （17.0 - TT2） |
| 13 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 14 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0- TT2） |
| 15 | 26 | 0 | 3 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.0 - TT | （16.5 - TT2） |
| 16 | 26 | 0 | 5.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 28.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 17 | 26 | 0 | 5.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 28.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 18 | 26 | 0 | 5.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 28.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 19 | 26 | 0 | 2 | 0 | （1.52） | 24.0 | （22.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | （17.5 - TT2） |
| 20 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 21 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 22 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 23 | 26 | 0 | 2.5 | 0 | （1.52） | 23.5 | （22.02） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.5 - TT | （17.0 - TT2） |
| 24 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 25 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 26 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 27 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 28 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 29 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 30 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 |  | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| 31 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 |  | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| 32 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 |  | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n1, n3, and n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2.2.5-5. | | | | | | | | | | | | | |

Table 6.2D.2.5-2c: UE Power Class test requirements (for Bands n1, n3, n41, n77, n78, n79) for Power Class 2 UEs supporting ULFPTx and, (supporting *ul-FullPwrMode1-TPMIGroup-r1* without indicating TxD) or (supporting ul-FullPwrMode-r16 or ul-FullPwrMode2-TPMIGroup-r16)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 26 | 0 | 0 | 0 | （1.52） | 26.0 | （24.52） | 3.0 |  | 3 | 28.0 + TT | 23.0 - TT | （21.5 - TT2） |
| 2 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 3 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0- TT2） |
| 4 | 26 | 0 | 0.5 | 0 | （1.52） | 25.5 | （24.02） | 3.0 |  | 3 | 28.0 + TT | 22.5 - TT | （21.0 - TT2） |
| 5 | 26 | 0 | 0 | 0 | （1.52） | 26.0 | （24.52） | 3.0 |  | 3 | 28.0 + TT | 23.0 - TT | （21.5 - TT2） |
| 6 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 7 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 8 | 26 | 0 | 1 | 0 | （1.52） | 25.0 | （23.52） | 3.0 |  | 3 | 28.0 + TT | 22.0 - TT | （20.5 - TT2） |
| 9 | 26 | 0 | 1 | 0 | （1.52） | 25.0 | （23.52） | 3.0 |  | 3 | 28.0 + TT | 22.0 - TT | （20.5 - TT2） |
| 10 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 11 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 12 | 26 | 0 | 2 | 0 | （1.52） | 24.0 | （22.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | （17.5 - TT2） |
| 13 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 14 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0- TT2） |
| 15 | 26 | 0 | 2.5 | 0 | （1.52） | 23.5 | （22.02） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.5 - TT | （17.0 - TT2） |
| 16 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 17 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 18 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 19 | 26 | 0 | 1.5 | 0 | （1.52） | 24.5 | （23.02） | 3.0 |  | 3 | 28.0 + TT | 21.5 - TT | （20.0 - TT2） |
| 20 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 21 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 22 | 26 | 0 | 3 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.0 - TT | （16.5 - TT2） |
| 23 | 26 | 0 | 2 | 0 | （1.52） | 24.0 | （22.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | （17.5 - TT2） |
| 24 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 25 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 26 | 26 | 0 | 3 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.0 - TT | （16.5 - TT2） |
| 27 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 28 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 29 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 30 | 26 | 0 | 6.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 3 | 28.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 31 | 26 | 0 | 6.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 3 | 28.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 32 | 26 | 0 | 6.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 3 | 28.0 + TT | 14.5 - TT | （13.0 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2.2.5-5. | | | | | | | | | | | | | |

Table 6.2D.2.5-3: UL MIMO MPR test requirements (for Band n41, n77, n78, n79) for Power Class 1.5 UEs

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 29 | 0 | 2 | 0 | （1.52） | 27.0 | （25.52） | 3.0 |  | 3 | 31.0 + TT | 24.0 - TT | （22.5 - TT2） |
| 2 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 3 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 4 | 29 | 0 | 4.5 | 0 | （1.52） | 24.5 | （23.02） | 3.0 |  | 3 | 31.0 + TT | 21.5 - TT | （20.0 - TT2） |
| 5 | 29 | 0 | 2.5 | 0 | （1.52） | 26.5 | （25.02） | 3.0 |  | 3 | 31.0 + TT | 23.5 - TT | （22.0 - TT2） |
| 6 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 7 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 8 | 29 | 0 | 4.5 | 0 | （1.52） | 24.5 | （23.02） | 3.0 |  | 3 | 31.0 + TT | 21.5 - TT | （20.0 - TT2） |
| 9 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 10 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 11 | 29 | 0 | 5 | 0 | （1.52） | 24.0 | （22.52） | 3.0 | （5.02） | 3 | 31.0 + TT | 21.0 - TT | （17.5 - TT2） |
| 12 | 29 | 0 | 8.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 31.0 + TT | 14.5 - TT | （14.0- TT2） |
| 13 | 29 | 0 | 8.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 31.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 14 | 29 | 0 | 8.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 31.0 + TT | 14.5 - TT | （14.0 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n1, n3, and n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2D.2.5-5. | | | | | | | | | | | | | |

Table 6.2D.2.5-3a: UL MIMO MPR test requirements (for Band n41, n77, n78, n79) for Power Class 1.5 UEs supporting ULFPTx except the feature *ul-FullPwrMode-r16* or *ul-FullPwrMode2-TPMIGroup-r16*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 29 | 0 | 0.5 | 0 | （1.52） | 28.5 | （27.02） | 3.0 |  | 3 | 31.0 + TT | 25.5 – TT | （24.0 - TT2） |
| 2 | 29 | 0 | 6 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | (5.02) | 3 | 31.0 + TT | 20.0 – TT | （18.5 - TT2） |
| 3 | 29 | 0 | 6 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | (5.02) | 3 | 31.0 + TT | 20.0 – TT | （18.5 - TT2） |
| 4 | 29 | 0 | 2 | 0 | （1.52） | 27.0 | （25.52） | 3.0 |  | 3 | 31.0 + TT | 24.0 – TT | （22.5 - TT2） |
| 5 | 29 | 0 | 0.5 | 0 | （1.52） | 28.5 | （27.02） | 3.0 |  | 3 | 31.0 + TT | 25.5 – TT | （24.0 - TT2） |
| 6 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 – TT | （16.0 - TT2） |
| 7 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 – TT | （16.0 - TT2） |
| 8 | 29 | 0 | 2.5 | 0 | （1.52） | 26.5 | （25.02） | 3.0 |  | 3 | 31.0 + TT | 23.5 - TT | （22.0 - TT2） |
| 9 | 29 | 0 | 1.5 | 0 | （1.52） | 27.5 | （26.02） | 3.0 |  | 3 | 31.0 + TT | 24.5 - TT | （23.0 - TT2） |
| 10 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 11 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 12 | 29 | 0 | 3.5 | 0 | （1.52） | 25.5 | （24.02） | 3.0 |  | 3 | 31.0 + TT | 22.5 - TT | （21.0 - TT2） |
| 13 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 14 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 15 | 29 | 0 | 4 | 0 | （1.52） | 25.0 | （23.52） | 3.0 |  | 3 | 31.0 + TT | 22.0 - TT | （20.5 - TT2） |
| 16 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0- TT2） |
| 17 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 18 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2D.2.5-5. | | | | | | | | | | | | | |

Table 6.2D.2.5-4: UL MIMO MPR test requirements (for Band n41, n77, n78, n79) for Power Class 1.5 FWA UEs

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 29 | 0 | 1.5 | 0 | （1.53） | 27.5 | （26.03） | 3.0 |  | 3 | 31.0 + TT | 24.5 - TT | （23.0 - TT3） |
| 2 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 – TT | （16.0 - TT3） |
| 3 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 – TT | （16.0 - TT3） |
| 4 | 29 | 0 | 4 | 0 | （1.53） | 25.0 | （23.53） | 3.0 |  | 3 | 31.0 + TT | 22.0 – TT | （20.5 - TT3） |
| 5 | 29 | 0 | 2 | 0 | （1.53） | 27.0 | （25.53） | 3.0 |  | 3 | 31.0 + TT | 24.0 – TT | （22.5 - TT3） |
| 6 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT3） |
| 7 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT3） |
| 8 | 29 | 0 | 4 | 0 | （1.53） | 25.0 | （23.53） | 3.0 |  | 3 | 31.0 + TT | 22.0 - TT | （20.5 - TT3） |
| 9 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT3） |
| 10 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT3） |
| 11 | 29 | 0 | 4.5 | 0 | （1.53） | 24.5 | （23.03） | 3.0 |  | 3 | 31.0 + TT | 21.5 - TT | （20.0 - TT3） |
| 12 | 29 | 0 | 7.5 | 0 | （1.53） | 21.5 | （20.03） | 5.0 | （6.03） | 3 | 31.0 + TT | 16.5 - TT | （14.0- TT3） |
| 13 | 29 | 0 | 7.5 | 0 | （1.53） | 21.5 | （20.03） | 5.0 | （6.03） | 3 | 31.0 + TT | 16.5 - TT | （14.0 - TT3） |
| 14 | 29 | 0 | 7.5 | 0 | （1.53） | 21.5 | （20.03） | 5.0 | （6.03） | 3 | 31.0 + TT | 16.5 - TT | （14.0 - TT3） |
| NOTE 1: This table is targeted to large FWA form factor with 20 dB or above antenna isolation.  NOTE 2: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 3: For Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 4: TT for each frequency and channel bandwidth is specified in Table 6.2D.2.5-5. | | | | | | | | | | | | | |

Table 6.2D.2.5-4a: UL MIMO MPR test requirements (for Band n41, n77, n78, n79) for Power Class 1.5 FWA UEs supporting ULFPTx except the feature *ul-FullPwrMode-r16* or *ul-FullPwrMode2-TPMIGroup-r16*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 29 | 0 | 0 | 0 | （1.53） | 29.0 | （27.53） | 3.0 |  | 3 | 31.0 + TT | 26.0 – TT | （24.5 - TT3） |
| 2 | 29 | 0 | 6 | 0 | （1.53） | 23.0 | （21.53） | 3.0 | (5.03) | 3 | 31.0 + TT | 20.0 – TT | （18.5 - TT3） |
| 3 | 29 | 0 | 6 | 0 | （1.53） | 23.0 | （21.53） | 3.0 | (5.03) | 3 | 31.0 + TT | 20.0 – TT | （18.5 - TT3） |
| 4 | 29 | 0 | 1.5 | 0 | （1.53） | 27.5 | （26.03） | 3.0 |  | 3 | 31.0 + TT | 24.5 – TT | （23.0 - TT3） |
| 5 | 29 | 0 | 0 | 0 | （1.53） | 29.0 | （27.53） | 3.0 |  | 3 | 31.0 + TT | 26.0 – TT | （24.5 - TT3） |
| 6 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 – TT | （16.0 - TT3） |
| 7 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 – TT | （16.0 - TT3） |
| 8 | 29 | 0 | 2 | 0 | （1.53） | 27.0 | （25.53） | 3.0 |  | 3 | 31.0 + TT | 24.0 - TT | （22.5 - TT3） |
| 9 | 29 | 0 | 1 | 0 | （1.53） | 28.0 | （26.53） | 3.0 |  | 3 | 31.0 + TT | 25.0 - TT | （23.5 - TT3） |
| 10 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT3） |
| 11 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT3） |
| 12 | 29 | 0 | 3 | 0 | （1.53） | 26.0 | （24.53） | 3.0 |  | 3 | 31.0 + TT | 23.0 - TT | （21.5 - TT3） |
| 13 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT3） |
| 14 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 – TT | （16.0 - TT3） |
| 15 | 29 | 0 | 3.5 | 0 | （1.53） | 25.5 | （24.03） | 3.0 |  | 3 | 31.0 + TT | 22.5 - TT | （21.0 - TT3） |
| 16 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0- TT3） |
| 17 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | （21.03） | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | （16.0 - TT3） |
| 18 | 29 | 0 | 5.5 | 0 | （1.53） | 23.5 | （22.03） | 3.0 | (5.03) | 3 | 31.0 + TT | 20.5 - TT | （17.0 - TT3） |
| NOTE 1: This table is targeted to large FWA form factor with 20 dB or above antenna isolation.  NOTE 2: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 3: For Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 4: TT for each frequency and channel bandwidth is specified in Table 6.2D.2.5-5. | | | | | | | | | | | | | |

Table 6.2D.2.5-5: Test Tolerance (Maximum Power Reduction (MPR))

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 | 1.0 |
| 40MHz < BW ≤ 100MHz | 1.0 | 1.0 |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2D.2\_1 UE maximum output power reduction for SUL with UL MIMO

6.2D.2\_1.1 Test purpose

Same test purpose as in clause 6.2D.2.1

6.2D.2\_1.2 Test applicability

This test case applies to all types of NR UE release 17 and forward that support SUL and UL MIMO operating on the SUL bands.

NOTE: Test execution is not necessary if TS 38.521-1 6.5D.2.4.1\_1 is executed.

6.2D.2\_1.3 Minimum conformance requirements

For a terminal that supports SUL for the band combination specified in Table 5.2C-1, the current version of the specification assumes the terminal is configured with active transmission either on UL carrier or SUL carrier at any time in one serving cell and the UE requirements for single carrier shall apply for the active UL or SUL carrier accordingly.

The minimum requirements are same as in 6.2D.1.3 with following exceptions:

Instead of Table 6.2D.1.3-1 🡪 use Table 6.2D.1\_1.3-1

6.2D.2\_1.4 Test description

6.2D.2\_1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in Table 5.5C-1. All of these configurations shall be tested with applicable test parameters for each combination of channel bandwidth and sub-carrier spacing, are shown in Table 6.2D.2\_1.4.1-1 ~ 6.2D.2\_1.4.1-2. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2D.2\_1.4-1: Test Configuration Table for Power Class 3

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | Low range and high range for SUL carrier  Mid range for Non-SUL carrier. | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | Lowest, Highest for SUL carrier  Lowest for Non-SUL carrier | | |
| Test SCS as specified in Table 5.3.5-1 | | | | 15kHz for SUL carrier and Lowest supported SCS for Non-SUL carrier | | |
| Test Parameters for Channel Bandwidths | | | | | | |
| Test ID | Freq | Downlink Configuration | UL Configuration | | SUL Configuration | |
|  |  | N/A | N/A | | Modulation | RB allocation (NOTE 2) |
| 1 | Default |  |  | | CP-OFDM QPSK | Inner Full |
| 2 | Low |  |  | | CP-OFDM QPSK | Edge\_1RB\_Left |
| 3 | High |  |  | | CP-OFDM QPSK | Edge\_1RB\_Right |
| 4 | Default |  |  | | CP-OFDM QPSK | Outer Full |
| 5 | Default |  |  | | CP-OFDM 16 QAM | Inner Full |
| 6 | Low |  |  | | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 7 | High |  |  | | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 8 | Default |  |  | | CP-OFDM 16 QAM | Outer Full |
| 9 | Low |  |  | | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 10 | High |  |  | | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 11 | Default |  |  | | CP-OFDM 64 QAM | Outer Full |
| 12 | Low |  |  | | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 13 | High |  |  | | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 14 | Default |  |  | | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: Test Channel Bandwidths are checked separately for each SUL band combination, the applicable channel bandwidths are specified in Table 5.5C-1.  NOTE 2: The specific configuration of each RB allocation is defined in Table 6.1-1. | | | | | | |

Table 6.2D.2\_1.4.1-2: Test Configuration Table for Power Class 2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | Low range and high range for SUL carrier  Mid range for Non-SUL carrier. | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | Lowest, Highest for SUL carrier  Lowest for Non-SUL carrier | | |
| Test SCS as specified in Table 5.5C-1 | | | | 15kHz for SUL carrier and Lowest supported SCS for Non-SUL carrier | | |
| Test Parameters for Channel Bandwidths | | | | | | |
| Test ID | Freq | Downlink Configuration | UL Configuration | | SUL Configuration | |
|  |  | N/A | N/A | | Modulation | RB allocation (NOTE 2) |
| 1 | Default |  |  | | CP-OFDM QPSK | Inner Full |
| 2 | Low |  |  | | CP-OFDM QPSK | Edge\_1RB\_Left |
| 3 | High |  |  | | CP-OFDM QPSK | Edge\_1RB\_Right |
| 4 | Default |  |  | | CP-OFDM QPSK | Outer Full |
| 5 | Default |  |  | | CP-OFDM 16 QAM | Inner Full |
| 6 | Low |  |  | | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 7 | High |  |  | | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 8 | Default |  |  | | CP-OFDM 16 QAM | Outer Full |
| 9 | Low |  |  | | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 10 | High |  |  | | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 11 | Default |  |  | | CP-OFDM 64 QAM | Outer Full |
| 12 | Low |  |  | | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 13 | High |  |  | | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 14 | Default |  |  | | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: Test Channel Bandwidths are checked separately for each SUL band combination, the applicable channel bandwidths are specified in Table 5.5C-1.  NOTE 2: The specific configuration of each RB allocation is defined in Table 6.1-1. | | | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.5 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0 with consideration of supplementary uplink physical channels.

4. The UL Reference Measurement Channel is set according to Table 6.2D.2\_1.4.1-1 ~ Table 6.2D.2\_1.4.1-2.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR,* Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2D.2\_1.4.3.

6.2D.2\_1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2D.2\_1.4.1-1 and Table 6.2D.2\_1.4.1-2. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the sum of the mean power of the UE from both transmit antenna connectors in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. For TDD symbol with transient periods are not under test.

6.2D.2\_1.4.3 Message contents

Message contents in initial conditions are according to TS 38.508-1 [5] subclause 4.3.6.1.1.2 ensuring UL/SUL indicator in Table 4.3.6.1.1.2-1 with condition SUL, subclause 4.6 ensuring Table 4.6.1-28 with condition SUL AND (RF OR RRM), Table 4.6.3-14 with condition SUL\_SUL for SUL carrier, and Table 4.6.3-167 with condition PUSCH\_PUCCH\_ON\_SUL.

Message contents are according to TS 38.508-1 [5] subclause 4.6 ensuring Table 4.6.3-182 with the condition 2TX\_UL\_MIMO.

6.2D.2\_1.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2D.2\_1.5-1~6.2D.2\_1.5-2.

Table 6.2D.2\_1.5-1: UE Power Class test requirements (for Band n80, n84, n95, n97) for Power Class 3

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 23 | 0 | 1.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 25.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 2 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 3 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 4 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 5 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 | （5.02） | 3 | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 6 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 7 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 8 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 9 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 3 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 10 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 3 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 11 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 3 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 12 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 3 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 13 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 3 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 14 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 3 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n80, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2D.2\_1.5-3. | | | | | | | | | | | | | |

6.2D.2\_1.5-1a: UE Power Class test requirements for Band n99 for Power Class 3

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 23 | 0 | 1.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 4 | 25.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 2 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 4 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 3 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 4 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 4 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 4 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 5 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 | （5.02） | 4 | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 6 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 4 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 7 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 4 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 8 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 4 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 9 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 4 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 10 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 4 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 11 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 | （5.02） | 4 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 12 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 4 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 13 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 4 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 14 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 4 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n80, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2D.2\_1.5-3. | | | | | | | | | | | | | |

Table 6.2D.2\_1.5-2: UE Power Class test requirements (for Band n80, n84, n95, n97) for Power Class 2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 26 | 0 | 2 | 0 | （1.52） | 24.0 | （22.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | （17.5 - TT2） |
| 2 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 3 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 4 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （212） | 5.0 | （5.02） | 3 | 28.0 + TT | 17.5 - TT | （16 - TT2） |
| 5 | 26 | 0 | 2.5 | 0 | （1.52） | 23.5 | （222） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.5 - TT | （17 - TT2） |
| 6 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 7 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 8 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （212） | 5.0 | （5.02） | 3 | 28.0 + TT | 17.5 - TT | （16 - TT2） |
| 9 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （202） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14 - TT2） |
| 10 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （202） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14 - TT2） |
| 11 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （202） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14 - TT2） |
| 12 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16,52） | 5.0 | （5.02） | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| 13 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 | （5.02） | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| 14 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 | （5.02） | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n80 and n84, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2D.2\_1.5-3. | | | | | | | | | | | | | |

Table 6.2D.2\_1.5-3: Test Tolerance (Maximum Power Reduction (MPR))

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 | 1.0 |
| 40MHz < BW ≤ 100MHz | 1.0 | 1.0 |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2D.3 UE additional maximum output power reduction for UL MIMO

Editor’s Note:

- Supporting of ULFPTx is only completed for NS\_04, NS\_03, NS\_03U.

6.2D.3.1 Test purpose

Additional emission requirements can be signalled by the network. Each additional emission requirement is associated a unique with network signalling (NS) value indicated in RRC signalling by an NR frequency band number of the applicable operating band and an associated value in the field *additionalSpectrumEmission.* Throughout this specification, the notion of indication or signalling of an NS value refers to the corresponding indication of an NR frequency band number of the applicable operating band (the IE *freqBandIndicatorNR*) and an associated value of *additionalSpectrumEmission* in the relevant RRC information elements [6]*.*

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2D.1.3-1. Unless stated otherwise, an A-MPR of 0 dB shall be used.

6.2D.3.2 Test applicability

The requirements of this test apply in test case 6.5D.2.3 Additional Spectrum Emission mask for UL MIMO for network signalling value NS\_03, NS\_03U, NS\_04 to all types of NR UE release 15 and forward that support UL MIMO.

The requirements of this test apply in test case 6.5D.2.4.2 Adjacent channel leakage ratio for network signalling values NS\_03U, NS\_05U, and NS\_100 to all types of NR Power Class 2 and 3 UE release 15 and forward.

The requirements of this test apply in test case 6.5D.3.3 Additional Spurious Emissions for network signalling value NS\_04, NS\_47, NS\_21, NS\_56, NS\_50 to all types of NR UE release 15 and forward that support UL-MIMO.

NOTE: Test execution is not necessary if 6.5D.2.3, 6.5D.2.4.2 and 6.5D.3.3 are executed.

6.2D.3.3 Minimum conformance requirements

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the A-MPR values specified in subclause 6.2.3.3 shall apply to the maximum output power specified in Table 6.2D.1.3-1. The requirements shall be met with the UL MIMO configurations specified in Table 6.2D.1.3-2. For UE supporting UL MIMO, the maximum output power is defined as the sum of the maximum output power from both UE antenna connector. Unless stated otherwise, an A-MPR of 0 dB shall be used.

For UE support uplink full power transmission (ULFPTx) for UL MIMO, the A-MPR values specified in clause 6.2.3.3 shall apply to the maximum output power specified in Table 6.2D.1.3-1. The requirements shall be met with the PUSCH configurations specified in Table 6.2D.1.3-3, based upon UE’s support of uplink full power transmission mode.

For the UE maximum output power modified by A-MPR, the power limits specified in subclause 6.2D.4.3 apply.

If UE is configured for transmission on single-antenna port, the requirements in subclause 6.2.3.3 apply.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2D.3.

6.2D.3.4 Test description

6.2D.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in tables 6.2D.3.4.1-1 to 6.2D.3.4.1-11. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2

Table 6.2D.3.4.1-1: Test Configuration table for NS\_04

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | (See Freq column) | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | Lowest, Highest | |
| A-MPR test parameters for NS\_04 | | | | | | | |
|  |  |  |  | Downlink Configuration | Uplink Configuration | | |
| Test ID | Freq | | | N/A | Modulation  (NOTE 2) | | RB allocation (NOTE 1) |
| 1 | Low | | |  | CP-OFDM QPSK | | Edge\_1RB\_Left |
| 2 | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | CP-OFDM QPSK | | Edge\_1RB\_Left |
| 3 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | CP-OFDM QPSK | | Edge\_1RB\_Left |
| 4 | Low | | |  | CP-OFDM QPSK | | Outer Full |
| 5 | High | | |  | CP-OFDM QPSK | | Edge\_1RB\_Right |
| 6 | High | | |  | CP-OFDM QPSK | | Outer Full |
| 7 | Low | | |  | CP-OFDM 16 QAM | | Edge\_1RB\_Left |
| 8 | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | CP-OFDM 16 QAM | | Edge\_1RB\_Left |
| 9 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | CP-OFDM 16 QAM | | Edge\_1RB\_Left |
| 10 | Low | | |  | CP-OFDM 16 QAM | | Outer Full |
| 11 | High | | |  | CP-OFDM 16 QAM | | Edge\_1RB\_Right |
| 12 | High | | |  | CP-OFDM 16 QAM | | Outer Full |
| 13 | Low | | |  | CP-OFDM 64 QAM | | Edge\_1RB\_Left |
| 14 | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | CP-OFDM 64 QAM | | Edge\_1RB\_Left |
| 15 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | CP-OFDM 64 QAM | | Edge\_1RB\_Left |
| 16 | Low | | |  | CP-OFDM 64 QAM | | Outer Full |
| 17 | High | | |  | CP-OFDM 64 QAM | | Edge\_1RB\_Right |
| 18 | High | | |  | CP-OFDM 64 QAM | | Outer Full |
| 19 | Low | | |  | CP-OFDM 256 QAM | | Edge\_1RB\_Left |
| 20 | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | CP-OFDM 256 QAM | | Edge\_1RB\_Left |
| 21 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | CP-OFDM 256 QAM | | Edge\_1RB\_Left |
| 22 | Low | | |  | CP-OFDM 256 QAM | | Outer Full |
| 23 | High | | |  | CP-OFDM 256 QAM | | Edge\_1RB\_Right |
| 24 | High | | |  | CP-OFDM 256 QAM | | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1. | | | | | | | |

Table 6.2D.3.4.1-1a: Test Configuration table for NS\_04 with supporting ULFPTx

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | (See Freq column) | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | Lowest, Highest | |
| A-MPR test parameters for NS\_04 | | | | | | | |
|  |  |  |  | Downlink Configuration | Uplink Configuration | | |
| Test ID | Freq | | | N/A for A-MPR testing | Modulation  (NOTE 2) | | RB allocation (NOTE 1) |
| 1 (Note 3) | Low | | |  | DFT-s-OFDM PI/2 BPSK | | Edge\_1RB\_Left |
| 2 (Note 3, 5) | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | DFT-s-OFDM PI/2 BPSK | | Edge\_1RB\_Left |
| 3 (Note 3) | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | DFT-s-OFDM PI/2 BPSK | | Edge\_1RB\_Left |
| 4 (Note 3) | Low | | |  | DFT-s-OFDM PI/2 BPSK | | Outer Full |
| 5 (Note 3) | High | | |  | DFT-s-OFDM PI/2 BPSK | | Edge\_1RB\_Right |
| 6 (Note 3) | High | | |  | DFT-s-OFDM PI/2 BPSK | | Outer Full |
| 7 (Note 4) | Low | | |  | DFT-s-OFDM PI/2 BPSK | | Edge\_1RB\_Left |
| 8 (Note 4, 5) | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | DFT-s-OFDM PI/2 BPSK | | Edge\_1RB\_Left |
| 9 (Note 4) | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | DFT-s-OFDM PI/2 BPSK | | Edge\_1RB\_Left |
| 10 (Note 4) | Low | | |  | DFT-s-OFDM PI/2 BPSK | | Outer Full |
| 11 (Note 4) | High | | |  | DFT-s-OFDM PI/2 BPSK | | Edge\_1RB\_Right |
| 12 (Note 4) | High | | |  | DFT-s-OFDM PI/2 BPSK | | Outer Full |
| 13 | Low | | |  | DFT-s-OFDM QPSK | | Edge\_1RB\_Left |
| 14 (Note 5) | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | DFT-s-OFDM QPSK | | Edge\_1RB\_Left |
| 15 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | DFT-s-OFDM QPSK | | Edge\_1RB\_Left |
| 16 | Low | | |  | DFT-s-OFDM QPSK | | Outer Full |
| 17 | High | | |  | DFT-s-OFDM QPSK | | Edge\_1RB\_Right |
| 18 | High | | |  | DFT-s-OFDM QPSK | | Outer Full |
| 19 | Low | | |  | DFT-s-OFDM 16 QAM | | Edge\_1RB\_Left |
| 20 (Note 5) | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | DFT-s-OFDM 16 QAM | | Edge\_1RB\_Left |
| 21 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | DFT-s-OFDM 16 QAM | | Edge\_1RB\_Left |
| 22 | Low | | |  | DFT-s-OFDM 16 QAM | | Outer Full |
| 23 | High | | |  | DFT-s-OFDM 16 QAM | | Edge\_1RB\_Right |
| 24 | High | | |  | DFT-s-OFDM 16 QAM | | Outer Full |
| 25 | Low | | |  | DFT-s-OFDM 64 QAM | | Edge\_1RB\_Left |
| 26 (Note 5) | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | DFT-s-OFDM 64 QAM | | Edge\_1RB\_Left |
| 27 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | DFT-s-OFDM 64 QAM | | Edge\_1RB\_Left |
| 28 | Low | | |  | DFT-s-OFDM 64 QAM | | Outer Full |
| 29 | High | | |  | DFT-s-OFDM 64 QAM | | Edge\_1RB\_Right |
| 30 | High | | |  | DFT-s-OFDM 64 QAM | | Outer Full |
| 31 | Low | | |  | DFT-s-OFDM 256 QAM | | Edge\_1RB\_Left |
| 32 (Note 5) | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | DFT-s-OFDM 256 QAM | | Edge\_1RB\_Left |
| 33 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | DFT-s-OFDM 256 QAM | | Edge\_1RB\_Left |
| 34 | Low | | |  | DFT-s-OFDM 256 QAM | | Outer Full |
| 35 | High | | |  | DFT-s-OFDM 256 QAM | | Edge\_1RB\_Right |
| 36 | High | | |  | DFT-s-OFDM 256 QAM | | Outer Full |
| 37 | Low | | |  | CP-OFDM QPSK | | Edge\_1RB\_Left |
| 38 (Note 5) | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | CP-OFDM QPSK | | Edge\_1RB\_Left |
| 39 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | CP-OFDM QPSK | | Edge\_1RB\_Left |
| 40 | Low | | |  | CP-OFDM QPSK | | Outer Full |
| 41 | High | | |  | CP-OFDM QPSK | | Edge\_1RB\_Right |
| 42 | High | | |  | CP-OFDM QPSK | | Outer Full |
| 43 | Low | | |  | CP-OFDM 16 QAM | | Edge\_1RB\_Left |
| 44 (Note 5) | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | CP-OFDM 16 QAM | | Edge\_1RB\_Left |
| 45 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | CP-OFDM 16 QAM | | Edge\_1RB\_Left |
| 46 | Low | | |  | CP-OFDM 16 QAM | | Outer Full |
| 47 | High | | |  | CP-OFDM 16 QAM | | Edge\_1RB\_Right |
| 48 | High | | |  | CP-OFDM 16 QAM | | Outer Full |
| 49 | Low | | |  | CP-OFDM 64 QAM | | Edge\_1RB\_Left |
| 50 (Note 5) | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | CP-OFDM 64 QAM | | Edge\_1RB\_Left |
| 51 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | CP-OFDM 64 QAM | | Edge\_1RB\_Left |
| 52 | Low | | |  | CP-OFDM 64 QAM | | Outer Full |
| 53 | High | | |  | CP-OFDM 64 QAM | | Edge\_1RB\_Right |
| 54 | High | | |  | CP-OFDM 64 QAM | | Outer Full |
| 55 | Low | | |  | CP-OFDM 256 QAM | | Edge\_1RB\_Left |
| 56 (Note 5) | Table 6.2.3.4.1-2a - Table 6.2.3.4.1-2c | | |  | CP-OFDM 256 QAM | | Edge\_1RB\_Left |
| 57 | Table 6.2.3.4.1-2d - Table 6.2.3.4.1-2f | | |  | CP-OFDM 256 QAM | | Edge\_1RB\_Left |
| 58 | Low | | |  | CP-OFDM 256 QAM | | Outer Full |
| 59 | High | | |  | CP-OFDM 256 QAM | | Edge\_1RB\_Right |
| 60 | High | | |  | CP-OFDM 256 QAM | | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and the IE *powerBoostPi2BPSK* is set to 1 for band n41.  NOTE 4: UE operating in FDD mode, or in TDD mode in bands other than n41, or in TDD mode the IE *powerBoostPi2BPSK* is set to 0 for bands n41.  NOTE 5: Only applicable for 10 MHz and 15 MHz channel bandwidth | | | | | | | |

Table 6.2D.3.4.1-2: Test Configuration table for NS\_35

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | Normal |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | Low range, High range |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | Lowest, Highest |
| Test SCS as specified in Table 5.3.5-1 | | | | Lowest, Highest |
| A-MPR test parameters for NS\_35 | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  | Modulation | RB allocation (NOTE 1) |
| 1 | Low |  | CP-OFDM QPSK | Edge\_1RB\_Left |
| 2 | High |  | CP-OFDM QPSK | Edge\_1RB\_Right |
| 3 | Default | N/A | CP-OFDM QPSK | Outer Full |
| 4 | Low |  | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 5 | High |  | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 6 | Default |  | CP-OFDM 16 QAM | Outer Full |
| 7 | Low |  | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 8 | High |  | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 9 | Default |  | CP-OFDM 64 QAM | Outer Full |
| 10 | Low |  | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 11 | High |  | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 12 | Default |  | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1. | | | | |

Table 6.2D.3.4.1-3: Test Configuration table for NS\_05

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | | Normal | | | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | Use uplink carrier centre frequency (Fc) as specified in test parameters | | | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | 5 MHz, 10 MHz, 15 MHz, 20 MHz | | | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | | Lowest, Highest unless otherwise specified in test parameters. | | | | |
| A-MPR test parameters for NS\_05 | | | | | | | | | | | | |
| Test ID | Fc  (MHz) | ChBw (MHz) | SCS (kHz) | Downlink Config. | A-MPR | Uplink Configuration | | | | | | |
| Modulation  (NOTE 2) | | | RB allocation (Note 1) | | | |
| SCS 15 kHz | SCS 30 kHz | SCS 60 kHz | |
| 1 | 1922.5 | 5 | 15 | A3 | CP-OFDM | QPSK | | Outer\_Full | | | |
| 2 | 1925 | 10 | Default | A1 | QPSK | | Outer\_Full | | | |
| 3 | 1925 | 10 | Default | A7 | QPSK | | 42@10 | 18@5 | | 8@3 |
| 4 | 1925 | 10 | Default | A2 | QPSK | | 6@40 | 3@20 | | 1@10 |
| 5 | 1935 | 10 | Default | A4 | QPSK | | Outer\_Full | | | |
| 6 | 1927.5 | 15 | Default | A1 | QPSK | | Outer\_Full | | | |
| 7 | 1927.5 | 15 | Default | A7 | QPSK | | 60@19 | 28@10 | | 12@5 |
| 8 | 1927.5 | 15 | Default | A2 | QPSK | | 6@56 | 3@28 | | 1@14 |
| 9 | 1932.5 | 15 | Default | A1 | QPSK | | Outer\_Full | | | |
| 10 | 1932.5 | 15 | Default | A2 | QPSK | | 6@68 | 3@34 | | 1@17 |
| 11 | 1942.5 | 15 | Default | A5 | QPSK | | Outer\_Full | | | |
| 12 | 1930 | 20 | Default | A1 | QPSK | | Outer\_Full | | | |
| 13 | 1930 | 20 | Default | A7 | QPSK | | 78@28 | 37@14 | | 17@7 |
| 14 | 1930 | 20 | Default | A2 | QPSK | | 6@76 | 3@38 | | 1@19 |
| 15 | 1950 | 20 | Default | A6 | QPSK | | Outer\_Full | | | |
| 16 | 1922.5 | 5 | 15 | A3 | 16 QAM | | Outer\_Full | | | |
| 17 | 1925 | 10 | Default | A1 | 16 QAM | | Outer\_Full | | | |
| 18 | 1925 | 10 | Default | A7 | 16 QAM | | 42@10 | 18@5 | | 8@3 |
| 19 | 1925 | 10 | Default | A2 | 16 QAM | | 6@40 | 3@20 | | 1@10 |
| 20 | 1935 | 10 | Default | A4 | 16 QAM | | Outer\_Full | | | |
| 21 | 1927.5 | 15 | Default | A1 | 16 QAM | | Outer\_Full | | | |
| 22 | 1927.5 | 15 | Default | A7 | 16 QAM | | 60@19 | 28@10 | | 12@5 |
| 23 | 1927.5 | 15 | Default | A2 | 16 QAM | | 6@56 | 3@28 | | 1@14 |
| 24 | 1932.5 | 15 | Default | A1 | 16 QAM | | Outer\_Full | | | |
| 25 | 1932.5 | 15 | Default | A2 | 16 QAM | | 6@68 | 3@34 | | 1@17 |
| 26 | 1942.5 | 15 | Default | A5 | 16 QAM | | Outer\_Full | | | |
| 27 | 1930 | 20 | Default | A1 | 16 QAM | | Outer\_Full | | | |
| 28 | 1930 | 20 | Default | A7 | 16 QAM | | 78@28 | 37@14 | | 17@7 |
| 29 | 1930 | 20 | Default | A2 | 16 QAM | | 6@76 | 3@38 | | 1@19 |
| 30 | 1950 | 20 | Default | A6 | 16 QAM | | Outer\_Full | | | |
| 31 | 1922.5 | 5 | 15 | A3 | 64 QAM | | Outer\_Full | | | |
| 32 | 1925 | 10 | Default | A1 | 64 QAM | | Outer\_Full | | | |
| 33 | 1925 | 10 | Default | A7 | 64 QAM | | 42@10 | 18@5 | | 8@3 |
| 34 | 1925 | 10 | Default | A2 | 64 QAM | | 6@40 | 3@20 | | 1@10 |
| 35 | 1927.5 | 15 | Default | A1 | 64 QAM | | Outer\_Full | | | |
| 36 | 1927.5 | 15 | Default | A7 | 64 QAM | | 60@19 | 28@10 | | 12@5 |
| 37 | 1927.5 | 15 | Default | A2 | 64 QAM | | 6@56 | 3@28 | | 1@14 |
| 38 | 1932.5 | 15 | Default | A1 | 64 QAM | | Outer\_Full | | | |
| 39 | 1932.5 | 15 | Default | A2 | 64 QAM | | 6@68 | 3@34 | | 1@17 |
| 40 | 1930 | 20 | Default | A1 | 64 QAM | | Outer\_Full | | | |
| 41 | 1930 | 20 | Default | A7 | 64 QAM | | 78@28 | 37@14 | | 17@7 |
| 42 | 1930 | 20 | Default | A2 | 64 QAM | | 6@76 | 3@38 | | 1@19 |
| 43 | 1922.5 | 5 | 15 | A3 | 256 QAM | | Outer\_Full | | | |
| 44 | 1925 | 10 | Default | A1 | 256 QAM | | Outer\_Full | | | |
| 45 | 1925 | 10 | Default | A7 | 256 QAM | | 42@10 | 18@5 | | 8@3 |
| 46 | 1927.5 | 15 | Default | A1 | 256 QAM | | Outer\_Full | | | |
| 47 | 1927.5 | 15 | Default | A7 | 256 QAM | | 60@19 | 28@10 | | 12@5 |
| 48 | 1932.5 | 15 | Default | A1 | 256 QAM | | Outer\_Full | | | |
| 49 | 1930 | 20 | Default | A1 | 256 QAM | | Outer\_Full | | | |
| 50 | 1930 | 20 | Default | A7 | 256 QAM | | 78@28 | 37@14 | | 17@7 |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1. | | | | | | | | | | | | |

Table 6.2D.3.4.1-4: Test Configuration table for NS\_05U

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Initial Conditions** | | | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | | Normal | | | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | Use uplink carrier centre frequency (Fc) as specified in test parameters | | | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | 5 MHz, 10 MHz, 15 MHz, 20 MHz | | | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | | Lowest, Highest unless otherwise specified in test parameters. | | | | |
| A-MPR test parameters for NS\_05U | | | | | | | | | | | | |
| Test ID | Fc  (MHz) | ChBw (MHz) | SCS (kHz) | Downlink Config. | A-MPR | Uplink Configuration | | | | | | |
| Modulation  (NOTE 2) | | | RB allocation (Note 1) | | | |
| SCS 15 kHz | SCS 30 kHz | SCS 60 kHz | |
| 1 | 1922.5 | 5 | 15 | A3 | CP-OFDM | QPSK | | Outer\_Full | | | |
| 2 | 1925 | 10 | Default | A1 | QPSK | | Outer\_Full | | | |
| 3 | 1925 | 10 | Default | A7 | QPSK | | 42@10 | 18@5 | | 8@3 |
| 4 | 1925 | 10 | Default | A2 | QPSK | | 6@40 | 3@20 | | 1@10 |
| 5 | 1935 | 10 | Default | A4 | QPSK | | Outer\_Full | | | |
| 6 | 1927.5 | 15 | Default | A1 | QPSK | | Outer\_Full | | | |
| 7 | 1927.5 | 15 | Default | A7 | QPSK | | 60@19 | 28@10 | | 12@5 |
| 8 | 1927.5 | 15 | Default | A2 | QPSK | | 6@56 | 3@28 | | 1@14 |
| 9 | 1932.5 | 15 | Default | A1 | QPSK | | Outer\_Full | | | |
| 10 | 1932.5 | 15 | Default | A2 | QPSK | | 6@68 | 3@34 | | 1@17 |
| 11 | 1942.5 | 15 | Default | A5 | QPSK | | Outer\_Full | | | |
| 12 | 1930 | 20 | Default | A1 | QPSK | | Outer\_Full | | | |
| 13 | 1930 | 20 | Default | A7 | QPSK | | 78@28 | 37@14 | | 17@7 |
| 14 | 1930 | 20 | Default | A2 | QPSK | | 6@76 | 3@38 | | 1@19 |
| 15 | 1950 | 20 | Default | A6 | QPSK | | Outer\_Full | | | |
| 16 | 1922.5 | 5 | 15 | A3 | 16 QAM | | Outer\_Full | | | |
| 17 | 1925 | 10 | Default | A1 | 16 QAM | | Outer\_Full | | | |
| 18 | 1925 | 10 | Default | A7 | 16 QAM | | 42@10 | 18@5 | | 8@3 |
| 19 | 1925 | 10 | Default | A2 | 16 QAM | | 6@40 | 3@20 | | 1@10 |
| 20 | 1935 | 10 | Default | A4 | 16 QAM | | Outer\_Full | | | |
| 21 | 1927.5 | 15 | Default | A1 | 16 QAM | | Outer\_Full | | | |
| 22 | 1927.5 | 15 | Default | A7 | 16 QAM | | 60@19 | 28@10 | | 12@5 |
| 23 | 1927.5 | 15 | Default | A2 | 16 QAM | | 6@56 | 3@28 | | 1@14 |
| 24 | 1932.5 | 15 | Default | A1 | 16 QAM | | Outer\_Full | | | |
| 25 | 1932.5 | 15 | Default | A2 | 16 QAM | | 6@68 | 3@34 | | 1@17 |
| 26 | 1942.5 | 15 | Default | A5 | 16 QAM | | Outer\_Full | | | |
| 27 | 1930 | 20 | Default | A1 | 16 QAM | | Outer\_Full | | | |
| 28 | 1930 | 20 | Default | A7 | 16 QAM | | 78@28 | 37@14 | | 17@7 |
| 29 | 1930 | 20 | Default | A2 | 16 QAM | | 6@76 | 3@38 | | 1@19 |
| 30 | 1950 | 20 | Default | A6 | 16 QAM | | Outer\_Full | | | |
| 31 | 1922.5 | 5 | 15 | A3 | 64 QAM | | Outer\_Full | | | |
| 32 | 1925 | 10 | Default | A1 | 64 QAM | | Outer\_Full | | | |
| 33 | 1925 | 10 | Default | A7 | 64 QAM | | 42@10 | 18@5 | | 8@3 |
| 34 | 1925 | 10 | Default | A2 | 64 QAM | | 6@40 | 3@20 | | 1@10 |
| 35 | 1935 | 10 | Default | A4 | 64 QAM | | Outer\_Full | | | |
| 36 | 1927.5 | 15 | Default | A1 | 64 QAM | | Outer\_Full | | | |
| 37 | 1927.5 | 15 | Default | A7 | 64 QAM | | 60@19 | 28@10 | | 12@5 |
| 38 | 1927.5 | 15 | Default | A2 | 64 QAM | | 6@56 | 3@28 | | 1@14 |
| 39 | 1932.5 | 15 | Default | A1 | 64 QAM | | Outer\_Full | | | |
| 40 | 1932.5 | 15 | Default | A2 | 64 QAM | | 6@68 | 3@34 | | 1@17 |
| 41 | 1942.5 | 15 | Default | A5 | 64 QAM | | Outer\_Full | | | |
| 42 | 1930 | 20 | Default | A1 | 64 QAM | | Outer\_Full | | | |
| 43 | 1930 | 20 | Default | A7 | 64 QAM | | 78@28 | 37@14 | | 17@7 |
| 44 | 1930 | 20 | Default | A2 | 64 QAM | | 6@76 | 3@38 | | 1@19 |
| 45 | 1950 | 20 | Default | A6 | 64 QAM | | Outer\_Full | | | |
| 46 | 1922.5 | 5 | 15 | A3 | 256 QAM | | Outer\_Full | | | |
| 47 | 1925 | 10 | Default | A1 | 256 QAM | | Outer\_Full | | | |
| 48 | 1925 | 10 | Default | A7 | 256 QAM | | 42@10 | 18@5 | | 8@3 |
| 49 | 1935 | 10 | Default | A4 | 256 QAM | | Outer\_Full | | | |
| 50 | 1927.5 | 15 | Default | A1 | 256 QAM | | Outer\_Full | | | |
| 51 | 1927.5 | 15 | Default | A7 | 256 QAM | | 60@19 | 28@10 | | 12@5 |
| 52 | 1932.5 | 15 | Default | A1 | 256 QAM | | Outer\_Full | | | |
| 53 | 1942.5 | 15 | Default | A5 | 256 QAM | | Outer\_Full | | | |
| 54 | 1930 | 20 | Default | A1 | 256 QAM | | Outer\_Full | | | |
| 55 | 1930 | 20 | Default | A7 | 256 QAM | | 78@28 | 37@14 | | 17@7 |
| 56 | 1950 | 20 | Default | A6 | 256 QAM | | Outer\_Full | | | |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1. | | | | | | | | | | | | |

Table 6.2D.3.4.1-5: Test Configuration table for NS\_48

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | | Normal | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | Low range, High range | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | 25 MHz, 30MHz, 40MHz, 50MHz | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | | Lowest, Highest | | |
| **A-MPR test parameters for NS\_48** | | | | | | | | | | |
| Test ID | Fc (MHz) | Ch BW (MHz) | SCS (kHz) | Downlink Configuration | Uplink Configuration | | | | | |
| Modulation  (Note 2) | | RB allocation (Note 1) | | | |
| SCS 15 kHz | | SCS 30 kHz | SCS 60 kHz |
| 1 | Default | 25 | Default | CP-OFDM | QPSK | Outer\_Full (A3) | | | |
| 2 | Default | 25 | Default | QPSK | Edge\_1RB\_Right (A3) | | | |
| 3 | Default | 30 | Default | QPSK | Outer\_Full (A3) | | | |
| 4 | Default | 30 | Default | QPSK | Edge\_1RB\_Right (A5) | | | |
| 5 | Default | 40 | Default | QPSK | 16@0 (A2) | | 8@0 (A2) | 4@0 (A2) |
| 6 | Default | 40 | Default | QPSK | 95@0 (A3) | | 48@0 (A3) | 24@0 (A3) |
| 7 | Default | 40 | Default | QPSK | 152@0 (A4) | | 76@0 (A4) | 38@0 (A4) |
| 8 | Default | 40 | Default | QPSK | 192@0 (A2) | | 96@0 (A2) | 48@0 (A2) |
| 9 | Default | 40 | Default | QPSK | 5@187 (A3) | | 2@94 (A3) | 1@47 (A3) |
| 10 | Default | 40 | Default | QPSK | Outer\_Full (A1) | | | |
| 11 | Default | 50 | Default | QPSK | 34@0 (A2) | | 18@0 (A2) | 9@0 (A2) |
| 12 | Default | 50 | Default | QPSK | 115@0 (A4) | | 58@0 (A4) | 29@0 (A4) |
| 13 | Default | 50 | Default | QPSK | 228@0 (A2) | | 114@0 (A2) | 57@0 (A2) |
| 14 | Default | 50 | Default | QPSK | 5@223 (A5) | | 2@112 (A5) | 1@56 (A5) |
| 15 | Default | 50 | Default | QPSK | Outer\_Full (A1) | | | |
| 16 | Default | 25 | Default | 256 QAM | Outer\_Full (A3) | | | |
| 17 | Default | 25 | Default | 256 QAM | Edge\_1RB\_Right (A3) | | | |
| 18 | Default | 30 | Default | 256 QAM | Outer\_Full (A3) | | | |
| 19 | Default | 30 | Default | 256 QAM | Edge\_1RB\_Right (A5) | | | |
| 20 | Default | 40 | Default | 256 QAM | 16@0 (A2) | | 8@0 (A2) | 4@0 (A2) |
| 21 | Default | 40 | Default | 256 QAM | 95@0 (A3) | | 48@0 (A3) | 24@0 (A3) |
| 22 | Default | 40 | Default | 256 QAM | 152@0 (A4) | | 76@0 (A4) | 38@0 (A4) |
| 23 | Default | 40 | Default | 256 QAM | 192@0 (A2) | | 96@0 (A2) | 48@0 (A2) |
| 24 | Default | 40 | Default | 256 QAM | 5@187 (A3) | | 2@94 (A3) | 1@47 (A3) |
| 25 | Default | 40 | Default | 256 QAM | Outer\_Full (A1) | | | |
| 26 | Default | 50 | Default | 256 QAM | 34@0 (A2) | | 18@0 (A2) | 9@0 (A2) |
| 27 | Default | 50 | Default | 256 QAM | 115@0 (A4) | | 58@0 (A4) | 29@0 (A4) |
| 28 | Default | 50 | Default | 256 QAM | 228@0 (A2) | | 114@0 (A2) | 57@0 (A2) |
| 29 | Default | 50 | Default | 256 QAM | 5@223 (A5) | | 2@112 (A5) | 1@56 (A5) |
| 30 | Default | 50 | Default | 256 QAM | Outer\_Full (A1) | | | |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table. | | | | | | | | | | |

Table 6.2D.3.4.1-6: Test Configuration table for NS\_49

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | | Normal | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | Low range, High range | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | 25 MHz, 30MHz, 40MHz, 50MHz | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | | Lowest, Highest | | |
| **A-MPR test parameters for NS\_49** | | | | | | | | | | |
| Test ID | Fc (MHz) | Ch BW (MHz) | SCS (kHz) | Downlink Configuration | Uplink Configuration | | | | | |
| Modulation  (Note 2) | | RB allocation (Note 1) | | | |
| SCS 15 kHz | | SCS 30 kHz | SCS 60 kHz |
| 1 | Default | 25 | Default | CP-OFDM | QPSK | Outer\_Full (A3) | | | |
| 2 | Default | 25 | Default | QPSK | Edge\_1RB\_Right (A3) | | | |
| 3 | Default | 25 | Default | QPSK | Edge\_1RB\_Left (A3) | | | |
| 4 | Default | 30 | Default | QPSK | 20@0 (A1) | | 10@0 (A1) | 5@0 (A1) |
| 5 | Default | 30 | Default | QPSK | 36@0 (A5) | | 18@0 (A5) | 9@0 (A5) |
| 6 | Default | 30 | Default | QPSK | 80@0 (A3) | | 40@0 (A3) | 20@0 (A3) |
| 7 | Default | 30 | Default | QPSK | 120@0 (A4) | | 60@0 (A4) | 30@0 (A4) |
| 8 | Default | 30 | Default | QPSK | Outer\_Full (A2) | | | |
| 9 | Default | 30 | Default | QPSK | Edge\_1RB\_Right (A5) | | | |
| 10 | Default | 40 | Default | QPSK | 40@0 (A1) | | 20@0 (A1) | 10@0 (A1) |
| 11 | Default | 40 | Default | QPSK | 5@53 (A5) | | 2@27 (A5) | 1@14 (A5) |
| 12 | Default | 40 | Default | QPSK | 100@0 (A4) | | 50@0 (A4) | 25@0 (A4) |
| 13 | Default | 40 | Default | QPSK | 159@33 (A2) | | 79@17 (A2) | 39@9 (A2) |
| 14 | Default | 40 | Default | QPSK | 5@187 (A5) | | 2@94 (A5) | 1@47 (A5) |
| 15 | Default | 40 | Default | QPSK | 192@0 (A1) | | 96@0 (A1) | 48@0 (A1) |
| 16 | Default | 40 | Default | QPSK | Outer\_Full (A1) | | | |
| 17 | Default | 50 | Default | QPSK | 5@75 (A5) | | 2@38 (A5) | 1@19 (A5) |
| 18 | Default | 50 | Default | QPSK | 5@215 (A5) | | 2@108 (A5) | 1@54 (A5) |
| 19 | Default | 50 | Default | QPSK | 175@45 (A2) | | 87@23 (A2) | 43@12 (A2) |
| 20 | Default | 50 | Default | QPSK | 220@0 (A1) | | 110@0 (A1) | 55@0 (A1) |
| 21 | Default | 50 | Default | QPSK | Outer\_Full (A1) | | | |
| 22 | Default | 25 | Default | 256 QAM | Outer\_Full (A3) | | | |
| 23 | Default | 25 | Default | 256 QAM | Edge\_1RB\_Right (A3) | | | |
| 24 | Default | 25 | Default | 256 QAM | Edge\_1RB\_Left (A3) | | | |
| 25 | Default | 30 | Default | 256 QAM | 20@0 (A1) | | 10@0 (A1) | 5@0 (A1) |
| 26 | Default | 30 | Default | 256 QAM | 36@0 (A5) | | 18@0 (A5) | 9@0 (A5) |
| 27 | Default | 30 | Default | 256 QAM | 80@0 (A3) | | 40@0 (A3) | 20@0 (A3) |
| 28 | Default | 30 | Default | 256 QAM | 120@0 (A4) | | 60@0 (A4) | 30@0 (A4) |
| 29 | Default | 30 | Default | 256 QAM | Outer\_Full (A2) | | | |
| 30 | Default | 30 | Default | 256 QAM | Edge\_1RB\_Right (A5) | | | |
| 31 | Default | 40 | Default | 256 QAM | 40@0 (A1) | | 20@0 (A1) | 10@0 (A1) |
| 32 | Default | 40 | Default | 256 QAM | 5@53 (A5) | | 2@27 (A5) | 1@14 (A5) |
| 33 | Default | 40 | Default | 256 QAM | 100@0 (A4) | | 50@0 (A4) | 25@0 (A4) |
| 34 | Default | 40 | Default | 256 QAM | 159@33 (A2) | | 79@17 (A2) | 39@9 (A2) |
| 35 | Default | 40 | Default | 256 QAM | 5@187 (A5) | | 2@94 (A5) | 1@47 (A5) |
| 36 | Default | 40 | Default | 256 QAM | 192@0 (A1) | | 96@0 (A1) | 48@0 (A1) |
| 37 | Default | 40 | Default | 256 QAM | Outer\_Full (A1) | | | |
| 38 | Default | 50 | Default | 256 QAM | 5@75 (A5) | | 2@38 (A5) | 1@19 (A5) |
| 39 | Default | 50 | Default | 256 QAM | 5@215 (A5) | | 2@108 (A5) | 1@54 (A5) |
| 40 | Default | 50 | Default | 256 QAM | 175@45 (A2) | | 87@23 (A2) | 43@12 (A2) |
| 41 | Default | 50 | Default | 256 QAM | 220@0 (A1) | | 110@0 (A1) | 55@0 (A1) |
| 42 | Default | 50 | Default | 256 QAM | Outer\_Full (A1) | | | |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table. | | | | | | | | | | |

Table 6.2D.3.4.1-7: Test Configuration table for NS\_03, NS\_03U and NS\_100

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | Normal |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | Low range, High range |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | Lowest, Highest |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | Lowest, Highest |
| A-MPR test parameters for NS\_03, NS\_03U and NS\_100 | | | | | | | |
| Test ID | Freq | **ChBw** | **SCS** | Downlink Configuration | Uplink Configuration | | |
| Modulation | | RB allocation (Note 1) |
| 1 | Low | Default | Default | N/A for A-MPR test cases | CP- OFDM | QPSK | Edge\_1RB\_Left |
| 2 | High | Default | Default | QPSK | Edge\_1RB\_Right |
| 3 | Default | Default | Default | QPSK | Outer\_Full |
| 4 | Low | Default | Default | 16 QAM | Edge\_1RB\_Left |
| 5 | High | Default | Default | 16 QAM | Edge\_1RB\_Right |
| 6 | Default | Default | Default | 16 QAM | Outer\_Full |
| 7 | Low | Default | Default | 64 QAM | Edge\_1RB\_Left |
| 8 | High | Default | Default | 64 QAM | Edge\_1RB\_Right |
| 9 | Default | Default | Default | 64 QAM | Outer\_Full |
| 10 | Low | Default | Default | 256 QAM | Edge\_1RB\_Left |
| 11 | High | Default | Default | 256 QAM | Edge\_1RB\_Right |
| 12 | Default | Default | Default | 256 QAM | Outer\_Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table. | | | | | | | |

Table 6.2D.3.4.1-7a: Test Configuration Table for NS\_03, NS\_03U and NS\_100 for UEs supporting ULFPTx

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | Normal |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | Low range, High range |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | Lowest, Highest |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | Lowest, Highest |
| Test parameters for NS\_03U | | | | | | | |
| Test ID | Freq | ChBw | SCS | Downlink Configuration | Uplink Configuration | | |
| Modulation  (Note 2) | | RB allocation (Note 1) |
| 1 | Low | Default | Default | N/A | DFT-s OFDM | PI/2 BPSK | Edge\_1RB\_Left |
| 2 | High | Default | Default |  | PI/2 BPSK | Edge\_1RB\_Right |
| 3 | Default | Default | Default |  | PI/2 BPSK | Outer\_Full |
| 4 | Low | Default | Default |  | QPSK | Edge\_1RB\_Left |
| 5 | High | Default | Default |  | QPSK | Edge\_1RB\_Right |
| 6 | Default | Default | Default |  | QPSK | Outer\_Full |
| 7 | Low | Default | Default |  | 16 QAM | Edge\_1RB\_Left |
| 8 | High | Default | Default |  | 16 QAM | Edge\_1RB\_Right |
| 9 | Default | Default | Default |  | 16 QAM | Outer\_Full |
| 10 | Low | Default | Default |  | 64 QAM | Edge\_1RB\_Left |
| 11 | High | Default | Default |  | 64 QAM | Edge\_1RB\_Right |
| 12 | Default | Default | Default |  | 64 QAM | Outer\_Full |
| 13 | Low | Default | Default |  | 256 QAM | Edge\_1RB\_Left |
| 14 | High | Default | Default |  | 256 QAM | Edge\_1RB\_Right |
| 15 | Default | Default | Default |  | 256 QAM | Outer\_Full |
| 16 | Low | Default | Default |  | CP-s OFDM | QPSK | Edge\_1RB\_Left |
| 17 | High | Default | Default |  | QPSK | Edge\_1RB\_Right |
| 18 | Default | Default | Default |  | QPSK | Outer\_Full |
| 19 | Low | Default | Default |  | 16 QAM | Edge\_1RB\_Left |
| 20 | High | Default | Default |  | 16 QAM | Edge\_1RB\_Right |
| 21 | Default | Default | Default |  | 16 QAM | Outer\_Full |
| 22 | Low | Default | Default |  | 64 QAM | Edge\_1RB\_Left |
| 23 | High | Default | Default |  | 64 QAM | Edge\_1RB\_Right |
| 24 | Default | Default | Default |  | 64 QAM | Outer\_Full |
| 25 | Low | Default | Default |  | 256 QAM | Edge\_1RB\_Left |
| 26 | High | Default | Default |  | 256 QAM | Edge\_1RB\_Right |
| 27 | Default | Default | Default |  | 256 QAM | Outer\_Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1. | | | | | | | |

Table 6.2D.3.4.1-8: Test Configuration table for NS\_46

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | | Normal | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | High range | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | 15MHz, 20MHz, 25 MHz, 50MHz | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | | Lowest, Highest | | |
| **A-MPR test parameters for NS\_46** | | | | | | | | | | |
| Test ID | Fc | Ch BW | SCS |  | Uplink Configuration | | | | | |
|  | (MHz) | (MHz) | (kHz) |  | Modulation | | RB allocation (Note 1) | | | |
|  |  |  |  |  | (Note 2) | | SCS 15 kHz | | SCS 30 kHz | SCS 60 kHz |
| 1 | Default | 25 | Default |  |  | QPSK | 90@43 (A3) | | 45@20 (A3) | 23@8 (A3) |
| 2 | Default | 25 | Default |  |  | 256QAM | 90@43 (A3) | | 45@20 (A3) | 23@8 (A3) |
| 3 | Default | 50 | Default |  |  | QPSK | Edge\_1RB\_Left (A4) | | | |
| 4 | Default | 50 | Default |  |  | 64QAM | Edge\_1RB\_Left (A4) | | | |
| 5 | Default | 50 | Default | Downlink Configuration | CP-OFDM | QPSK | 120@0 (A5) | | 60@0 (A5) | 30@0 (A5) |
| 6 | Default | 50 | Default |  |  | 64QAM | 120@0 (A5) | | 60@0 (A5) | 30@0 (A5) |
| 7 | Default | 50 | Default |  |  | QPSK | 175@0 (A6) | | 88@0 (A6) | 44@0 (A6) |
| 8 | Default | 50 | Default |  |  | 64QAM | 175@0 (A6) | | 88@0 (A6) | 44@0 (A6) |
| 9 | Default | 50 | Default |  |  | QPSK | 220@0 (A7) | | 110@0 (A7) | 55@0 (A7) |
| 10 | Default | 50 | Default |  |  | 256QAM | 220@0 (A7) | | 110@0 (A7) | 55@0 (A7) |
| 11 | Default | 50 | Default |  |  | QPSK | Outer\_Full (A8) | | | |
| 12 | Default | 50 | Default |  |  | 256QAM | Outer\_Full (A8) | | | |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table. | | | | | | | | | | |

Table 6.2D.3.4.1-9: Test Configuration table for NS\_21

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | Normal | | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | Low range, High range | | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | Lowest, Highest | | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | Lowest, Highest | | | |
| A-MPR test parameters for NS\_21 | | | | | | | | | | |
| Test ID | Freq | ChBw | SCS | Downlink | Uplink Configuration | | | | | |
|  |  |  |  | Configuration | Modulation | | | RB allocation (Note 1) | | |
|  |  |  |  |  | (Note 2) | | | SCS 15 kHz | SCS 30 kHz | |
| 1 | Low | Default | Default |  |  | QPSK | | Edge\_1RB\_Left | | |
| 2 | High | Default | Default |  |  | QPSK | | Edge\_1RB\_Right | | |
| 3 | Default | Default | Default |  |  | QPSK | | Outer\_Full | | |
| 4 | Default | 10 MHz | Default |  |  | QPSK | | 4@0 | | 2@0 |
| 5 | Default | 10 MHz | Default |  |  | QPSK | | 4@48 | | 2@22 |
| 6 | Low | Default | Default |  |  | 16 QAM | | Edge\_1RB\_Left | | |
| 7 | High | Default | Default |  |  | 16 QAM | | Edge\_1RB\_Right | | |
| 8 | Default | Default | Default | N/A | CP-OFDM | 16 QAM | | Outer\_Full | | |
| 9 | Default | 10 MHz | Default |  |  | 16 QAM | | 4@0 | | 2@0 |
| 10 | Default | 10 MHz | Default |  |  | 16 QAM | | 4@48 | | 2@22 |
| 11 | Low | Default | Default |  |  | 64 QAM | | Edge\_1RB\_Left | | |
| 12 | High | Default | Default |  |  | 64 QAM | | Edge\_1RB\_Right | | |
| 13 | Default | Default | Default |  |  | 64 QAM | | Outer\_Full | | |
| 14 | Default | 10 MHz | Default |  |  | 64 QAM | | 4@0 | | 2@0 |
| 15 | Default | 10 MHz | Default |  |  | 64 QAM | | 4@48 | | 2@22 |
| 16 | Low | Default | Default |  |  | 256 QAM | | Edge\_1RB\_Left | | |
| 17 | High | Default | Default |  |  | 256 QAM | | Edge\_1RB\_Right | | |
| 18 | Default | Default | Default |  |  | 256 QAM | | Outer\_Full | | |
| 19 | Default | 10 MHz | Default |  |  | 256 QAM | | 4@0 | | 2@0 |
| 20 | Default | 10 MHz | Default |  |  | 256 QAM | | 4@48 | | 2@22 |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1. | | | | | | | | | | |

Table 6.2D.3.4.1-10: Test Configuration table for NS\_44

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | | Normal | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | Defined for each test ID | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | Defined for each test ID | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | | Lowest, Highest | | |
| A-MPR test parameters for NS\_44 | | | | | | | | | | |
| Test ID | Fc | Ch BW | SCS | Downlink Configuration | Uplink Configuration | | | | | |
|  | (MHz) | (MHz) | (kHz) |  | Modulation | | RB allocation (Note 1) | | | |
|  |  |  |  |  | (Note 2) | | SCS 15 kHz | | SCS 30 kHz | SCS 60 kHz |
| 1 | 2602.5 | 25 | Default |  | CP-OFDM | 64 QAM | 100@0 (A3) | | 50@0 (A3) | 25@0 (A3) |
| 2 | 2602.5 | 25 | Default |  | 64 QAM | 39@94 (A3) | | 19@46 (A3) | 9@22 (A3) |
| 3 | 2602.5 | 25 | Default |  | 64 QAM | Outer\_Full (A6) | | | |
| 4 | 2602.5 | 25 | Default |  | 256 QAM | 100@0 (A3) | | 50@0 (A3) | 25@0 (A3) |
| 5 | 2602.5 | 25 | Default | N/A | 256 QAM | 39@94 (A3) | | 19@46 (A3) | 9@22 (A3) |
| 6 | 2602.5 | 25 | Default |  | 256 QAM | Outer\_Full (A6) | | | |
| 7 | 2600 | 30 | Default |  | 64 QAM | 120@0 (A3) | | 60@0 (A3) | 30@0 (A3) |
| 8 | 2600 | 30 | Default |  | 64 QAM | 69@91 (A3) | | 34@44 (A3) | 17@21 (A3) |
| 9 | 2600 | 30 | Default |  | 64 QAM | Outer\_Full (A6) | | | |
| 10 | 2600 | 30 | Default |  | 256 QAM | 120@0 (A3) | | 60@0 (A3) | 30@0 (A3) |
| 11 | 2600 | 30 | Default |  | 256 QAM | 69@91 (A3) | | 34@44 (A3) | 17@21 (A3) |
| 12 | 2600 | 30 | Default |  | 256 QAM | Outer\_Full (A6) | | | |
| 13 | 2595 | 40 | Default |  | 64 QAM | 16@0 (A1) | | 8@0 (A1) | 4@0 (A1) |
| 14 | 2595 | 40 | Default |  | 64 QAM | 80@0 (A2) | | 40@0 (A2) | 20@0 (A2) |
| 15 | 2595 | 40 | Default |  | 64 QAM | 130@0 (A3) | | 65@0 (A3) | 33@0 (A3) |
| 16 | 2595 | 40 | Default |  | 64 QAM | 180@0 (A4) | | 90@0 (A4) | 45@0 (A4) |
| 17 | 2595 | 40 | Default |  | 64 QAM | Outer\_Full (A5) | | | |
| 18 | 2595 | 40 | Default |  | 256 QAM | 16@0 (A1) | | 8@0 (A1) | 4@0 (A1) |
| 19 | 2595 | 40 | Default |  | 256 QAM | 80@0 (A2) | | 40@0 (A2) | 20@0 (A2) |
| 20 | 2595 | 40 | Default |  | 256 QAM | 130@0 (A3) | | 65@0 (A3) | 33@0 (A3) |
| 21 | 2595 | 40 | Default |  | 256 QAM | 180@0 (A4) | | 90@0 (A4) | 45@0 (A4) |
| 22 | 2595 | 40 | Default |  | 256 QAM | Outer\_Full (A5) | | | |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table. | | | | | | | | | | |

Table 6.2D.3.4.1-11: Test Configuration table for NS\_27

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | Normal | | | |
| Test Frequencies | | | | | | | Refer to uplink carrier centre frequency (Fc) in test parameters.  Associated parameters defined in Table 6.2D.3.4.1-9a and 6.2D.3.4.1-9b. | | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | Refer to test parameters (15, 20, 40 MHz) | | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | Lowest, Highest (Note 3) | | | |
| A-MPR test parameters for NS\_27 | | | | | | | | | | |
| Test ID | Fc | Ch BW | SCS | Downlink | Uplink Configuration | | | | | |
|  | (MHz) | (MHz) | (kHz) | Configuration | Modulation | | | RB allocation (Note 1) | | |
|  |  |  |  |  | (Note 2) | | | SCS 15 kHz | SCS 30 kHz | SCS 60 kHz |
| 1 | 3557.52 | 15 | Default |  |  | QPSK | | Edge\_1RB\_Left (A3) | | |
| 2 | 3557.52 | 15 | Default |  |  | QPSK | | Outer\_Full (A3) | | |
| 3 | 3692.49 | 15 | Default |  |  | QPSK | | Edge\_1RB\_Right (A3) | | |
| 4 | 3692.49 | 15 | Default |  |  | QPSK | | Outer\_Full (A3) | | |
| 5 | 3562.5 | 15 | Default |  |  | QPSK | | Edge\_1RB\_Left (A4) | | |
| 6 | 3562.5 | 15 | Default |  |  | QPSK | | Outer\_Full (2) | | |
| 7 | 3687.48 | 15 | Default |  |  | QPSK | | Edge\_1RB\_Right (A4) | | |
| 8 | 3687.48 | 15 | Default |  |  | QPSK | | Outer\_Full (2) | | |
| 9 | 3560.01 | 20 | Default |  |  | QPSK | | Edge\_1RB\_Left (A5) | | |
| 10 | 3560.01 | 20 | Default |  |  | QPSK | | Outer\_Full (A5) | | |
| 11 | 3690 | 20 | Default |  |  | QPSK | | Edge\_1RB\_Right (A5) | | |
| 12 | 3690 | 20 | Default |  |  | QPSK | | Outer\_Full (A5) | | |
| 13 | 3570 | 20 | Default |  |  | QPSK | | Edge\_1RB\_Left (A6) | | |
| 14 | 3570 | 20 | Default |  |  | QPSK | | Outer\_Full (2) | | |
| 15 | 3679.98 | 20 | Default |  |  | QPSK | | Edge\_1RB\_Right (A6) | | |
| 16 | 3679.98 | 20 | Default |  |  | QPSK | | Outer\_Full (2) | | |
| 17 | 3570 | 40 | Default | N/A |  | QPSK | | Edge\_1RB\_Left (A7) | | |
| 18 | 3570 | 40 | Default |  |  | QPSK | | 153@63 (A2) | 72@32 (A2) | 32@16 (A2) |
| 19 | 3570 | 40 | Default |  |  | QPSK | | 99@69 (A1) | 49@34 (A1) | 24@16 (A1) |
| 20 | 3570 | 40 | Default |  |  | QPSK | | Edge\_1RB\_Right (A7) | | |
| 21 | 3679.98 | 40 | Default |  |  | QPSK | | Edge\_1RB\_Right (A7) | | |
| 22 | 3679.98 | 40 | Default |  |  | QPSK | | 137@0 (A2) | 68@0 (A2) | 35@0 (A2) |
| 23 | 3679.98 | 40 | Default |  |  | QPSK | | 99@38 (A1) | 49@18 (A1) | 24@9 (A1) |
| 24 | 3679.98 | 40 | Default |  |  | QPSK | | Edge\_1RB\_Left (A7) | | |
| 25 | 3600 | 40 | Default |  |  | QPSK | | Edge\_1RB\_Left(A8) | | |
| 26 | 3600 | 40 | Default |  |  | QPSK | | Outer\_Full (4.5) | | |
| 27 | 3649.98 | 40 | Default |  |  | QPSK | | Edge\_1RB\_Right (A8) | | |
| 28 | 3649.98 | 40 | Default |  |  | QPSK | | Outer\_Full (4.5) | | |
| 29 | 3557.52 | 15 | Default |  |  | 16 QAM | | Edge\_1RB\_Left (A3) | | |
| 30 | 3557.52 | 15 | Default |  |  | 16 QAM | | Outer\_Full (A3) | | |
| 31 | 3692.49 | 15 | Default |  |  | 16 QAM | | Edge\_1RB\_Right (A3) | | |
| 32 | 3692.49 | 15 | Default |  |  | 16 QAM | | Outer\_Full (A3) | | |
| 33 | 3562.5 | 15 | Default |  |  | 16 QAM | | Edge\_1RB\_Left (A4) | | |
| 34 | 3562.5 | 15 | Default |  |  | 16 QAM | | Outer\_Full (2) | | |
| 35 | 3687.48 | 15 | Default |  |  | 16 QAM | | Edge\_1RB\_Right (A4) | | |
| 36 | 3687.48 | 15 | Default |  |  | 16 QAM | | Outer\_Full (2) | | |
| 37 | 3560.01 | 20 | Default |  |  | 16 QAM | | Edge\_1RB\_Left (A5) | | |
| 38 | 3560.01 | 20 | Default |  |  | 16 QAM | | Outer\_Full (A5) | | |
| 39 | 3690 | 20 | Default |  |  | 16 QAM | | Edge\_1RB\_Right (A5) | | |
| 40 | 3690 | 20 | Default |  |  | 16 QAM | | Outer\_Full (A5) | | |
| 41 | 3570 | 20 | Default |  |  | 16 QAM | | Edge\_1RB\_Left (A6) | | |
| 42 | 3570 | 20 | Default |  |  | 16 QAM | | Outer\_Full (2) | | |
| 43 | 3679.98 | 20 | Default |  |  | 16 QAM | | Edge\_1RB\_Right (A6) | | |
| 44 | 3679.98 | 20 | Default |  |  | 16 QAM | | Outer\_Full (2) | | |
| 45 | 3570 | 40 | Default |  |  | 16 QAM | | Edge\_1RB\_Left (A7) | | |
| 46 | 3570 | 40 | Default |  |  | 16 QAM | | 153@63 (A2) | 72@32 (A2) | 32@16 (A2) |
| 47 | 3570 | 40 | Default |  |  | 16 QAM | | 99@69 (A1) | 49@34 (A1) | 24@16 (A1) |
| 48 | 3570 | 40 | Default |  |  | 16 QAM | | Edge\_1RB\_Right (A7) | | |
| 49 | 3679.98 | 40 | Default |  |  | 16 QAM | | Edge\_1RB\_Right (A7) | | |
| 50 | 3679.98 | 40 | Default |  |  | 16 QAM | | 137@0 (A2) | 68@0 (A2) | 35@0 (A2) |
| 51 | 3679.98 | 40 | Default |  |  | 16 QAM | | 99@38 (A1) | 49@18 (A1) | 24@9 (A1) |
| 52 | 3679.98 | 40 | Default |  |  | 16 QAM | | Edge\_1RB\_Left (A7) | | |
| 53 | 3600 | 40 | Default |  |  | 16 QAM | | Edge\_1RB\_Left (A8) | | |
| 54 | 3600 | 40 | Default |  | CP-OFDM | 16 QAM | | Outer\_Full (4.5) | | |
| 55 | 3649.98 | 40 | Default |  |  | 16 QAM | | Edge\_1RB\_Right (A8) | | |
| 56 | 3649.98 | 40 | Default |  |  | 16 QAM | | Outer\_Full (4.5) | | |
| 57 | 3557.52 | 15 | Default |  |  | 64 QAM | | Edge\_1RB\_Left (A3) | | |
| 58 | 3557.52 | 15 | Default |  |  | 64 QAM | | Outer\_Full (A3) | | |
| 59 | 3692.49 | 15 | Default |  |  | 64 QAM | | Edge\_1RB\_Right (A3) | | |
| 60 | 3692.49 | 15 | Default |  |  | 64 QAM | | Outer\_Full (A3) | | |
| 61 | 3562.5 | 15 | Default |  |  | 64 QAM | | Edge\_1RB\_Left (A4) | | |
| 62 | 3562.5 | 15 | Default |  |  | 64 QAM | | Outer\_Full (2) | | |
| 63 | 3687.48 | 15 | Default |  |  | 64 QAM | | Edge\_1RB\_Right (A4) | | |
| 64 | 3687.48 | 15 | Default |  |  | 64 QAM | | Outer\_Full (2) | | |
| 65 | 3560.01 | 20 | Default |  |  | 64 QAM | | Edge\_1RB\_Left (A5) | | |
| 66 | 3560.01 | 20 | Default |  |  | 64 QAM | | Outer\_Full (A5) | | |
| 67 | 3690 | 20 | Default |  |  | 64 QAM | | Edge\_1RB\_Right (A5) | | |
| 68 | 3690 | 20 | Default |  |  | 64 QAM | | Outer\_Full (A5) | | |
| 69 | 3570 | 20 | Default |  |  | 64 QAM | | Edge\_1RB\_Left (A6) | | |
| 70 | 3570 | 20 | Default |  |  | 64 QAM | | Outer\_Full (2) | | |
| 71 | 3679.98 | 20 | Default |  |  | 64 QAM | | Edge\_1RB\_Right (A6) | | |
| 72 | 3679.98 | 20 | Default |  |  | 64 QAM | | Outer\_Full (2) | | |
| 73 | 3570 | 40 | Default |  |  | 64 QAM | | Edge\_1RB\_Left (A7) | | |
| 74 | 3570 | 40 | Default |  |  | 64 QAM | | 153@63 (A2) | 72@32 (A2) | 32@16 (A2) |
| 75 | 3570 | 40 | Default |  |  | 64 QAM | | 99@69 (A1) | 49@34 (A1) | 24@16 (A1) |
| 76 | 3570 | 40 | Default |  |  | 64 QAM | | Edge\_1RB\_Right (A7) | | |
| 77 | 3679.98 | 40 | Default |  |  | 64 QAM | | Edge\_1RB\_Right (A7) | | |
| 78 | 3679.98 | 40 | Default |  |  | 64 QAM | | 137@0 (A2) | 68@0 (A2) | 35@0 (A2) |
| 79 | 3679.98 | 40 | Default |  |  | 64 QAM | | 99@38 (A1) | 49@18 (A1) | 24@9 (A1) |
| 80 | 3679.98 | 40 | Default |  |  | 64 QAM | | Edge\_1RB\_Left (A7) | | |
| 81 | 3600 | 40 | Default |  |  | 64 QAM | | Edge\_1RB\_Left (A8) | | |
| 82 | 3600 | 40 | Default |  |  | 64 QAM | | Outer\_Full (4.5) | | |
| 83 | 3649.98 | 40 | Default |  |  | 64 QAM | | Edge\_1RB\_Right (A8) | | |
| 84 | 3649.98 | 40 | Default |  |  | 64 QAM | | Outer\_Full (4.5) | | |
| 85 | 3557.52 | 15 | Default |  |  | 256 QAM | | Edge\_1RB\_Left (A3) | | |
| 86 | 3557.52 | 15 | Default |  |  | 256 QAM | | Outer\_Full (A3) | | |
| 87 | 3692.49 | 15 | Default |  |  | 256 QAM | | Edge\_1RB\_Right (A3) | | |
| 88 | 3692.49 | 15 | Default |  |  | 256 QAM | | Outer\_Full (A3) | | |
| 89 | 3562.5 | 15 | Default |  |  | 256 QAM | | Edge\_1RB\_Left (A4) | | |
| 90 | 3562.5 | 15 | Default |  |  | 256 QAM | | Outer\_Full (2) | | |
| 91 | 3687.48 | 15 | Default |  |  | 256 QAM | | Edge\_1RB\_Right (A4) | | |
| 92 | 3687.48 | 15 | Default |  |  | 256 QAM | | Outer\_Full (2) | | |
| 93 | 3560.01 | 20 | Default |  |  | 256 QAM | | Edge\_1RB\_Left (A5) | | |
| 94 | 3560.01 | 20 | Default |  |  | 256 QAM | | Outer\_Full (A5) | | |
| 95 | 3690 | 20 | Default |  |  | 256 QAM | | Edge\_1RB\_Right (A5) | | |
| 96 | 3690 | 20 | Default |  |  | 256 QAM | | Outer\_Full (A5) | | |
| 97 | 3570 | 20 | Default |  |  | 256 QAM | | Edge\_1RB\_Left (A6) | | |
| 98 | 3570 | 20 | Default |  |  | 256 QAM | | Outer\_Full (2) | | |
| 99 | 3679.98 | 20 | Default |  |  | 256 QAM | | Edge\_1RB\_Right (A6) | | |
| 100 | 3679.98 | 20 | Default |  |  | 256 QAM | | Outer\_Full (2) | | |
| 101 | 3570 | 40 | Default |  |  | 256 QAM | | Edge\_1RB\_Left (A7) | | |
| 102 | 3570 | 40 | Default |  |  | 256 QAM | | 153@63 (A2) | 72@32 (A2) | 32@16 (A2) |
| 103 | 3570 | 40 | Default |  |  | 256 QAM | | 99@69 (A1) | 49@34 (A1) | 24@16 (A1) |
| 104 | 3570 | 40 | Default |  |  | 256 QAM | | Edge\_1RB\_Right (A7) | | |
| 105 | 3679.98 | 40 | Default |  |  | 256 QAM | | Edge\_1RB\_Right (A7) | | |
| 106 | 3679.98 | 40 | Default |  |  | 256 QAM | | 137@0 (A2) | 68@0 (A2) | 35@0 (A2) |
| 107 | 3679.98 | 40 | Default |  |  | 256 QAM | | 99@38 (A1) | 49@18 (A1) | 24@9 (A1) |
| 108 | 3679.98 | 40 | Default |  |  | 256 QAM | | Edge\_1RB\_Left (A7) | | |
| 109 | 3600 | 40 | Default |  |  | 256 QAM | | Edge\_1RB\_Left (A8) | | |
| 110 | 3600 | 40 | Default |  |  | 256 QAM | | Outer\_Full (4.5) | | |
| 111 | 3649.98 | 40 | Default |  |  | 256 QAM | | Edge\_1RB\_Right (A8) | | |
| 112 | 3649.98 | 40 | Default |  |  | 256 QAM | | Outer\_Full (4.5) | | |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: For FR1 bands where highest supported SCS is 60 kHz the highest tested SCS is limited to 30 kHz as carrier with SCS=60 kHz cannot be used as PCell. | | | | | | | | | | |

Table 6.2D.3.4.1-11a: Test frequencies for NS\_27 (SCS=15 kHz, ΔFRaster = 15kHz)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] | *k*SSB | Offset Carrier CORESET#0  [RBs]  Note 2 | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA(SIB1)  [PRBs]  Note 1 |
| 15 | 79 | 3557.52 | 637168 | 3550.41 | 636694 | 0 | 30 | 7884 | 636960 | 2 | 0 | 0 (2) | 2 |
|  |  | 3562.5 | 637500 | 3555.39 | 637026 |  |  | 7888 | 637344 | 6 | 0 | 1 (6) | 6 |
|  |  | 3687.48 | 645832 | 3680.37 | 645358 |  |  | 7975 | 645696 | 2 | 2 | 1 (6) | 8 |
|  |  | 3692.49 | 646166 | 3685.38 | 645692 |  |  | 7978 | 645984 | 4 | 2 | 0 (2) | 4 |
| 20 | 106 | 3560.01 | 637334 | 3550.47 | 636698 |  |  | 7885 | 637056 | 10 | 3 | 1 (6) | 9 |
|  |  | 3570 | 638000 | 3560.46 | 637364 |  |  | 7891 | 637632 | 4 | 0 | 0 (2) | 2 |
|  |  | 3679.98 | 645332 | 3670.44 | 644696 |  |  | 7968 | 645024 | 4 | 1 | 1 (6) | 7 |
|  |  | 3690 | 646000 | 3680.46 | 645364 |  |  | 7975 | 645696 | 8 | 1 | 1 (6) | 7 |
| 40 | 216 | 3570 | 638000 | 3550.56 | 636704 |  |  | 7885 | 637056 | 4 | 3 | 1 (6) | 9 |
|  |  | 3600 | 640000 | 3580.56 | 638704 |  |  | 7905 | 638976 | 8 | 0 | 0 (2) | 2 |
|  |  | 3649.98 | 643332 | 3630.54 | 642036 |  |  | 7940 | 642336 | 0 | 3 | 0 (2) | 5 |
|  |  | 3679.98 | 645332 | 3660.54 | 644036 |  |  | 7961 | 644352 | 4 | 0 | 1 (6) | 6 |
| NOTE 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  NOTE 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | |

Table 6.2D.3.4.1-11b: Test frequencies for NS\_27 (SCS=30 kHz, ΔFRaster = 30 kHz)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CBW [MHz] | *carrierBandwidth*  [PRBs] | Carrier centre  [MHz] | Carrier centre  [ARFCN] | point A [MHz] | *absoluteFrequencyPointA*[ARFCN] | *offsetToCarrier* [Carrier PRBs] | SS block SCS  [kHz] | GSCN | *absoluteFrequencySSB*  [ARFCN] | *k*SSB | Offset Carrier CORESET#0  [RBs]  Note 2 | CORESET#0 Index (Offset  [RBs])  Note 1 | offsetToPointA(SIB1)  [PRBs]  Note 1 |
| 15 | 38 | 3557.52 | 637168 | 3550.68 | 636712 | 0 | 30 | 7884 | 636960 | 8 | 0 | 0 (0) | 0 |
|  |  | 3562.5 | 637500 | 3555.66 | 637044 |  |  | 7888 | 637344 | 12 | 0 | 2 (2) | 4 |
|  |  | 3687.48 | 645832 | 3680.64 | 645376 |  |  | 7975 | 645696 | 8 | 0 | 3 (3) | 6 |
|  |  | 3692.49 | 646166 | 3685.65 | 645710 |  |  | 7978 | 645984 | 10 | 0 | 1 (1) | 2 |
| 20 | 51 | 3560.01 | 637334 | 3550.83 | 636722 |  |  | 7885 | 637056 | 22 | 0 | 3 (3) | 6 |
|  |  | 3570 | 638000 | 3560.82 | 637388 |  |  | 7891 | 637632 | 4 | 0 | 0 (0) | 0 |
|  |  | 3679.98 | 645332 | 3670.8 | 644720 |  |  | 7968 | 645024 | 16 | 0 | 2 (2) | 4 |
|  |  | 3690 | 646000 | 3680.82 | 645388 |  |  | 7975 | 645696 | 20 | 0 | 2 (2) | 4 |
| 40 | 106 | 3570 | 638000 | 3550.92 | 636728 |  |  | 7885 | 637056 | 16 | 0 | 3 (3) | 6 |
|  |  | 3600 | 640000 | 3580.92 | 638728 |  |  | 7905 | 638976 | 8 | 0 | 0 (0) | 0 |
|  |  | 3649.98 | 643332 | 3630.9 | 642060 |  |  | 7940 | 642336 | 12 | 0 | 1 (1) | 2 |
|  |  | 3679.98 | 645332 | 3660.9 | 644060 |  |  | 7961 | 644352 | 4 | 0 | 2 (2) | 4 |
| NOTE 1: The CORESET#0 Index and the associated CORESET#0 Offset refers to Table 13-1 in TS 38.213 [22]. The value of CORESET#0 Index is signalled in controlResourceSetZero (pdcch-ConfigSIB1) in the MIB. The offsetToPointA IE is expressed in units of resource blocks assuming 15 kHz subcarrier spacing for FR1 and 60 kHz subcarrier spacing for FR2.  NOTE 2: The parameter Offset Carrier CORESET#0 specifies the offset from the lowest subcarrier of the carrier and the lowest subcarrier of CORESET#0. It corresponds to the parameter ΔFOffsetCORESET-0-Carrier in Annex C expressed in number of common RBs. | | | | | | | | | | | | | |

Table 6.2D.3.4.1-12: Test Configuration table for NS\_56

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | | Normal | | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | Use uplink carrier center frequency (Fc) as specified in test parameters | | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | 5 MHz, 10 MHz as specified in test parameters | | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | | Lowest, Highest unless otherwise specified in test parameters. | | | |
| A-MPR test parameters for NS\_56 | | | | | | | | | | | |
| Test ID | Fc  (MHz) | ChBw (MHz) | SCS (kHz) | Downlink Config. | A-MPR | Uplink Configuration | | | | | |
| Modulation  (NOTE 2) | | | RB allocation (Note 1) | | |
| SCS 15 kHz | SCS 30 kHz | SCS 60 kHz |
| 1 | Low | 5 | 15 | N/A for A-MPR testing | 14 | CP-OFDM | QPSK | | Edge\_1RB\_Left | N/A | N/A |
| 2 | Low | 5 | 30 | 8 | QPSK | | N/A | Edge\_1RB\_Left | N/A |
| 3 | Low | 5 | Default | 6 | QPSK | | Outer\_Full | Outer\_Full | N/A |
| 4 | Low | 5 | Default | 4 | QPSK | | 21@4 | 8@3 | N/A |
| 5 | Low | 5 | Default | 4 | QPSK | | 1@4 | 1@3 | N/A |
| 6 | Low | 5 | 15 | 14 | 16 QAM | | Edge\_1RB\_Left | N/A | N/A |
| 7 | Low | 5 | 30 | 8 | 16 QAM | | N/A | Edge\_1RB\_Left | N/A |
| 8 | Low | 5 | Default | 6 | 16 QAM | | Outer\_Full | Outer\_Full | N/A |
| 9 | Low | 5 | Default | 4 | 16 QAM | | 21@4 | 8@3 | N/A |
| 10 | Low | 5 | Default | 4 | 16 QAM | | 1@4 | 1@3 | N/A |
| 11 | Low | 5 | 15 | 14 | 64 QAM | | Edge\_1RB\_Left | N/A | N/A |
| 12 | Low | 5 | 30 | 8 | 64 QAM | | N/A | Edge\_1RB\_Left | N/A |
| 13 | Low | 5 | Default | 6 | 64 QAM | | Outer\_Full | Outer\_Full | N/A |
| 14 | Low | 5 | Default | 4 | 64 QAM | | 21@4 | 8@3 | N/A |
| 15 | Low | 5 | Default | 4 | 64 QAM | | 1@4 | 1@3 | N/A |
| 16 | Low | 5 | 15 | 14 | 256 QAM | | Edge\_1RB\_Left | N/A | N/A |
| 17 | Low | 5 | 30 | 8 | 256 QAM | | N/A | Edge\_1RB\_Left | N/A |
| 18 | Low | 5 | Default | 6 | 256 QAM | | Outer\_Full | Outer\_Full | N/A |
| 19 | Low | 5 | Default | 4 | 256 QAM | | 21@4 | 8@3 | N/A |
| 20 | Low | 5 | Default | 4 | 256 QAM | | 1@4 | 1@3 | N/A |
| 21 | Low | 10 | 15 | 12 | QPSK | | Edge\_1RB\_Left | N/A | N/A |
| 22 | Low | 10 | Highest | 8 | QPSK | | N/A | Edge\_1RB\_Left | Edge\_1RB\_Left |
| 23 | Low | 10 | Default | 8 | QPSK | | Outer\_Full | Outer\_Full | Outer\_Full |
| 24 | Low | 10 | Default | 6 | QPSK | | 1@3 | 1@2 | 1@1 |
| 25 | Low | 10 | Default | 6 | QPSK | | 43@9 | 19@5 | 8@2 |
| 26 | Low | 10 | Default | 4 | QPSK | | 1@35 | 1@17 | 1@8 |
| 27 | Low | 10 | Default | 2 | QPSK | | 17@35 | 5@19 | 3@8 |
| 28 | Low | 10 | Default | 5 | QPSK | | Edge\_1RB\_Right | Edge\_1RB\_Right | Edge\_1RB\_Right |
| 29 | Low | 10 | 15 | 5 | QPSK | | 1@40 | N/A | N/A |
| 30 | Low | 10 | 30 | 5 | QPSK | | N/A | 1@20 | N/A |
| 31 | Low | 10 | 15 | 3 | QPSK | | 8@44 | N/A | N/A |
| 32 | Low | 10 | 15 | 12 | 16 QAM | | Edge\_1RB\_Left | N/A | N/A |
| 33 | Low | 10 | Highest | 8 | 16 QAM | | N/A | Edge\_1RB\_Left | Edge\_1RB\_Left |
| 34 | Low | 10 | Default | 8 | 16 QAM | | Outer\_Full | Outer\_Full | Outer\_Full |
| 35 | Low | 10 | Default | 6 | 16 QAM | | 1@3 | 1@2 | 1@1 |
| 36 | Low | 10 | Default | 6 | 16 QAM | | 43@9 | 19@5 | 8@2 |
| 37 | Low | 10 | Default | 4 | 16 QAM | | 1@35 | 1@17 | 1@8 |
| 38 | Low | 10 | Default | 2 | 16 QAM | | 17@35 | 5@19 | 3@8 |
| 39 | Low | 10 | Default | 5 | 16 QAM | | Edge\_1RB\_Right | Edge\_1RB\_Right | Edge\_1RB\_Right |
| 40 | Low | 10 | 15 | 5 | 16 QAM | | 1@40 | N/A | N/A |
| 41 | Low | 10 | 30 | 5 | 16 QAM | | N/A | 1@20 | N/A |
| 42 | Low | 10 | 15 | 3 | 16 QAM | | 8@44 | N/A | N/A |
| 43 | Low | 10 | 15 | 12 | 64 QAM | | Edge\_1RB\_Left | N/A | N/A |
| 44 | Low | 10 | Highest | 8 | 64 QAM | | N/A | Edge\_1RB\_Left | Edge\_1RB\_Left |
| 45 | Low | 10 | Default | 8 | 64 QAM | | Outer\_Full | Outer\_Full | Outer\_Full |
| 46 | Low | 10 | Default | 6 | 64 QAM | | 1@3 | 1@2 | 1@1 |
| 47 | Low | 10 | Default | 6 | 64 QAM | | 43@9 | 19@5 | 8@2 |
| 48 | Low | 10 | Default | 4 | 64 QAM | | 1@35 | 1@17 | 1@8 |
| 49 | Low | 10 | Default | 2 | 64 QAM | | 17@35 | 5@19 | 3@8 |
| 50 | Low | 10 | Default | 5 | 64 QAM | | Edge\_1RB\_Right | Edge\_1RB\_Right | Edge\_1RB\_Right |
| 51 | Low | 10 | 15 | 5 | 64 QAM | | 1@40 | N/A | N/A |
| 52 | Low | 10 | 30 | 5 | 64 QAM | | N/A | 1@20 | N/A |
| 53 | Low | 10 | 15 | 3 | 64 QAM | | 8@44 | N/A | N/A |
| 54 | Low | 10 | 15 | 12 | 256 QAM | | Edge\_1RB\_Left | N/A | N/A |
| 55 | Low | 10 | Highest | 8 | 256 QAM | | N/A | Edge\_1RB\_Left | Edge\_1RB\_Left |
| 56 | Low | 10 | Default | 8 | 256 QAM | | Outer\_Full | Outer\_Full | Outer\_Full |
| 57 | Low | 10 | Default | 6 | 256 QAM | | 1@3 | 1@2 | 1@1 |
| 58 | Low | 10 | Default | 6 | 256 QAM | | 43@9 | 19@5 | 8@2 |
| 59 | Low | 10 | Default | 4 | 256 QAM | | 1@35 | 1@17 | 1@8 |
| 60 | Low | 10 | Default | 2 | 256 QAM | | 17@35 | 5@19 | 3@8 |
| 61 | Low | 10 | Default | 5 | 256 QAM | | Edge\_1RB\_Right | Edge\_1RB\_Right | Edge\_1RB\_Right |
| 62 | Low | 10 | 15 | 5 | 256 QAM | | 1@40 | N/A | N/A |
| 63 | Low | 10 | 30 | 5 | 256 QAM | | N/A | 1@20 | N/A |
| 64 | Low | 10 | 15 | 3 | 256 QAM | | 8@44 | N/A | N/A |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table. | | | | | | | | | | | |

Table 6.2D.3.4.1-13: Test Configuration table for NS\_50

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | Normal | | | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | (See Freq column for test frequency, and configuration detail specified in Table 6.2.3.4.1-32a, Table 6.2.3.4.1-32a and Table 6.2.3.4.1-32c) | | | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | 25 MHz, 30MHz, 40MHz | | | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | Lowest, Highest | | | | |
| A-MPR test parameters for NS\_50 (Power Class 3) | | | | | | | | | | | |
| Test ID | Fc (MHz) | Ch BW (MHz) | SCS (kHz) | Downlink Configuration | Uplink Configuration | | | | | | |
| Modulation  (Note 2) | | RB allocation (Note 1) | | | | |
| SCS 15 kHz | SCS 30 kHz | | SCS 60 kHz | |
| 1 | 1897.5 | 25 | Default | N/A | CP-OFDM | QPSK | Outer\_Full (A7) | | | | |
| 2 | 1897.5 | 25 | Default | QPSK | [Edge\_1RB\_left](mailto:1@0) (A8) | | | | |
| 3 | 1897.5 | 25 | Default | QPSK | 20@0 (A9) | | 10@0 (A9) | | 5@0 (A9) |
| 4 | 1900 | 30 | Default | QPSK | Outer\_Full (A7) | | | | |
| 5 | 1900 | 30 | Default | QPSK | [Edge\_1RB\_left](mailto:1@0) (A8) | | | | |
| 6 | 1900 | 30 | Default | QPSK | 20@0 (A9) | | 10@0 (A9) | | 5@0 (A9) |
| 7 | 1900 | 40 | Default | QPSK | Outer\_Full (A1) | | | | |
| 8 | 1900 | 40 | Default | QPSK | 60@25 (A3) | | 30@13 (A3) | | 15@7 (A3) |
| 9 | 1900 | 40 | Default | QPSK | 191@25 (A2) | | 93@13 (A2) | | 44@7 (A2) |
| 10 | 1900 | 40 | Default | QPSK | 115@101 (A6) | | 55@51 (A6) | | 25@26 (A6) |
| 11 | 1900 | 40 | Default | QPSK | 39@177 (A5) | | 17@89 (A5) | | 6@45 (A5) |
| 12 | 1897.5 | 25 | Default | 256 QAM | Outer\_Full (A7) | | | | |
| 13 | 1897.5 | 25 | Default | 256 QAM | [Edge\_1RB\_left](mailto:1@0) (A8) | | | | |
| 14 | 1897.5 | 25 | Default | 256 QAM | 20@0 (A9) | | 10@0 (A9) | | 5@0 (A9) |
| 15 | 1900 | 30 | Default | 256 QAM | Outer\_Full (A7) | | | | |
| 16 | 1900 | 30 | Default | 256 QAM | [Edge\_1RB\_left](mailto:1@0) (A8) | | | | |
| 17 | 1900 | 30 | Default | 256 QAM | 20@0 (A9) | | 10@0 (A9) | | 5@0 (A9) |
| 18 | Low | 40 | Default | 256 QAM | Outer\_Full (A1) | | | | |
| 19 | Low | 40 | Default | 256 QAM | 60@25 (A3) | | 30@13 (A3) | | 15@7 (A3) |
| 20 | Low | 40 | Default | 256 QAM | 191@25 (A2) | | 93@13 (A2) | | 44@7 (A2) |
| 21 | Low | 40 | Default | 256 QAM | 115@101 (A6) | | 55@51 (A6) | | 25@26 (A6) |
| 22 | Low | 40 | Default | 256 QAM | 39@177 (A5) | | 17@89 (A5) | | 6@45 (A5) |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table. | | | | | | | | | | | |

Editor’s note: The following lines belong at the end of subclause 6.2D.3.4.1. As new tables are added to this section, these lines should always follow the tables

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.2 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2 and uplink signals according Annex G.0, G.1, G.2 and G.3.0.

4. The UL Reference Measurement channels are set according to the applicable Table in clause 6.2D.3.4.1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2D.3.4.3.

6.2D.3.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to applicable table in clause 6.2D.3.4.1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE. Allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the sum of the mean power of the UE at each transmit antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms over all active uplink slots and in the uplink symbols. For TDD slots only slots consisting of only UL symbols are under.

4. If UE supports ULFPTx, repeat test steps 1~3 with UL RMC according to relevant configuration tables. The PDCCH DCI format 0\_1 is specified with the condition ULFPTx\_Mode1, ULFPTx\_Mode2 or ULFPTx\_ModeFull in 38.508-1 [5] subclause 4.3.6.1.1.2 depending on UE reported capability. Message contents are according to TS 38.508-1 [5] clause 4.6.3 Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED.

6.2D.3.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6.1 ensuring Table 4.6.3-182 with the condition 2TX\_UL\_MIMO, with the following exceptions for each network signalling value.

6.2D.3.4.3.1 Message contents exceptions for network signalling value "NS\_04"

1. Information element additionalSpectrumEmission is set to NS\_04. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.1-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_04"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_04) |  |  |

6.2D.3.4.3.2 Message contents exceptions for network signalling value "NS\_35"

1. Information element additionalSpectrumEmission is set to NS\_35. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.2-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_35" and NR band n71

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_35) |  |  |

6.2D.3.4.3.3 Message contents exceptions for network signalling value "NS\_05"

1. Information element additionalSpectrumEmission is set to NS\_05. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.3-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_05"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 2 (NS\_05) |  |  |

6.2D.3.4.3.4 Message contents exceptions for network signalling value "NS\_05U"

1. Information element additionalSpectrumEmission is set to NS\_05U. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.4-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_05U"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 3 (NS\_05U) |  |  |

6.2D.3.4.3.5 Message contents exceptions for network signalling value "NS\_48"

1. Information element additionalSpectrumEmission is set to NS\_48. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.5-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_48"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 4 (NS\_48) |  |  |

6.2D.3.4.3.6 Message contents exceptions for network signalling value "NS\_49"

1. Information element additionalSpectrumEmission is set to NS\_49. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.6-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_49"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 5 (NS\_49) |  |  |

6.2D.3.4.3.7 Message contents exceptions for network signalling value "NS\_100"

1. Information element additionalSpectrumEmission is set to NS\_100. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.7-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_100"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_100) |  | not for band n65 |
| 2 (NS\_100) |  | for band n65 |

6.2D.3.4.3.8 Message contents exceptions for network signalling value “NS\_03”

1. Information element additionalSpectrumEmission is set to NS\_03. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.8-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_03" and NR band n2, n25 and n66

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 2 (NS\_03) |  |  |

Table 6.2D.3.4.3.8-2: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_03" and NR band n70

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_03) |  |  |

6.2D.3.4.3.9 Message contents exceptions for network signalling value "NS\_03U"

1. Information element additionalSpectrumEmission is set to NS\_03U. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.9-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_03U"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 3 (NS\_03U) |  | for band n2, n25, n66 |

6.2D.3.4.3.10 Message contents exceptions for network signalling value "NS\_46"

1. Information element additionalSpectrumEmission is set to NS\_46. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.10-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_46"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_46) |  | for band n7 |

6.2D.3.4.3.11 Message contents exceptions for network signalling value "NS\_21"

1. Information element additionalSpectrumEmission is set to NS\_21. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.11-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_21"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_21) |  |  |

6.2D.3.4.3.12 Message contents exceptions for network signalling value "NS\_44"

1. Information element additionalSpectrumEmission is set to NS\_44. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.12-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_44"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_44) |  |  |

6.2D.3.4.3.13 Message contents exceptions for network signalling value "NS\_27"

1. Information element additionalSpectrumEmission is set to NS\_27. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.13-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_27"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_27) |  |  |

6.2D.3.4.3.14 Message contents exceptions for network signalling value "NS\_56"

1. Information element additionalSpectrumEmission is set to NS\_56. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.14-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_56"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_56) |  |  |

6.2D.3.4.3.15 Message contents exceptions for network signalling value "NS\_50"

1. Information element additionalSpectrumEmission is set to NS\_50. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3.4.3.15-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_50"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_50) |  |  |

6.2D.3.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in the applicable table from table 6.2D.3.5-1 to table 6.2D.3.5-14. The allowed A-MPR values specified in table 6.2.3.3.1-1 are in addition to the allowed MPR requirements specified in clause 6.2.2.3. For the UE maximum output power modified by MPR and/or A-MPR, the power limits specified in table 6.2D.1.3-1 apply.

Table 6.2D.3.5-0: Test Tolerance (UE additional maximum output power reduction)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 | 1.0 |
| 40MHz < BW ≤ 100MHz | 1.0 | 1.0 |

Table 6.2D.3.5-1: UE Power Class 2 test requirements (NS\_04) for band n41

| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (Note 2)(dBm) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 26 | 4 | 7.5 | 1.52 | 17 | 5 | 3 | 28+TT | 12.0-TT |
| 2 | 26 | 4 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 3 | 26 | 4 | 0 | 0 | 22 | 5 | 3 | 28+TT | 17.0-TT |
| 4 | 26 | 3.5 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 5 | 26 | 4 | 0 | 1.52 | 20.5 | 6 | 3 | 28+TT | 14.5-TT |
| 6 | 26 | 3.5 | 0 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 7 | 26 | 4 | 7.5 | 1.52 | 17 | 5 | 3 | 28+TT | 12.0-TT |
| 8 | 26 | 4 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 9 | 26 | 4 | 0 | 0 | 22 | 5 | 3 | 28+TT | 17.0-TT |
| 10 | 26 | 3.5 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 11 | 26 | 4 | 0 | 1.52 | 20.5 | 6 | 3 | 28+TT | 14.5-TT |
| 12 | 26 | 3.5 | 0 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 13 | 26 | 4.5 | 7.5 | 1.52 | 17 | 5 | 3 | 28+TT | 12.0-TT |
| 14 | 26 | 4.5 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 15 | 26 | 4.5 | 0 | 0 | 21.5 | 5 | 3 | 28+TT | 16.5-TT |
| 16 | 26 | 4.5 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 17 | 26 | 4.5 | 0 | 1.52 | 20 | 6 | 3 | 28+TT | 14.0-TT |
| 18 | 26 | 4.5 | 0 | 0 | 21.5 | 5 | 3 | 28+TT | 16.5-TT |
| 19 | 26 | 8 | 10 | 1.52 | 14.5 | 6 | 3 | 28+TT | 8.5-TT |
| 20 | 26 | 8 | 7.5 | 0 | 18 | 5 | 3 | 28+TT | 13.0-TT |
| 21 | 26 | 8 | 0 | 0 | 18 | 5 | 3 | 28+TT | 13.0-TT |
| 22 | 26 | 8 | 7.5 | 0 | 18 | 5 | 3 | 28+TT | 13.0-TT |
| 23 | 26 | 8 | 0 | 1.52 | 16.5 | 5 | 3 | 28+TT | 11.5-TT |
| 24 | 26 | 8 | 0 | 0 | 18 | 5 | 3 | 28+TT | 13.0-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the lower limit shall be decreased by 1.5 dB.  NOTE 3: TT=0.7 for BWchannel ≤ 40 MHz; TT=1.0 for 40 MHz < BWchannel ≤ 100 MHz. | | | | | | | | | |

Table 6.2D.3.5-1a: UE Power Class 2 test requirements (NS\_04) for band n41 with supporting ULFPTx

| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (Note 2)(dBm) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | 26 | 3.5 | 5.5 | 1.52 | 19 | 5 | 3 | 28+TT | 14.-TT |
| 8 | 26 | 3.5 | 3.5 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 9 | 26 | 3.5 | 0 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 10 | 26 | 1 | 3.5 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 11 | 26 | 3.5 | 0 | 1.52 | 21 | 5 | 3 | 28+TT | 16.-TT |
| 12 | 26 | 1 | 0 | 0 | 25 | 3 | 3 | 28+TT | 22.-TT |
| 13 | 26 | 3.5 | 6 | 1.52 | 18.5 | 5 | 3 | 28+TT | 13.5-TT |
| 14 | 26 | 3.5 | 4.5 | 0 | 21.5 | 5 | 3 | 28+TT | 16.5-TT |
| 15 | 26 | 3.5 | 0 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 16 | 26 | 2 | 4.5 | 0 | 21.5 | 5 | 3 | 28+TT | 16.5-TT |
| 17 | 26 | 3.5 | 0 | 1.52 | 21 | 5 | 3 | 28+TT | 16.-TT |
| 18 | 26 | 2 | 0 | 0 | 24 | 3 | 3 | 28+TT | 21.-TT |
| 19 | 26 | 3.5 | 6 | 1.52 | 18.5 | 5 | 3 | 28+TT | 13.5-TT |
| 20 | 26 | 3.5 | 5 | 0 | 21 | 5 | 3 | 28+TT | 16.-TT |
| 21 | 26 | 3.5 | 0 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 22 | 26 | 2.5 | 5 | 0 | 21 | 5 | 3 | 28+TT | 16.-TT |
| 23 | 26 | 3.5 | 0 | 1.52 | 21 | 5 | 3 | 28+TT | 16.-TT |
| 24 | 26 | 2.5 | 0 | 0 | 23.5 | 3 | 3 | 28+TT | 20.5-TT |
| 25 | 26 | 3.5 | 6.5 | 1.52 | 18 | 5 | 3 | 28+TT | 13.-TT |
| 26 | 26 | 3.5 | 5 | 0 | 21 | 5 | 3 | 28+TT | 16.-TT |
| 27 | 26 | 3.5 | 0 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 28 | 26 | 3 | 5 | 0 | 21 | 5 | 3 | 28+TT | 16.-TT |
| 29 | 26 | 3.5 | 0 | 1.52 | 21 | 5 | 3 | 28+TT | 16.-TT |
| 30 | 26 | 3 | 0 | 0 | 23 | 3 | 3 | 28+TT | 20.-TT |
| 31 | 26 | 5.5 | 8 | 1.52 | 16.5 | 5 | 3 | 28+TT | 11.5-TT |
| 32 | 26 | 5.5 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 33 | 26 | 5.5 | 0 | 0 | 20.5 | 6 | 3 | 28+TT | 14.5-TT |
| 34 | 26 | 5.5 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 35 | 26 | 5.5 | 0 | 1.52 | 19 | 5 | 3 | 28+TT | 14.-TT |
| 36 | 26 | 5.5 | 0 | 0 | 20.5 | 6 | 3 | 28+TT | 14.5-TT |
| 37 | 26 | 4 | 7.5 | 1.52 | 17 | 5 | 3 | 28+TT | 12.-TT |
| 38 | 26 | 4 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 39 | 26 | 4 | 0 | 0 | 22 | 5 | 3 | 28+TT | 17.-TT |
| 40 | 26 | 3.5 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 41 | 26 | 4 | 0 | 1.52 | 20.5 | 6 | 3 | 28+TT | 14.5-TT |
| 42 | 26 | 3.5 | 0 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 43 | 26 | 4 | 7.5 | 1.52 | 17 | 5 | 3 | 28+TT | 12.-TT |
| 44 | 26 | 4 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 45 | 26 | 4 | 0 | 0 | 22 | 5 | 3 | 28+TT | 17.-TT |
| 46 | 26 | 3.5 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 47 | 26 | 4 | 0 | 1.52 | 20.5 | 6 | 3 | 28+TT | 14.5-TT |
| 48 | 26 | 3.5 | 0 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 49 | 26 | 4.5 | 7.5 | 1.52 | 17 | 5 | 3 | 28+TT | 12.-TT |
| 50 | 26 | 4.5 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 51 | 26 | 4.5 | 0 | 0 | 21.5 | 5 | 3 | 28+TT | 16.5-TT |
| 52 | 26 | 4.5 | 6.5 | 0 | 19.5 | 5 | 3 | 28+TT | 14.5-TT |
| 53 | 26 | 4.5 | 0 | 1.52 | 20 | 6 | 3 | 28+TT | 14.-TT |
| 54 | 26 | 4.5 | 0 | 0 | 21.5 | 5 | 3 | 28+TT | 16.5-TT |
| 55 | 26 | 8 | 10 | 1.52 | 14.5 | 6 | 3 | 28+TT | 8.5-TT |
| 56 | 26 | 8 | 7.5 | 0 | 18 | 5 | 3 | 28+TT | 13.-TT |
| 57 | 26 | 8 | 0 | 0 | 18 | 5 | 3 | 28+TT | 13.-TT |
| 58 | 26 | 8 | 7.5 | 0 | 18 | 5 | 3 | 28+TT | 13.-TT |
| 59 | 26 | 8 | 0 | 1.52 | 16.5 | 5 | 3 | 28+TT | 11.5-TT |
| 60 | 26 | 8 | 0 | 0 | 18 | 5 | 3 | 28+TT | 13.-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the lower limit shall be decreased by 1.5 dB.  NOTE 3: TT=0.7 for BWchannel ≤ 40 MHz; TT=1.0 for 40 MHz < BWchannel ≤ 100 MHz. | | | | | | | | | |

Table 6.2D.3.5-2: UE Power Class 3 test requirements (NS\_04) for band n41

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (Note 2)(dBm) |
| 1 | 23 | 3 | 5.5 | 1.52 | 16 | 5 | 3 | 25+TT | 11.0-TT |
| 2 | 23 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 3 | 23 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.0-TT |
| 4 | 23 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 5 | 23 | 3 | 0 | 1.52 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 6 | 23 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.0-TT |
| 7 | 23 | 3 | 5.5 | 1.52 | 16 | 5 | 3 | 25+TT | 11.0-TT |
| 8 | 23 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 9 | 23 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.0-TT |
| 10 | 23 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 11 | 23 | 3 | 0 | 1.52 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 12 | 23 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.0-TT |
| 13 | 23 | 3.5 | 5.5 | 1.52 | 16 | 5 | 3 | 25+TT | 11.0-TT |
| 14 | 23 | 3.5 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 15 | 23 | 3.5 | 0 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 16 | 23 | 3.5 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 17 | 23 | 3.5 | 0 | 1.52 | 18 | 5 | 3 | 25+TT | 13.0-TT |
| 18 | 23 | 3.5 | 0 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 19 | 23 | 6.5 | 8 | 1.52 | 13.5 | 6 | 3 | 25+TT | 7.5-TT |
| 20 | 23 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 21 | 23 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 22 | 23 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 23 | 23 | 6.5 | 0 | 1.52 | 15 | 6 | 3 | 25+TT | 9.0-TT |
| 24 | 23 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the lower limit shall be decreased by 1.5 dB.  NOTE 3: TT=0.7 for BWchannel ≤ 40 MHz; TT=1.0 for 40 MHz < BWchannel ≤ 100 MHz. | | | | | | | | | |

Table 6.2D.3.5-2a: UE Power Class 3 test requirements (NS\_04) for band n41 with supporting ULFPTx

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | ΔPPowerClass  (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (Note 2)(dBm) |
| 1 | 23 | -3 | 3.5 | 3.5 | 1.52 | 21 | 5 | 3 | 28+TT | 16.-TT |
| 2 | 23 | -3 | 3.5 | 3.5 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 3 | 23 | -3 | 3.5 | 0 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 4 | 23 | -3 | 1.2 | 3.5 | 0 | 22.5 | 5 | 3 | 28+TT | 17.5-TT |
| 5 | 23 | -3 | 3.5 | 0 | 1.52 | 21 | 5 | 3 | 28+TT | 16.-TT |
| 6 | 23 | -3 | 1.2 | 0 | 0 | 24.8 | 3 | 3 | 28+TT | 21.8-TT |
| 7 | 23 | 0 | 0.5 | 3.5 | 1.52 | 18 | 5 | 3 | 25+TT | 13.-TT |
| 8 | 23 | 0 | 0.5 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 9 | 23 | 0 | 0.5 | 0 | 0 | 22.5 | 5 | 3 | 25+TT | 17.5-TT |
| 10 | 23 | 0 | 0.5 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 11 | 23 | 0 | 0.5 | 0 | 1.52 | 21 | 5 | 3 | 25+TT | 16.-TT |
| 12 | 23 | 0 | 0.5 | 0 | 0 | 22.5 | 5 | 3 | 25+TT | 17.5-TT |
| 13 | 23 | 0 | 1 | 4 | 1.52 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 14 | 23 | 0 | 1 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14.-TT |
| 15 | 23 | 0 | 1 | 0 | 0 | 22 | 5 | 3 | 25+TT | 17.-TT |
| 16 | 23 | 0 | 1 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14.-TT |
| 17 | 23 | 0 | 1 | 0 | 1.52 | 20.5 | 6 | 3 | 25+TT | 14.5-TT |
| 18 | 23 | 0 | 1 | 0 | 0 | 22 | 5 | 3 | 25+TT | 17.-TT |
| 19 | 23 | 0 | 2 | 4 | 1.52 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 20 | 23 | 0 | 2 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14.-TT |
| 21 | 23 | 0 | 2 | 0 | 0 | 21 | 5 | 3 | 25+TT | 16.-TT |
| 22 | 23 | 0 | 2 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14.-TT |
| 23 | 23 | 0 | 2 | 0 | 1.52 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 24 | 23 | 0 | 2 | 0 | 0 | 21 | 5 | 3 | 25+TT | 16.-TT |
| 25 | 23 | 0 | 2.5 | 4.5 | 1.52 | 17 | 5 | 3 | 25+TT | 12.-TT |
| 26 | 23 | 0 | 2.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14.-TT |
| 27 | 23 | 0 | 2.5 | 0 | 0 | 20.5 | 6 | 3 | 25+TT | 14.5-TT |
| 28 | 23 | 0 | 2.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14.-TT |
| 29 | 23 | 0 | 2.5 | 0 | 1.52 | 19 | 5 | 3 | 25+TT | 14.-TT |
| 30 | 23 | 0 | 2.5 | 0 | 0 | 20.5 | 6 | 3 | 25+TT | 14.5-TT |
| 31 | 23 | 0 | 4.5 | 6 | 1.52 | 15.5 | 6 | 3 | 25+TT | 9.5-TT |
| 32 | 23 | 0 | 4.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 33 | 23 | 0 | 4.5 | 0 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 34 | 23 | 0 | 4.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 35 | 23 | 0 | 4.5 | 0 | 1.52 | 17 | 5 | 3 | 25+TT | 12.-TT |
| 36 | 23 | 0 | 4.5 | 0 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 37 | 23 | 0 | 3 | 5.5 | 1.52 | 16 | 5 | 3 | 25+TT | 11.-TT |
| 38 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 39 | 23 | 0 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.-TT |
| 40 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 41 | 23 | 0 | 3 | 0 | 1.52 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 42 | 23 | 0 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.-TT |
| 43 | 23 | 0 | 3 | 5.5 | 1.52 | 16 | 5 | 3 | 25+TT | 11.-TT |
| 44 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 45 | 23 | 0 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.-TT |
| 46 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 47 | 23 | 0 | 3 | 0 | 1.52 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 48 | 23 | 0 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.-TT |
| 49 | 23 | 0 | 3.5 | 5.5 | 1.52 | 16 | 5 | 3 | 25+TT | 11.-TT |
| 50 | 23 | 0 | 3.5 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 51 | 23 | 0 | 3.5 | 0 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 52 | 23 | 0 | 3.5 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 53 | 23 | 0 | 3.5 | 0 | 1.52 | 18 | 5 | 3 | 25+TT | 13.-TT |
| 54 | 23 | 0 | 3.5 | 0 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 55 | 23 | 0 | 6.5 | 8 | 1.52 | 13.5 | 6 | 3 | 25+TT | 7.5-TT |
| 56 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 57 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 58 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 59 | 23 | 0 | 6.5 | 0 | 1.52 | 15 | 6 | 3 | 25+TT | 9.-TT |
| 60 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the lower limit shall be decreased by 1.5 dB.  NOTE 3: TT=0.7 dB for BWchannel ≤ 40 MHz; TT=1.0 dB for 40 MHz < BWchannel ≤ 100 MHz. | | | | | | | | | | |

Table 6.2D.3.5-3: UE Power Class 3 test requirements (NS\_35) for band n71

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.0 - TT |
| 2 | 23 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.0 - TT |
| 3 | 23 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.0 - TT |
| 4 | 23 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.0 - TT |
| 5 | 23 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.0 - TT |
| 6 | 23 | 3 | 0 | 0 | 20 | 6 | 3 | 25+TT | 14.0 - TT |
| 7 | 23 | 3.5 | 0 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5 - TT |
| 8 | 23 | 3.5 | 0 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5 - TT |
| 9 | 23 | 3.5 | 0 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5 - TT |
| 10 | 23 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5 - TT |
| 11 | 23 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5 - TT |
| 12 | 23 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5 - TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | |

Table 6.2D.3.5-4: UE Power Class 3 test requirements (NS\_05) for band n1

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 0 | 3.0 | 7.5 | 0 | 15.5 | 6 | 3 | 25+TT | 9.5-TT |
| 2 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 3 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 4 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 5 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 6 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 7 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 8 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 9 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 10 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 11 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 12 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 13 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 14 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 15 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 16 | 23 | 0 | 3.0 | 7.5 | 0 | 15.5 | 6 | 3 | 25+TT | 9.5-TT |
| 17 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 18 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 19 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 20 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 21 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 22 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 23 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 24 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 25 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 26 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 27 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 28 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 29 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 30 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 31 | 23 | 0 | 3.5 | 8 | 0 | 15 | 6 | 3 | 25+TT | 9-TT |
| 32 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 33 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 34 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 35 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 36 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 37 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 38 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 39 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 40 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 41 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 42 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 43 | 23 | 0 | 6.5 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 44 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 3 | 25+TT | 3-TT |
| 45 | 23 | 0 | 6.5 | 6 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 46 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 3 | 25+TT | 3-TT |
| 47 | 23 | 0 | 6.5 | 6 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 48 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 3 | 25+TT | 3-TT |
| 49 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 3 | 25+TT | 3-TT |
| 50 | 23 | 0 | 6.5 | 6 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-5: UE Power Class 3 test requirements (NS\_05U) for band n1

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 0 | 3.0 | 7.5 | 0 | 15.5 | 6 | 3 | 25+TT | 9.5-TT |
| 2 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 3 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 4 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 5 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 6 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 7 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 8 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 9 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 10 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 11 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 12 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 13 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 14 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 15 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 16 | 23 | 0 | 3.0 | 7.5 | 0 | 15.5 | 6 | 3 | 25+TT | 9.5-TT |
| 17 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 18 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 19 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 20 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 21 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 22 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 23 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 24 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 25 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 26 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 27 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 28 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 29 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 30 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 31 | 23 | 0 | 3.5 | 8 | 0 | 15 | 6 | 3 | 25+TT | 9-TT |
| 32 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 33 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 34 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 35 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 36 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 37 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 38 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 39 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 40 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 41 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 42 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 43 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 44 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 45 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 46 | 23 | 0 | 6.5 | 10 | 0 | 13 | 6 | 3 | 25+TT | 7-TT |
| 47 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 3 | 25+TT | 3-TT |
| 48 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 49 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 50 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 3 | 25+TT | 3-TT |
| 51 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 52 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 3 | 25+TT | 3-TT |
| 53 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 54 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 3 | 25+TT | 3-TT |
| 55 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 56 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-6: UE Power Class 3 test requirements (NS\_48) for band n1

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 2 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 3 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 4 | 23 | 0 | 3 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 5 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 6 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 7 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 8 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 9 | 23 | 0 | 1.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 10 | 23 | 0 | 3 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 11 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 12 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 13 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 14 | 23 | 0 | 1.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 15 | 23 | 0 | 3 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 16 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 17 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 18 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 19 | 23 | 0 | 6.5 | 5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 20 | 23 | 0 | 6.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 21 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 22 | 23 | 0 | 6.5 | 5.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 23 | 23 | 0 | 6.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 24 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 25 | 23 | 0 | 6.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 26 | 23 | 0 | 6.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 27 | 23 | 0 | 6.5 | 5.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 28 | 23 | 0 | 6.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 29 | 23 | 0 | 6.5 | 5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 30 | 23 | 0 | 6.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-7: UE Power Class 3 test requirements (NS\_49) for band n1

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 2 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 3 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 4 | 23 | 0 | 3 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 5 | 23 | 0 | 3 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 6 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 7 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 8 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 9 | 23 | 0 | 3 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 10 | 23 | 0 | 3 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 11 | 23 | 0 | 1.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 12 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 13 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 14 | 23 | 0 | 1.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 15 | 23 | 0 | 3 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 16 | 23 | 0 | 3 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 17 | 23 | 0 | 1.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 18 | 23 | 0 | 1.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 19 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 20 | 23 | 0 | 3 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 21 | 23 | 0 | 3 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 22 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 23 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 24 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 25 | 23 | 0 | 6.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 26 | 23 | 0 | 6.5 | 5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 27 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 28 | 23 | 0 | 6.5 | 5.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 29 | 23 | 0 | 6.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 30 | 23 | 0 | 6.5 | 5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 31 | 23 | 0 | 6.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 32 | 23 | 0 | 6.5 | 5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 33 | 23 | 0 | 6.5 | 5.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 34 | 23 | 0 | 6.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 35 | 23 | 0 | 6.5 | 5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 36 | 23 | 0 | 6.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 37 | 23 | 0 | 6.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 38 | 23 | 0 | 6.5 | 5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 39 | 23 | 0 | 6.5 | 5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 40 | 23 | 0 | 6.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 41 | 23 | 0 | 6.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 42 | 23 | 0 | 6.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-8: UE Power Class 3 test requirements (NS\_100) for band n1

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1, 2 | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 3 | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 4, 5 | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 6 | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 7, 8 | 23 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 9 | 23 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 10, 11 | 23 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 12 | 23 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | |

Table 6.2D.3.5-9: UE Power Class 3 test requirements (NS\_100) for band n2, n3, n25

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test ID** | **PPowerClass (dBm)** | **MPR (dB)** | **A-MPR (dB)** | **ΔTC,c (dB)** | **PCMAX\_L,c (dBm)** | **T(PCMAX\_L,c) (dB)** | **TL,c (dB)** | **Upper limit (dBm)** | **Lower limit (dBm)** |
| 1, 2 | 23 | 3 | 4 | 1.5 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 3 | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 4, 5 | 23 | 3 | 4 | 1.5 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 6 | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 7, 8 | 23 | 3.5 | 4 | 1.5 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 9 | 23 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 10, 11 | 23 | 6.5 | 6.5 | 1.5 | 15 | 6 | 3 | 25+TT | 9-TT |
| 12 | 23 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | |

Table 6.2D.3.5-9a: UE Power Class 3 test requirements (NS\_100) for band n2, n3, n25 supporting ULFPTx

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | Network signalling label | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1, 2 | NS\_100 | 23 | 0.5 | 2 | 1.5 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 3 | NS\_100 | 23 | 0.5 | 2 | 0 | 21 | 5 | 3 | 25+TT | 16-TT |
| 4, 5 | NS\_100 | 23 | 1 | 2 | 1.5 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 6 | NS\_100 | 23 | 1 | 2 | 0 | 21 | 5 | 3 | 25+TT | 16-TT |
| 7, 8 | NS\_100 | 23 | 2 | 2.5 | 1.5 | 19 | 5 | 3 | 25+TT | 14-TT |
| 9 | NS\_100 | 23 | 2 | 2.5 | 0 | 20.5 | 6 | 3 | 25+TT | 14.5-TT |
| 10, 11 | NS\_100 | 23 | 2.5 | 3 | 1.5 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 12 | NS\_100 | 23 | 2.5 | 3 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 13, 14 | NS\_100 | 23 | 4.5 | 4.5 | 1.5 | 17 | 5 | 3 | 25+TT | 12-TT |
| 15 | NS\_100 | 23 | 4.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 16, 17 | NS\_100 | 23 | 3 | 4 | 1.5 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 18 | NS\_100 | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 19, 20 | NS\_100 | 23 | 3 | 4 | 1.5 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 21 | NS\_100 | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 22, 23 | NS\_100 | 23 | 3.5 | 4 | 1.5 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 24 | NS\_100 | 23 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 25, 26 | NS\_100 | 23 | 6.5 | 6.5 | 1.5 | 15 | 6 | 3 | 25+TT | 9-TT |
| 27 | NS\_100 | 23 | 6.5 | 6.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-10: UE Power Class 3 test requirements (NS\_03/NS\_03U) for band n66, n70

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | Network signalling label | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1,2 | NS\_03, NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 3 | NS\_03, NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 4,5 | NS\_03, NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 6 | NS\_03, NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 7,8 | NS\_03, NS\_03U | 23 | 3.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 9 | NS\_03, NS\_03U | 23 | 3.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 10,11 | NS\_03, NS\_03U | 23 | 6.5 | 7.5 | 0 | 15.5 | 6 | 3 | 25+TT | 9.5-TT |
| 12 | NS\_03, NS\_03U | 23 | 6.5 | 7.5 | 0 | 15.5 | 6 | 3 | 25+TT | 9.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-10a: UE Power Class 3 test requirements (NS\_03/NS\_03U) for band n66, n70 supporting ULFPTx

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | Network signalling label | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1, 2 | NS\_03 | 23 | 0.5 | 1.5 | 0 | 21.5 | 5 | 3 | 25+TT | 16.5-TT |
| NS\_03U | 23 | 0.5 | 2 | 0 | 21 | 5 | 3 | 25+TT | 16-TT |
| 3 | NS\_03 | 23 | 0.5 | 1.5 | 0 | 21.5 | 5 | 3 | 25+TT | 16.5-TT |
| NS\_03U | 23 | 0.5 | 2 | 0 | 21 | 5 | 3 | 25+TT | 16-TT |
| 4, 5 | NS\_03, NS\_03U | 23 | 1 | 2 | 0 | 21 | 5 | 3 | 25+TT | 16-TT |
| 6 | NS\_03, NS\_03U | 23 | 1 | 2 | 0 | 21 | 5 | 3 | 25+TT | 16-TT |
| 7, 8 | NS\_03, NS\_03U | 23 | 2 | 3 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 9 | NS\_03, NS\_03U | 23 | 2 | 3 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 10, 11 | NS\_03, NS\_03U | 23 | 2.5 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 12 | NS\_03, NS\_03U | 23 | 2.5 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 13, 14 | NS\_03, NS\_03U | 23 | 4.5 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 15 | NS\_03, NS\_03U | 23 | 4.5 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 16, 17 | NS\_03, NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 18 | NS\_03, NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 19, 20 | NS\_03, NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 21 | NS\_03, NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 22, 23 | NS\_03, NS\_03U | 23 | 3.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 24 | NS\_03, NS\_03U | 23 | 3.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 25, 26 | NS\_03, NS\_03U | 23 | 6.5 | 7.5 | 0 | 15.5 | 6 | 3 | 25+TT | 9.5-TT |
| 27 | NS\_03, NS\_03U | 23 | 6.5 | 7.5 | 0 | 15.5 | 6 | 3 | 25+TT | 9.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-11: UE Power Class 3 test requirements (NS\_03/NS\_03U) for band n2, n25

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | Network signalling label | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1,2 | NS\_03, NS\_03U | 23 | 3 | 4 | 1.5 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 3 | NS\_03, NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 4,5 | NS\_03, NS\_03U | 23 | 3 | 4 | 1.5 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 6 | NS\_03, NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 7,8 | NS\_03, NS\_03U | 23 | 3.5 | 4.5 | 1.5 | 17 | 5 | 3 | 25+TT | 12-TT |
| 9 | NS\_03, NS\_03U | 23 | 3.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 10,11 | NS\_03, NS\_03U | 23 | 6.5 | 7.5 | 1.5 | 14 | 6 | 3 | 25+TT | 8-TT |
| 12 | NS\_03, NS\_03U | 23 | 6.5 | 7.5 | 0 | 15.5 | rr | 3 | 25+TT | 9.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-11a: UE Power Class 3 test requirements (NS\_03/NS\_03U) for band n2, n25 supporting ULFPTx

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | Network signalling label | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1, 2 | NS\_03 | 23 | 0.5 | 1.5 | 1.5 | 20 | 6 | 3 | 25+TT | 14-TT |
| NS\_03U | 23 | 0.5 | 2 | 1.5 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 3 | NS\_03 | 23 | 0.5 | 1.5 | 0 | 21.5 | 5 | 3 | 25+TT | 16.5-TT |
| NS\_03U | 23 | 0.5 | 2 | 0 | 21 | 5 | 3 | 25+TT | 16-TT |
| 4, 5 | NS\_03; NS\_03U | 23 | 1 | 2 | 1.5 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 6 | NS\_03; NS\_03U | 23 | 1 | 2 | 0 | 21 | 5 | 3 | 25+TT | 16-TT |
| 7, 8 | NS\_03; NS\_03U | 23 | 2 | 3 | 1.5 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 9 | NS\_03; NS\_03U | 23 | 2 | 3 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 10, 11 | NS\_03; NS\_03U | 23 | 2.5 | 3.5 | 1.5 | 18 | 5 | 3 | 25+TT | 13-TT |
| 12 | NS\_03; NS\_03U | 23 | 2.5 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 13, 14 | NS\_03; NS\_03U | 23 | 4.5 | 5.5 | 1.5 | 16 | 5 | 3 | 25+TT | 11-TT |
| 15 | NS\_03; NS\_03U | 23 | 4.5 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 16, 17 | NS\_03; NS\_03U | 23 | 3 | 4 | 1.5 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 18 | NS\_03; NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 19, 20 | NS\_03; NS\_03U | 23 | 3 | 4 | 1.5 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 21 | NS\_03; NS\_03U | 23 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 22, 23 | NS\_03; NS\_03U | 23 | 3.5 | 4.5 | 1.5 | 17 | 5 | 3 | 25+TT | 12-TT |
| 24 | NS\_03; NS\_03U | 23 | 3.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 25, 26 | NS\_03; NS\_03U | 23 | 6.5 | 7.5 | 1.5 | 14 | 6 | 3 | 25+TT | 8-TT |
| 27 | NS\_03; NS\_03U | 23 | 6.5 | 7.5 | 0 | 15.5 | 6 | 3 | 25+TT | 9.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-12: UE Power Class 3 test requirements (NS\_46) for band n7

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 2 | 23 | 0 | 6.5 | 6 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 3 | 23 | 0 | 3 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 4 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 5 | 23 | 0 | 3 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 6 | 23 | 0 | 3.5 | 3.5 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 7 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 8 | 23 | 0 | 3.5 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 9 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 10 | 23 | 0 | 6.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 11 | 23 | 0 | 3 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| 12 | 23 | 0 | 6.5 | 11 | 0 | 12 | 6 | 3 | 25+TT | 6-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-13: UE Power Class 3 test requirements (NS\_21) for band n30

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test ID** | ChBw (MHz) | **PPowerClass (dBm)** | **MPR (dB)** | **A-MPR (dB)** | | **ΔTC,c (dB)** | **PCMAX\_L,c (dBm)** | **T(PCMAX\_L,c) (dB)** | **TL,c (dB)** | **Upper limit (dBm)** | **Lower limit (dBm)** |
| 1,2 | 5 | 23 | 3 | 0 | 0 | | 20 | 6 | 3 | 25+TT | 14-TT |
| 10 | 23 | 3 | 6 | 0 | | 17 | 5 | 3 | 25+TT | 12-TT |
| 3 | 5 | 23 | 3 | 0 | 0 | | 20 | 6 | 3 | 25+TT | 14-TT |
| 10 | 23 | 3 | 5.5 | 0 | | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 4,5 | 10 | 23 | 3 | 4 | 0 | | 19 | 5 | 3 | 25+TT | 14-TT |
| 6,7 | 5 | 23 | 3 | 0 | 0 | | 20 | 6 | 3 | 25+TT | 14-TT |
| 10 | 23 | 3 | 6 | 0 | | 17 | 5 | 3 | 25+TT | 12-TT |
| 8 | 5 | 23 | 3 | 0 | 0 | | 20 | 6 | 3 | 25+TT | 14-TT |
| 10 | 23 | 3 | 5.5 | 0 | | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 9,10 | 10 | 23 | 3 | 4 | 0 | | 19 | 5 | 3 | 25+TT | 14-TT |
| 11,12 | 5 | 23 | 3.5 | 0 | 0 | | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 10 | 23 | 3.5 | 6 | 0 | | 17 | 5 | 3 | 25+TT | 12-TT |
| 13 | 5 | 23 | 3.5 | 0 | 0 | | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 10 | 23 | 3.5 | 5.5 | 0 | | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 14,15 | 10 | 23 | 3.5 | 4 | 0 | | 19 | 5 | 3 | 25+TT | 14-TT |
| 16,17 | 5 | 23 | 6.5 | 0 | 0 | | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 10 | 23 | 6.5 | 6 | 0 | | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 18 | 5 | 23 | 6.5 | 0 | 0 | | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 10 | 23 | 6.5 | 5.5 | 0 | | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 19,20 | 10 | 23 | 6.5 | 4 | 0 | | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | | |

Table 6.2D.3.5-14: UE Power Class 3 test requirements (NS\_44) for band n38

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 2 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 3 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 4 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 5 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 6 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 7 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 8 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 9 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 10 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 11 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 12 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 13 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 14 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 15 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 3 | 25+TT | 13-TT |
| 16 | 23 | 0 | 3.5 | 8 | 0 | 15 | 6 | 3 | 25+TT | 9-TT |
| 17 | 23 | 0 | 3.5 | 12 | 0 | 11 | 6 | 3 | 25+TT | 5-TT |
| 18 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 19 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 20 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 21 | 23 | 0 | 6.5 | 8 | 0 | 15 | 6 | 3 | 25+TT | 9-TT |
| 22 | 23 | 0 | 6.5 | 12 | 0 | 11 | 6 | 3 | 25+TT | 5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

Table 6.2D.3.5-15: UE Power Class 3 test requirements (NS\_27) for band n48

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 2 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 3 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 4 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 5 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 6 | 23 | 0 | 3 | 2 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 7 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 8 | 23 | 0 | 3 | 2 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 9 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 10 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 11 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 12 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 13 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 14 | 23 | 0 | 3 | 2 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 15 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 16 | 23 | 0 | 3 | 2 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 17 | 23 | 0 | 3 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 18 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 19 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 20 | 23 | 0 | 3 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 21 | 23 | 0 | 3 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 22 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 23 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 24 | 23 | 0 | 3 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 25 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 26 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 27 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 28 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 29 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 30 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 31 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 32 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 33 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 34 | 23 | 0 | 3 | 2 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 35 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 36 | 23 | 0 | 3 | 2 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 37 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 38 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 39 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 40 | 23 | 0 | 3 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 41 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 42 | 23 | 0 | 3 | 2 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 43 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 44 | 23 | 0 | 3 | 2 | 0 | 20 | 6 | 3 | 25+TT | 14-TT |
| 45 | 23 | 0 | 3 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 46 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 47 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 48 | 23 | 0 | 3 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 49 | 23 | 0 | 3 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 50 | 23 | 0 | 3 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 51 | 23 | 0 | 3 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 52 | 23 | 0 | 3 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 53 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 54 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 55 | 23 | 0 | 3 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 56 | 23 | 0 | 3 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 57 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 58 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 59 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 60 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 61 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 62 | 23 | 0 | 3.5 | 2 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 63 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 64 | 23 | 0 | 3.5 | 2 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 65 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 66 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 67 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 68 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 3 | 25+TT | 12-TT |
| 69 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 70 | 23 | 0 | 3.5 | 2 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 71 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 72 | 23 | 0 | 3.5 | 2 | 0 | 19.5 | 5 | 3 | 25+TT | 14.5-TT |
| 73 | 23 | 0 | 3.5 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 74 | 23 | 0 | 3.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 75 | 23 | 0 | 3.5 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 76 | 23 | 0 | 3.5 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 77 | 23 | 0 | 3.5 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 78 | 23 | 0 | 3.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 79 | 23 | 0 | 3.5 | 5.5 | 0 | 17.5 | 5 | 3 | 25+TT | 12.5-TT |
| 80 | 23 | 0 | 3.5 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 81 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 82 | 23 | 0 | 3.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 83 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 3 | 25+TT | 14-TT |
| 84 | 23 | 0 | 3.5 | 4.5 | 0 | 18.5 | 5 | 3 | 25+TT | 13.5-TT |
| 85 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 86 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 87 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 88 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 89 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 90 | 23 | 0 | 6.5 | 2 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 91 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 92 | 23 | 0 | 6.5 | 2 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 93 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 94 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 95 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 96 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 97 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 98 | 23 | 0 | 6.5 | 2 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 99 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 100 | 23 | 0 | 6.5 | 2 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 101 | 23 | 0 | 6.5 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 102 | 23 | 0 | 6.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 103 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 104 | 23 | 0 | 6.5 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 105 | 23 | 0 | 6.5 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 106 | 23 | 0 | 6.5 | 7 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 107 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 108 | 23 | 0 | 6.5 | 11.5 | 0 | 11.5 | 6 | 3 | 25+TT | 5.5-TT |
| 109 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 110 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 111 | 23 | 0 | 6.5 | 0 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| 112 | 23 | 0 | 6.5 | 4.5 | 0 | 16.5 | 5 | 3 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

Table 6.2D.3.5-16: UE Power Class 3 test requirements (NS\_56) for band n24

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 3 | 14 | 0 | 9 | 6 | 4 | 25+TT | 3-TT |
| 2 | 23 | 3 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 3 | 23 | 3 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 4 | 23 | 3 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 5 | 23 | 1.5 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 6 | 23 | 3 | 14 | 0 | 9 | 6 | 4 | 25+TT | 3-TT |
| 7 | 23 | 3 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 8 | 23 | 3 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 9 | 23 | 3 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15 -TT |
| 10 | 23 | 2 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 11 | 23 | 3.5 | 14 | 0 | 9 | 6 | 4 | 25+TT | 3-TT |
| 12 | 23 | 3.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 13 | 23 | 3.5 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 14 | 23 | 3.5 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 15 | 23 | 3.5 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 16 | 23 | 6.5 | 14 | 0 | 9 | 6 | 4 | 25+TT | 3-TT |
| 17 | 23 | 6.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 18 | 23 | 6.5 | 6 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 19 | 23 | 6.5 | 4 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 20 | 23 | 6.5 | 4 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 21 | 23 | 3 | 12 | 0 | 9 | 6 | 4 | 25+TT | 5-TT |
| 22 | 23 | 3 | 8 | 0 | 11 | 5 | 4 | 25+TT | 10-TT |
| 23 | 23 | 3 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 24 | 23 | 1.5 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 25 | 23 | 3 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 26 | 23 | 1.5 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 27 | 23 | 3 | 2 | 0 | 20 | 2.5 | 4 | 25+TT | 16-TT |
| 28 | 23 | 3 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 29 | 23 | 1.5 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 30 | 23 | 1.5 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 31 | 23 | 3 | 3 | 0 | 20 | 2.5 | 4 | 25+TT | 16-TT |
| 32 | 23 | 3 | 12 | 0 | 11 | 6 | 4 | 25+TT | 5-TT |
| 33 | 23 | 3 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 34 | 23 | 3 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 35 | 23 | 2 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 36 | 23 | 3 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 37 | 23 | 2 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 38 | 23 | 3 | 2 | 0 | 20 | 2.5 | 4 | 25+TT | 16-TT |
| 39 | 23 | 3 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 40 | 23 | 2 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 41 | 23 | 2 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 42 | 23 | 3 | 3 | 0 | 20 | 2.5 | 4 | 25+TT | 16-TT |
| 43 | 23 | 3.5 | 12 | 0 | 11 | 6 | 4 | 25+TT | 5-TT |
| 44 | 23 | 3.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 45 | 23 | 3.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 46 | 23 | 3.5 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 47 | 23 | 3.5 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 48 | 23 | 3.5 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 49 | 23 | 3.5 | 2 | 0 | 19.5 | 3.5 | 4 | 25+TT | 15.5-TT |
| 50 | 23 | 3.5 | 5 | 0 | 18 | 3.5 | 4 | 25+TT | 14-TT |
| 51 | 23 | 3.5 | 5 | 0 | 18 | 3.5 | 4 | 25+TT | 14-TT |
| 52 | 23 | 3.5 | 5 | 0 | 18 | 3.5 | 4 | 25+TT | 14-TT |
| 53 | 23 | 3.5 | 3 | 0 | 19.5 | 3.5 | 4 | 25+TT | 15.5-TT |
| 54 | 23 | 6.5 | 12 | 0 | 11 | 6 | 4 | 25+TT | 5-TT |
| 55 | 23 | 6.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 56 | 23 | 6.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 57 | 23 | 6.5 | 6 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 58 | 23 | 6.5 | 6 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 59 | 23 | 6.5 | 4 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 60 | 23 | 6.5 | 2 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 61 | 23 | 6.5 | 5 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 62 | 23 | 6.5 | 5 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 63 | 23 | 6.5 | 5 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 64 | 23 | 6.5 | 3 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | |

Table 6.2D.3.5-17: UE Power Class 3 test requirements (NS\_50) for band n39

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 23 | 0 | 3 | 5 | 0 |  | 18 |  | 4.0 |  | 3 | 25.0 + TT | 14.0 - TT |  |
| 2 | 23 | 0 | 3 | 6.5 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT |  |
| 3 | 23 | 0 | 3 | 0 | 0 |  | 20 |  | 2.5 |  | 3 | 25.0 + TT | 17 - TT |  |
| 4 | 23 | 0 | 3 | 0 | 0 |  | 20.0 |  | 2.5 |  | 3 | 25.0 + TT | 17 - TT |  |
| 5 | 23 | 0 | 3 | 6.5 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT |  |
| 6 | 23 | 0 | 3 | 0 | 0 |  | 20 |  | 2.5 |  | 3 | 25.0 + TT | 17 - TT |  |
| 7 | 23 | 0 | 3 | 0 | 0 |  | 20.0 |  | 2.5 |  | 3 | 25.0 + TT | 17 – TT |  |
| 8 | 23 | 0 | 3 | 12 | 0 |  | 11 |  | 6.0 |  | 3 | 25.0 + TT | 5.0 - TT |  |
| 9 | 23 | 0 | 3 | 4.5 | 0 |  | 18.5 |  | 4.0 |  | 3 | 25.0 + TT | 14.5 - TT |  |
| 10 | 23 | 0 | 3 | 3.5 | 0 |  | 19.5 |  | 3.5 |  | 3 | 25.0 + TT | 16 - TT |  |
| 11 | 23 | 0 | 3 | 5 | 0 |  | 18 |  | 4.0 |  | 3 | 25.0 + TT | 14.0 - TT |  |
| 12 | 23 | 0 | 6.5 | 6.5 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT |  |
| 13 | 23 | 0 | 6.5 | 0 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT |  |
| 14 | 23 | 0 | 6.5 | 6 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT |  |
| 15 | 23 | 0 | 6.5 | 6.5 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT |  |
| 16 | 23 | 0 | 6.5 | 0 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT |  |
| 17 | 23 | 0 | 6.5 | 0 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT4 |  |
| 18 | 23 | 0 | 6.5 | 12 | 0 |  | 11 |  | 6.0 |  | 3 | 25.0 + TT | 5.0 - TT |  |
| 19 | 23 | 0 | 6.5 | 4..5 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT |  |
| 20 | 23 | 0 | 6.5 | 8 | 0 |  | 15 |  | 5.0 |  | 3 | 25.0 + TT | 10.0 - TT |  |
| 21 | 23 | 0 | 6.5 | 3.5 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT |  |
| 22 | 23 | 0 | 6.5 | 5 | 0 |  | 16.5 |  | 5.0 |  | 3 | 25.0 + TT | 11.5 - TT |  |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2D.3.5-0. | | | | | | | | | | | | | | |

### 6.2D.3\_1 UE additional maximum output power reduction for SUL with UL MIMO

6.2D.3\_1.1 Test purpose

Additional emission requirements can be signalled by the network. Each additional emission requirement is associated a unique with network signalling (NS) value indicated in RRC signalling by an NR frequency band number of the applicable operating band and an associated value in the field *additionalSpectrumEmission.* Throughout this specification, the notion of indication or signalling of an NS value refers to the corresponding indication of an NR frequency band number of the applicable operating band (the IE *freqBandIndicatorNR*) and an associated value of *additionalSpectrumEmission* in the relevant RRC information elements [6]*.*

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2D.1\_1.3-1. Unless stated otherwise, an A-MPR of 0 dB shall be used.

6.2D.3\_1.2 Test applicability

The requirements of this test apply in test case 6.5D.2.4.2\_1 UTRA Adjacent channel leakage ratio for network signalling values NS\_05U to all types of NR UE release 17 and forward that support SUL and UL-MIMO.

The requirements of this test apply in test case 6.5D.3\_2.3 Additional Spurious Emissions for network signalling value NS\_05, NS\_05U and NS\_56 to all types of NR UE release 17 and forward that support SUL and UL-MIMO.

NOTE: Test execution is not necessary if 6.5D.2.4.2\_1 and 6.5D.3\_2.3 are executed.

6.2D.3\_1.3 Minimum conformance requirements

For a terminal that supports SUL for the band combination specified in Table 5.2C-1, the current version of the specification assumes the terminal is configured with active transmission either on UL carrier or SUL carrier at any time in one serving cell and the UE requirements for single carrier shall apply for the active UL or SUL carrier accordingly.

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the A-MPR values specified in subclause 6.2.3.3 shall apply to the maximum output power specified in Table 6.2D.1\_1.3-1. The requirements shall be met with the UL MIMO configurations specified in Table 6.2D.1\_1.3-2. For UE supporting UL MIMO, the maximum output power is defined as the sum of the maximum output power from both UE antenna connector. Unless stated otherwise, an A-MPR of 0 dB shall be used.

For the UE maximum output power modified by A-MPR, the power limits specified in subclause 6.2D.4\_1.3 apply.

If UE is configured for transmission on single-antenna port, the requirements in subclause 6.2.3.3 apply.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2D.3.1.

6.2D.3\_1.4 Test description

6.2D.3\_1.4.1 Test procedure

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in Table 5.5C-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing and are shown in Table 6.2D.3\_1.4.1-1 to Table 6.2D.3\_1.4.1-3. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2D.3\_1.4.1-1: Test Configuration Table for NS\_05

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | Normal | | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | SUL carrier: use Fc as specified in test parameters  NUL carrier: Mid range | | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | SUL carrier: 5 MHz, 10 MHz, 15 MHz, 20 MHz  NUL carrier: Highest | | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | 15kHz for SUL carrier and Lowest supported SCS for NUL carrier | | | |
| A-MPR test parameters for NS\_05 | | | | | | | | |
| Test ID | Fc  (MHz) | ChBw (MHz) | Downlink Config. | Uplink Config | A-MPR | SUL Configuration | | |
| Modulation  (NOTE 2) | | RB allocation (Note 1) |
| 1 | 1922.5 | 5 |  |  | A3 | CP-OFDM | QPSK | Outer\_Full |
| 2 | 1925 | 10 | A1 | QPSK | Outer\_Full |
| 3 | 1925 | 10 | A7 | QPSK | 42@10 |
| 4 | 1925 | 10 | A2 | QPSK | 6@40 |
| 5 | 1935 | 10 | A4 | QPSK | Outer\_Full |
| 6 | 1927.5 | 15 | A1 | QPSK | Outer\_Full |
| 7 | 1927.5 | 15 | A7 | QPSK | 60@19 |
| 8 | 1927.5 | 15 | A2 | QPSK | 6@56 |
| 9 | 1932.5 | 15 | A1 | QPSK | Outer\_Full |
| 10 | 1932.5 | 15 | A2 | QPSK | 6@68 |
| 11 | 1942.5 | 15 | A5 | QPSK | Outer\_Full |
| 12 | 1930 | 20 | A1 | QPSK | Outer\_Full |
| 13 | 1930 | 20 | A7 | QPSK | 78@28 |
| 14 | 1930 | 20 | A2 | QPSK | 6@76 |
| 15 | 1950 | 20 | A6 | QPSK | Outer\_Full |
| 16 | 1922.5 | 5 | A3 | 16 QAM | Outer\_Full |
| 17 | 1925 | 10 | A1 | 16 QAM | Outer\_Full |
| 18 | 1925 | 10 | A7 | 16 QAM | 42@10 |
| 19 | 1925 | 10 | A2 | 16 QAM | 6@40 |
| 20 | 1935 | 10 | A4 | 16 QAM | Outer\_Full |
| 21 | 1927.5 | 15 | A1 | 16 QAM | Outer\_Full |
| 22 | 1927.5 | 15 | A7 | 16 QAM | 60@19 |
| 23 | 1927.5 | 15 | A2 | 16 QAM | 6@56 |
| 24 | 1932.5 | 15 | A1 | 16 QAM | Outer\_Full |
| 25 | 1932.5 | 15 | A2 | 16 QAM | 6@68 |
| 26 | 1942.5 | 15 | A5 | 16 QAM | Outer\_Full |
| 27 | 1930 | 20 | A1 | 16 QAM | Outer\_Full |
| 28 | 1930 | 20 | A7 | 16 QAM | 78@28 |
| 29 | 1930 | 20 | A2 | 16 QAM | 6@76 |
| 30 | 1950 | 20 | A6 | 16 QAM | Outer\_Full |
| 31 | 1922.5 | 5 | A3 | 64 QAM | Outer\_Full |
| 32 | 1925 | 10 | A1 | 64 QAM | Outer\_Full |
| 33 | 1925 | 10 | A7 | 64 QAM | 42@10 |
| 34 | 1925 | 10 | A2 | 64 QAM | 6@40 |
| 35 | 1927.5 | 15 | A1 | 64 QAM | Outer\_Full |
| 36 | 1927.5 | 15 | A7 | 64 QAM | 60@19 |
| 37 | 1927.5 | 15 | A2 | 64 QAM | 6@56 |
| 38 | 1932.5 | 15 | A1 | 64 QAM | Outer\_Full |
| 39 | 1932.5 | 15 | A2 | 64 QAM | 6@68 |
| 40 | 1930 | 20 | A1 | 64 QAM | Outer\_Full |
| 41 | 1930 | 20 | A7 | 64 QAM | 78@28 |
| 42 | 1930 | 20 | A2 | 64 QAM | 6@76 |
| 43 | 1922.5 | 5 | A3 | 256 QAM | Outer\_Full |
| 44 | 1925 | 10 | A1 | 256 QAM | Outer\_Full |
| 45 | 1925 | 10 | A7 | 256 QAM | 42@10 |
| 46 | 1927.5 | 15 | A1 | 256 QAM | Outer\_Full |
| 47 | 1927.5 | 15 | A7 | 256 QAM | 60@19 |
| 48 | 1932.5 | 15 | A1 | 256 QAM | Outer\_Full |
| 49 | 1930 | 20 | A1 | 256 QAM | Outer\_Full |
| 50 | 1930 | 20 | A7 | 256 QAM | 78@28 |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table. | | | | | | | | |

Table 6.2D.3\_1.4.1-2: Test Configuration Table for NS\_05U

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | Normal | | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | SUL carrier: Use Fc as specified in test parameters  NUL carrier: Mid range | | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | SUL carrier: 5 MHz, 10 MHz, 15 MHz, 20 MHz  NUL carrier: Highest | | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | 15kHz for SUL and Lowest supported SCS for NUL carrier | | | |
| AMPR Test parameters for NS\_05U | | | | | | | | |
| Test ID | Fc  (MHz) | ChBw (MHz) | Downlink Config. | Uplink config | A-MPR | SUL Configuration | | |
| Modulation  (NOTE 2) | | RB allocation (Note 1) |
| 1 | 1922.5 | 5 |  |  | A3 | CP-OFDM | QPSK | Outer\_Full |
| 2 | 1925 | 10 | A1 | QPSK | Outer\_Full |
| 3 | 1925 | 10 | A7 | QPSK | 42@10 |
| 4 | 1925 | 10 | A2 | QPSK | 6@40 |
| 5 | 1935 | 10 | A4 | QPSK | Outer\_Full |
| 6 | 1927.5 | 15 | A1 | QPSK | Outer\_Full |
| 7 | 1927.5 | 15 | A7 | QPSK | 60@19 |
| 8 | 1927.5 | 15 | A2 | QPSK | 6@56 |
| 9 | 1932.5 | 15 | A1 | QPSK | Outer\_Full |
| 10 | 1932.5 | 15 | A2 | QPSK | 6@68 |
| 11 | 1942.5 | 15 | A5 | QPSK | Outer\_Full |
| 12 | 1930 | 20 | A1 | QPSK | Outer\_Full |
| 13 | 1930 | 20 | A7 | QPSK | 78@28 |
| 14 | 1930 | 20 | A2 | QPSK | 6@76 |
| 15 | 1950 | 20 | A6 | QPSK | Outer\_Full |
| 16 | 1922.5 | 5 | A3 | 16 QAM | Outer\_Full |
| 17 | 1925 | 10 | A1 | 16 QAM | Outer\_Full |
| 18 | 1925 | 10 | A7 | 16 QAM | 42@10 |
| 19 | 1925 | 10 | A2 | 16 QAM | 6@40 |
| 20 | 1935 | 10 | A4 | 16 QAM | Outer\_Full |
| 21 | 1927.5 | 15 | A1 | 16 QAM | Outer\_Full |
| 22 | 1927.5 | 15 | A7 | 16 QAM | 60@19 |
| 23 | 1927.5 | 15 | A2 | 16 QAM | 6@56 |
| 24 | 1932.5 | 15 | A1 | 16 QAM | Outer\_Full |
| 25 | 1932.5 | 15 | A2 | 16 QAM | 6@68 |
| 26 | 1942.5 | 15 | A5 | 16 QAM | Outer\_Full |
| 27 | 1930 | 20 | A1 | 16 QAM | Outer\_Full |
| 28 | 1930 | 20 | A7 | 16 QAM | 78@28 |
| 29 | 1930 | 20 | A2 | 16 QAM | 6@76 |
| 30 | 1950 | 20 | A6 | 16 QAM | Outer\_Full |
| 31 | 1922.5 | 5 | A3 | 64 QAM | Outer\_Full |
| 32 | 1925 | 10 | A1 | 64 QAM | Outer\_Full |
| 33 | 1925 | 10 | A7 | 64 QAM | 42@10 |
| 34 | 1925 | 10 | A2 | 64 QAM | 6@40 |
| 35 | 1935 | 10 | A4 | 64 QAM | Outer\_Full |
| 36 | 1927.5 | 15 | A1 | 64 QAM | Outer\_Full |
| 37 | 1927.5 | 15 | A7 | 64 QAM | 60@19 |
| 38 | 1927.5 | 15 | A2 | 64 QAM | 6@56 |
| 39 | 1932.5 | 15 | A1 | 64 QAM | Outer\_Full |
| 40 | 1932.5 | 15 | A2 | 64 QAM | 6@68 |
| 41 | 1942.5 | 15 | A5 | 64 QAM | Outer\_Full |
| 42 | 1930 | 20 | A1 | 64 QAM | Outer\_Full |
| 43 | 1930 | 20 | A7 | 64 QAM | 78@28 |
| 44 | 1930 | 20 | A2 | 64 QAM | 6@76 |
| 45 | 1950 | 20 | A6 | 64 QAM | Outer\_Full |
| 46 | 1922.5 | 5 | A3 | 256 QAM | Outer\_Full |
| 47 | 1925 | 10 | A1 | 256 QAM | Outer\_Full |
| 48 | 1925 | 10 | A7 | 256 QAM | 42@10 |
| 49 | 1935 | 10 | A4 | 256 QAM | Outer\_Full |
| 50 | 1927.5 | 15 | A1 | 256 QAM | Outer\_Full |
| 51 | 1927.5 | 15 | A7 | 256 QAM | 60@19 |
| 52 | 1932.5 | 15 | A1 | 256 QAM | Outer\_Full |
| 53 | 1942.5 | 15 | A5 | 256 QAM | Outer\_Full |
| 54 | 1930 | 20 | A1 | 256 QAM | Outer\_Full |
| 55 | 1930 | 20 | A7 | 256 QAM | 78@28 |
| 56 | 1950 | 20 | A6 | 256 QAM | Outer\_Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table. | | | | | | | | |

Table 6.2D.3\_1.4.1-3: Test Configuration Table for NS\_56

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | Use uplink carrier centre frequency (Fc) as specified in test parameters | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | 5 MHz, 10 MHz as specified in test parameters for SUL carrier  Lowest for non-SUL carrier | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | 15kHz for SUL and Lowest supported SCS for NUL carriers | |
| A-MPR test parameters for NS\_56 | | | | | | | | |
| Test ID | Fc  (MHz) | ChBw (MHz) | Downlink Configuration | Uplink Configuration | A-MPR | Uplink Configuration | | |
| Modulation  (NOTE 2) | | RB allocation (Note 1) |
| SCS 15 kHz |
| 1 | Low | 5 | N/A for A-MPR testing | N/A | 14 | CP-OFDM | QPSK | Edge\_1RB\_Left |
| 2 | Low | 5 | 6 | QPSK | Outer\_Full |
| 3 | Low | 5 | 4 | QPSK | 21@4 |
| 4 | Low | 5 | 4 | QPSK | 1@4 |
| 5 | Low | 5 | 14 | 16 QAM | Edge\_1RB\_Left |
| 6 | Low | 5 | 6 | 16 QAM | Outer\_Full |
| 7 | Low | 5 | 4 | 16 QAM | 21@4 |
| 8 | Low | 5 | 4 | 16 QAM | 1@4 |
| 9 | Low | 5 | 14 | 64 QAM | Edge\_1RB\_Left |
| 10 | Low | 5 | 6 | 64 QAM | Outer\_Full |
| 11 | Low | 5 | 4 | 64 QAM | 21@4 |
| 12 | Low | 5 | 4 | 64 QAM | 1@4 |
| 13 | Low | 5 | 14 | 256 QAM | Edge\_1RB\_Left |
| 14 | Low | 5 | 6 | 256 QAM | Outer\_Full |
| 15 | Low | 5 | 4 | 256 QAM | 21@4 |
| 16 | Low | 5 | 4 | 256 QAM | 1@4 |
| 17 | Low | 10 | 12 | QPSK | Edge\_1RB\_Left |
| 18 | Low | 10 | 8 | QPSK | Outer\_Full |
| 19 | Low | 10 | 6 | QPSK | 1@3 |
| 20 | Low | 10 |  |  | 6 | QPSK | 43@9 |
| 21 | Low | 10 | 4 | QPSK | 1@35 |
| 22 | Low | 10 | 2 | QPSK | 17@35 |
| 23 | Low | 10 | 5 | QPSK | Edge\_1RB\_Right |
| 24 | Low | 10 | 5 | QPSK | 1@40 |
| 25 | Low | 10 | 3 | QPSK | 8@44 |
| 26 | Low | 10 | 12 | 16 QAM | Edge\_1RB\_Left |
| 27 | Low | 10 | 8 | 16 QAM | Outer\_Full |
| 28 | Low | 10 | 6 | 16 QAM | 1@3 |
| 29 | Low | 10 | 6 | 16 QAM | 43@9 |
| 30 | Low | 10 | 4 | 16 QAM | 1@35 |
| 31 | Low | 10 | 2 | 16 QAM | 17@35 |
| 32 | Low | 10 | 5 | 16 QAM | Edge\_1RB\_Right |
| 33 | Low | 10 | 5 | 16 QAM | 1@40 |
| 34 | Low | 10 | 3 | 16 QAM | 8@44 |
| 35 | Low | 10 | 12 | 64 QAM | Edge\_1RB\_Left |
| 36 | Low | 10 | 8 | 64 QAM | Outer\_Full |
| 37 | Low | 10 | 6 | 64 QAM | 1@3 |
| 38 | Low | 10 | 6 | 64 QAM | 43@9 |
| 39 | Low | 10 | 4 | 64 QAM | 1@35 |
| 40 | Low | 10 | 2 | 64 QAM | 17@35 |
| 41 | Low | 10 | 5 | 64 QAM | Edge\_1RB\_Right |
| 42 | Low | 10 | 5 | 64 QAM | 1@40 |
| 43 | Low | 10 | 3 | 64 QAM | 8@44 |
| 44 | Low | 10 | 12 | 256 QAM | Edge\_1RB\_Left |
| 45 | Low | 10 |  |  | 8 | 256 QAM | Outer\_Full |
| 46 | Low | 10 | 6 | 256 QAM | 1@3 |
| 47 | Low | 10 | 6 | 256 QAM | 43@9 |
| 48 | Low | 10 | 4 | 256 QAM | 1@35 |
| 49 | Low | 10 | 2 | 256 QAM | 17@35 |
| 50 | Low | 10 | 5 | 256 QAM | Edge\_1RB\_Right |
| 51 | Low | 10 | 5 | 256 QAM | 1@40 |
| 52 | Low | 10 | 3 | 256 QAM | 8@44 |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table. | | | | | | | | |

Editor’s note: The following lines belong at the end of subclause 6.2D.3.4.1. As new tables are added to this section, these lines should always follow the tables

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.2 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2 and uplink signals according Annex G.0, G.1, G.2 and G.3.0 with consideration of supplementary uplink physical channels.

4. The UL Reference Measurement channels are set according to the applicable tables 6.2D.3\_1.4.1-1 to 6.2D.3\_1.4.1-3.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2D.3\_1.4.3.

6.2D.3\_1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2D.3\_1.4.1-1 to Table 6.2D.3\_1.4.1-3. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE. Allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the sum of the mean power of the UE at each transmit antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms over all active uplink slots and in the uplink symbols. For TDD slots only slots consisting of only UL symbols are under.

6.2D.3\_1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6.1 ensuring Table 4.6.3-182 with the condition 2TX\_UL\_MIMO, with the following exceptions for each network signalling value.

Message contents in initial conditions are according to TS 38.508-1 [5] subclause 4.3.6.1.1.2 ensuring UL/SUL indicator in Table 4.3.6.1.1.2-1 with condition SUL, subclause 4.6 ensuring Table 4.6.1-28 with condition SUL AND (RF OR RRM), Tables 4.6.3-14 with condition SUL\_SUL for SUL carrier, and Table 4.6.3-167 with condition PUSCH\_PUCCH\_ON\_SUL. All the AdditionalSpectrumEmission in 6.2.3.4.3 are sent in *SIB1* as part of *supplementaryUplink* instead of *uplinkConfigCommon*.

6.2D.3\_1.4.3.1 Message contents exceptions for network signalling value "NS\_05"

1. Information element additionalSpectrumEmission is set to NS\_05. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3\_1.4.3.1-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_05"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 2 (NS\_05) |  |  |

6.2D.3\_1.4.3.2 Message contents exceptions for network signalling value "NS\_05U"

1. Information element additionalSpectrumEmission is set to NS\_05U. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3\_1.4.3.2-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_05U"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 3 (NS\_05U) |  |  |

6.2D.3\_1.4.3.3 Message contents exceptions for network signalling value "NS\_56"

1. Information element additionalSpectrumEmission is set to NS\_56. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2D.3\_1.4.3.3-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_56"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_56) |  |  |

6.2D.3\_1.5 Test requirement

The measured maximum output power shall be within the range prescribed by the nominal maximum output power and tolerance in the applicable tables from Table 6.2D.3\_1.5-1 to Table 6.2D.3\_1.5-3. The allowed A-MPR values specified in table 6.2.3.3.1-1 are in addition to the allowed MPR requirements specified in clause 6.2C.4. For the UE maximum output power modified by MPR and/or A-MPR, the power limits specified in Table 6.2D.1\_1.3-1 apply.

Table 6.2D.3\_1.5-1: UE Power Class 3 test requirements (NS\_05) for band n84

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 0 | 3.0 | 7.5 | 0 | 15.5 | 6 | 2 | 25+TT | 9.5-TT |
| 2 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 3 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 4 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 5 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 2 | 25+TT | 14.5-TT |
| 6 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 7 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 8 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 9 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 10 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 11 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 2 | 25+TT | 14.5-TT |
| 12 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 13 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 14 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 15 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 2 | 25+TT | 14.5-TT |
| 16 | 23 | 0 | 3.0 | 7.5 | 0 | 15.5 | 6 | 2 | 25+TT | 9.5-TT |
| 17 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 18 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 19 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 20 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 2 | 25+TT | 14.5-TT |
| 21 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 22 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 23 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 24 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 25 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 26 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 2 | 25+TT | 14.5-TT |
| 27 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 28 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 29 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 30 | 23 | 0 | 3.0 | 3.5 | 0 | 19.5 | 5 | 2 | 25+TT | 14.5-TT |
| 31 | 23 | 0 | 3.5 | 8 | 0 | 15 | 6 | 2 | 25+TT | 9-TT |
| 32 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 2 | 25+TT | 6-TT |
| 33 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 34 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 35 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 2 | 25+TT | 6-TT |
| 36 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 37 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 38 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 2 | 25+TT | 6-TT |
| 39 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 40 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 2 | 25+TT | 6-TT |
| 41 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 42 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 43 | 23 | 0 | 6.5 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 44 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 2 | 25+TT | 3-TT |
| 45 | 23 | 0 | 6.5 | 6 | 0 | 16.5 | 5 | 2 | 25+TT | 11.5-TT |
| 46 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 2 | 25+TT | 3-TT |
| 47 | 23 | 0 | 6.5 | 6 | 0 | 16.5 | 5 | 2 | 25+TT | 11.5-TT |
| 48 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 2 | 25+TT | 3-TT |
| 49 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 2 | 25+TT | 3-TT |
| 50 | 23 | 0 | 6.5 | 6 | 0 | 16.5 | 5 | 2 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2.3.5-0. | | | | | | | | | | |

Table 6.2D.3\_1.5-2: UE Power Class 3 test requirements (NS\_05U) for band n84

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 0 | 3.0 | 7.5 | 0 | 15.5 | 6 | 2 | 25+TT | 9.5-TT |
| 2 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 3 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 4 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 5 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 2 | 25+TT | 14-TT |
| 6 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 7 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 8 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 9 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 10 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 11 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 2 | 25+TT | 14-TT |
| 12 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 13 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 14 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 15 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 2 | 25+TT | 14-TT |
| 16 | 23 | 0 | 3.0 | 7.5 | 0 | 15.5 | 6 | 2 | 25+TT | 9.5-TT |
| 17 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 18 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 19 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 20 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 2 | 25+TT | 14-TT |
| 21 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 22 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 23 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 24 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 25 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 26 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 2 | 25+TT | 14-TT |
| 27 | 23 | 0 | 3.0 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 28 | 23 | 0 | 3.0 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 29 | 23 | 0 | 3.0 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 30 | 23 | 0 | 3.0 | 4 | 0 | 19 | 5 | 2 | 25+TT | 14-TT |
| 31 | 23 | 0 | 3.5 | 8 | 0 | 15 | 6 | 2 | 25+TT | 9-TT |
| 32 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 2 | 25+TT | 6-TT |
| 33 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 34 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 35 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 2 | 25+TT | 14-TT |
| 36 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 2 | 25+TT | 6-TT |
| 37 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 38 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 39 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 2 | 25+TT | 6-TT |
| 40 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 41 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 2 | 25+TT | 14-TT |
| 42 | 23 | 0 | 3.5 | 11 | 0 | 12 | 6 | 2 | 25+TT | 6-TT |
| 43 | 23 | 0 | 3.5 | 6 | 0 | 17 | 5 | 2 | 25+TT | 12-TT |
| 44 | 23 | 0 | 3.5 | 5 | 0 | 18 | 5 | 2 | 25+TT | 13-TT |
| 45 | 23 | 0 | 3.5 | 4 | 0 | 19 | 5 | 2 | 25+TT | 14-TT |
| 46 | 23 | 0 | 6.5 | 10 | 0 | 13 | 6 | 2 | 25+TT | 7-TT |
| 47 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 2 | 25+TT | 3-TT |
| 48 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 2 | 25+TT | 11.5-TT |
| 49 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 2 | 25+TT | 11.5-TT |
| 50 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 2 | 25+TT | 3-TT |
| 51 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 2 | 25+TT | 11.5-TT |
| 52 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 2 | 25+TT | 3-TT |
| 53 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 2 | 25+TT | 11.5-TT |
| 54 | 23 | 0 | 6.5 | 13 | 0 | 10 | 7 | 2 | 25+TT | 3-TT |
| 55 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 2 | 25+TT | 11.5-TT |
| 56 | 23 | 0 | 6.5 | 6.5 | 0 | 16.5 | 5 | 2 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2.3.5-0. | | | | | | | | | | |

Table 6.2D.3\_1.5-3: UE Power Class 3 test requirements (NS\_56) for band n99

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 3 | 14 | 0 | 9 | 6 | 4 | 25+TT | 3-TT |
| 2 | 23 | 3 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 3 | 23 | 3 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 4 | 23 | 3 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 5 | 23 | 1.5 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 6 | 23 | 3 | 14 | 0 | 9 | 6 | 4 | 25+TT | 3-TT |
| 7 | 23 | 3 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 8 | 23 | 3 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 9 | 23 | 3 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 10 | 23 | 2 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 11 | 23 | 3.5 | 14 | 0 | 9 | 6 | 4 | 25+TT | 3-TT |
| 12 | 23 | 3.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 13 | 23 | 3.5 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 14 | 23 | 3.5 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 15 | 23 | 3.5 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 16 | 23 | 6.5 | 14 | 0 | 9 | 6 | 4 | 25+TT | 3-TT |
| 17 | 23 | 6.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 18 | 23 | 6.5 | 6 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 19 | 23 | 6.5 | 4 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 20 | 23 | 6.5 | 4 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 21 | 23 | 3 | 12 | 0 | 9 | 6 | 4 | 25+TT | 5-TT |
| 22 | 23 | 3 | 8 | 0 | 11 | 5 | 4 | 25+TT | 10-TT |
| 23 | 23 | 3 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 24 | 23 | 1.5 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 25 | 23 | 3 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 26 | 23 | 1.5 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 27 | 23 | 3 | 2 | 0 | 20 | 2.5 | 4 | 25+TT | 15.5-TT |
| 28 | 23 | 3 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 29 | 23 | 1.5 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 30 | 23 | 1.5 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 31 | 23 | 3 | 3 | 0 | 20 | 2.5 | 4 | 25+TT | 15.5-TT |
| 32 | 23 | 3 | 12 | 0 | 11 | 6 | 4 | 25+TT | 5-TT |
| 33 | 23 | 3 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 34 | 23 | 3 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 35 | 23 | 2 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 36 | 23 | 3 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 37 | 23 | 2 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 38 | 23 | 3 | 2 | 0 | 20 | 2.5 | 4 | 25+TT | 15.5-TT |
| 39 | 23 | 3 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 40 | 23 | 2 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 41 | 23 | 2 | 5 | 0 | 18 | 4 | 4 | 25+TT | 14-TT |
| 42 | 23 | 3 | 3 | 0 | 20 | 2.5 | 4 | 25+TT | 15.5-TT |
| 43 | 23 | 3.5 | 12 | 0 | 11 | 6 | 4 | 25+TT | 5-TT |
| 44 | 23 | 3.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 45 | 23 | 3.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 46 | 23 | 3.5 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 47 | 23 | 3.5 | 6 | 0 | 17 | 5 | 4 | 25+TT | 12-TT |
| 48 | 23 | 3.5 | 4 | 0 | 19 | 3.5 | 4 | 25+TT | 15-TT |
| 49 | 23 | 3.5 | 2 | 0 | 19.5 | 3.5 | 4 | 25+TT | 15.5-TT |
| 50 | 23 | 3.5 | 5 | 0 | 18 | 3.5 | 4 | 25+TT | 14-TT |
| 51 | 23 | 3.5 | 5 | 0 | 18 | 3.5 | 4 | 25+TT | 14-TT |
| 52 | 23 | 3.5 | 5 | 0 | 18 | 3.5 | 4 | 25+TT | 14-TT |
| 53 | 23 | 3.5 | 3 | 0 | 19.5 | 3.5 | 4 | 25+TT | 15.5-TT |
| 54 | 23 | 6.5 | 12 | 0 | 11 | 6 | 4 | 25+TT | 5-TT |
| 55 | 23 | 6.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 56 | 23 | 6.5 | 8 | 0 | 15 | 5 | 4 | 25+TT | 10-TT |
| 57 | 23 | 6.5 | 6 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 58 | 23 | 6.5 | 6 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 59 | 23 | 6.5 | 4 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 60 | 23 | 6.5 | 2 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 61 | 23 | 6.5 | 5 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 62 | 23 | 6.5 | 5 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 63 | 23 | 6.5 | 5 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| 64 | 23 | 6.5 | 3 | 0 | 16.5 | 5 | 4 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n99, refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the lower limit shall be decreased by 1.5 dB.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2.3.5-0. | | | | | | | | | |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2D.4 Configured transmitted power for UL MIMO

6.2D.4.1 Test purpose

To verify the measured UE configured maximum output power PUMAX,f,c for UL MIMO is within the specified bounds.

6.2D.4.2 Test applicability

This test case applies to all types of NR Power Class 1.5, Power Class 2 and Power Class 3 UE release 15 and forward that support 2-layer codebook based UL MIMO.

This test case applies to all types of NR Power Class 1.5, Power Class 2 and Power Class 3 UE release 16 and forward that support UL full power transmission (ULFPTx).

6.2D.4.3 Minimum conformance requirements

For UE supporting UL MIMO, the transmitted power is configured per each UE.

The definitions of configured maximum output power PCMAX,*c*, the lower bound PCMAX\_L,*c*, and the higher bound PCMAX\_H,*c* specified in subclause 6.2.4 shall apply to UE supporting UL MIMO, where

PPowerClass,ΔPPowerClass and TC,*c* are specified in subclause 6.2D.1.3;

MPR*c* is specified in subclause 6.2D.2.3;

A-MPR*c* is specified in subclause 6.2D.3.3.

The measured configured maximum output power PUMAX,*c* for serving cell *c* shall be within the following bounds:

PCMAX\_L,*c*– MAX{TL, T LOW(PCMAX\_L,*c*)} ≤ PUMAX,*c* ≤ PCMAX\_H,*c*+ T HIGH(PCMAX\_H,*c*)

where TLOW(PCMAX\_L,*c*) and THIGH(PCMAX\_H,*c*) are defined as the tolerance and applies to PCMAX\_L,*c* and PCMAX\_H,*c* separately, while TL is the absolute value of the lower tolerance in Table 6.2D.1.3-1 for the applicable operating band.

For UE with two transmit antenna connectors in closed-loop spatial amultiplexing scheme, the tolerance is specified in Table 6.2D.4.3-1. The requirements shall be met with UL MIMO configurations specified in Table 6.2D.1.3-2.

For UE support uplink full power transmission (ULFPTx) for UL MIMO, the tolerance is specified in Table 6.2D.4.3-1. The requirements shall be met with the PUSCH configurations specified in Table 6.2D.1.3-3, based upon UE’s support of uplink full power transmission mode.

Table 6.2D.4.3-1: PCMAX,*c* tolerance in closed-loop spatial multiplexing scheme

|  |  |  |
| --- | --- | --- |
| PCMAX,*c*(dBm) | Tolerance TLOW(PCMAX\_L,*c*) (dB) | Tolerance THIGH(PCMAX\_H,*c*) (dB) |
| 23 ≤ PCMAX,*c* ≤ 29 | 3.0 | 2.0 |
| 22 ≤ PCMAX,*c* < 23 | 5.0 | 2.0 |
| 21 ≤ PCMAX,*c* < 22 | 5.0 | 3.0 |
| 20 ≤ PCMAX,*c* < 21 | 6.0 | 4.0 |
| 16 ≤ PCMAX,*c* < 20 | 5.0 | |
| 11 ≤ PCMAX,*c* < 16 | 6.0 | |
| -40 ≤ PCMAX,*c* < 11 | 7.0 | |

If UE is scheduled for single antenna-port PUSCH transmission by DCI format 0\_0 or by DCI format 0\_1 for single antenna port codebook based transmission, the requirements in clause 6.2D.1.3 apply for the power class as indicated by the *ue-PowerClass* field in capability signalling.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2D.4.

6.2D.4.4 Test description

6.2D.4.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2D.4.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2D.4.4.1-1: Test Configuration Table

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Mid range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest | |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A | Modulation | RB allocation (NOTE 1) |
| 1 |  | CP-OFDM QPSK | Inner Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1. | | | |

Table 6.2D.4.4.1-2: Test Configuration Table for uplink full power transmission (ULFPTx)

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Mid range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest | |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 |  | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 2 |  | DFT-s-OFDM QPSK | Inner Full |
| 33 |  | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: UE operating in TDD mode with PI/2 PBSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and the IE *powerBoostPi2BPSK* is set to 1 for bands n40, n41, n77, n78 and n79. | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.2 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2D.4.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR,* Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2D.4.4.3.

6.2D.4.4.2 Test procedure

Sub-test for 2-Layer codebook based UL-MIMO

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2D.4.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level of the test point.

3. Measure the sum of the mean power of the UE at each transmit antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms over all active uplink slots and in the uplink symbols. For TDD slots only slots consisting of only UL symbols are under test.

Sub-test for ULFPTx

4. If UE supports ULFPTx, repeat test steps 1~3 with UL RMC according to Table 6.2D.4.4.1-2. The PDCCH DCI format 0\_1 is specified with the condition ULFPTx\_Mode1, ULFPTx\_Mode2 or ULFPTx\_ModeFull in 38.508-1 [5] subclause 4.3.6.1.1.2 depending on UE reported capability.

6.2D.4.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 ensuring Table 4.6.3-182 with the condition 2TX\_UL\_MIMO and following exception.

Table 6.2D.4.4.3-1: FrequencyInfoUL-SIB: Test point 1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 0 |  |  |

Table 6.2D.4.4.3-2: FrequencyInfoUL-SIB: Test point 2

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 14 |  |  |

Table 6.2D.4.4.3-3: FrequencyInfoUL-SIB: Test point 3

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 20 |  |  |

Table 6.2D.4.4.3-4: ServingCellConfig: ULFPTx

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| uplinkConfig SEQUENCE { |  |  |  |
| powerBoostPi2BPSK | 0 |  | ULFPTx Test ID 1, 2 |
|  | 1 |  | ULFPTx Test ID 3 |
| } |  |  |  |
| } |  |  |  |

6.2D.4.5 Test requirement

The maximum output power measured shall not exceed the values specified in Table 6.2D.4.5-1.

Table 6.2D.4.5-1: PCMAX configured UE output power

|  |  |
| --- | --- |
| Configured transmitted power | |
| Measured UE output power test point 1 | 0 dBm ± (7+TT) |
| Measured UE output power test point 2 | 14 dBm ± (6+TT) |
| Measured UE output power test point 3 | 20 dBm + (4+TT) / - (6+TT) |
| Note 1: TT for each frequency and channel bandwidth is specified in Table 6.2D.4.5-2.  Note 2: In addition note 2 in Table 6.2D.1.3-1 shall apply to the tolerances. | |

Table 6.2D.4.5-2: Test Tolerance (Configured transmitted power for UL MIMO)

|  |  |  |
| --- | --- | --- |
|  | **f ≤ 3.0GHz** | **3.0GHz < f ≤ 6.0GHz** |
| BW ≤ 40MHz | 0.7 | 1.0 |
| 40MHz < BW ≤ 100MHz | 1.0 | 1.0 |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2D.4\_1 Configured transmitted power for SUL with UL MIMO

6.2D.4\_1.1 Test purpose

Same test purpose as in clause 6.2D.4.1.

6.2D.4\_1.2 Test applicability

This test applies to all types of NR UE release 17 and forward that support SUL and UL MIMO operating on the SUL bands.

6.2D.4\_1.3 Minimum conformance requirements

Same minimum conformance requirements as in clause 6.2D.4.3.

6.2D.4\_1.4 Test description

6.2D.4\_1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2D.4\_1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2D.4\_1.4.1-1: Test Configuration Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Mid range for both SUL carrier and Non-SUL carrier | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Mid, Highest for SUL carrier  Lowest for Non-SUL carrier | | |
| Test SCS as specified in Table 5.5C-1 | | | 15kHz for SUL carrier and Lowest supported SCS for Non-SUL carrier | | |
| Test Parameters for Channel Bandwidths | | | | | |
| Test ID | Downlink Configuration | UL Configuration | | SUL Configuration | |
|  | N/A | N/A | | Modulation | RB allocation (NOTE 2) |
| 1 |  |  | | CP-OFDM QPSK | Inner Full |
| NOTE 1: Test Channel Bandwidths are checked separately for each SUL band combination, the applicable channel bandwidths are specified in Table 5.5C-1.  NOTE 2: The specific configuration of each RB allocation is defined in Table 6.1-1. | | | | | |

Table 6.2D.4\_1.4.1-2: Test Configuration Table for uplink full power transmission (ULFPTx)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Mid range for both SUL carrier and Non-SUL carrier | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Mid, Highest for SUL carrier  Lowest for Non-SUL carrier | | |
| Test SCS as specified in Table 5.5C-1 | | | 15kHz for SUL carrier and Lowest supported SCS for Non-SUL carrier | | |
| Test Parameters for Channel Bandwidths | | | | | |
| Test ID | Downlink Configuration | UL Configuration | | SUL Configuration | |
|  | N/A | N/A | | Modulation | RB allocation (NOTE 2) |
| 1 |  |  | | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 2 |  |  | | DFT-s-OFDM QPSK | Inner Full |
| NOTE 1: Test Channel Bandwidths are checked separately for each SUL band combination, the applicable channel bandwidths are specified in Table 5.5C-1.  NOTE 2: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 3: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1. | | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.5 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2 and G.3.0 with consideration of supplementary uplink physical channels.

4. The UL Reference Measurement Channel is set according to Table 6.2D.4\_1.4.1-1 or 6.2D.4\_1.4.1-2.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR,* Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2D.4\_1.4.3.

6.2D.4\_1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2D.4\_1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level of the test point.

3. Measure the sum of the mean power of the UE at each transmit antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms over all active uplink slots and in the uplink symbols.

4. If UE supports ULFPTx, repeat test steps 1~3 with UL RMC according to Table 6.2D.4\_1.4.1-2. The PDCCH DCI format 0\_1 is specified with the condition ULFPTx\_Mode1, ULFPTx\_Mode2 or ULFPTx\_ModeFull in 38.508-1 [5] subclause 4.3.6.1.1.2 depending on UE reported capability.

6.2D.4\_1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.3.6.1.1.2 ensuring UL/SUL indicator in Table 4.3.6.1.1.2-1 with condition SUL, subclause 4.6 ensuring Table 4.6.1-28 with condition SUL AND (RF OR RRM), Tables 4.6.3-14 with condition SUL\_SUL for SUL carrier, Table 4.6.3-167 with condition PUSCH\_PUCCH\_ON\_SUL, and Table 4.6.3-182 with the condition 2TX\_UL\_MIMO and following exception.

Table 6.2D.4\_1.4.3-1: FrequencyInfoUL-SIB: Test point 1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 0 |  |  |

Table 6.2D.4\_1.4.3-2: FrequencyInfoUL-SIB: Test point 2

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 14 |  |  |

Table 6.2D.4\_1.4.3-3: FrequencyInfoUL-SIB: Test point 3

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 18 |  |  |

6.2D.4\_1.5 Test requirement

The maximum output power measured shall not exceed the values specified in Table 6.2D.4\_1.5-1.

Table 6.2D.4\_1.5-1: PCMAX configured UE output power

|  |  |
| --- | --- |
| Configured transmitted power | |
| Measured UE output power test point 1 | 0 dBm ± (7+TT) |
| Measured UE output power test point 2 | 14 dBm ± (6+TT) |
| Measured UE output power test point 3 | 18 dBm ± (5+TT) |
| Note 1: TT for each frequency and channel bandwidth is specified in Table 6.2D.4\_1.5-2.  Note 2: In addition note 2 in Table 6.2D.1\_1.3-1 shall apply to the tolerances. | |

Table 6.2D.4\_1.5-2: Test Tolerance (Configured transmitted power for UL MIMO)

|  |  |  |
| --- | --- | --- |
|  | **f ≤ 3.0GHz** | **3.0GHz < f ≤ 6.0GHz** |
| BW ≤ 40MHz | 0.7 | 1.0 |
| 40MHz < BW ≤ 100MHz | 1.0 | 1.0 |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

## 6.2E Transmitter power for V2X

### 6.2E.1 UE maximum output power for V2X

#### 6.2E.1.0 Minimum conformance requirements

6.2E.1.0.1 General

When NR V2X UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands specified in Table 5.2E.1-1, the allowed NR V2X UE maximum output power is specified in Table 6.2.1.3-1 in clause 6.2.1.

When a UE is configured for NR V2X sidelink transmissions in NR Band n47, the V2X UE shall meet the following additional requirements for transmission within the frequency ranges 5855-5925 MHz:

- The maximum mean power spectral density shall be restricted to 23 dBm/MHz EIRP when the network signalling value NS\_33 is indicated.

where the network signalling values are specified in clause 6.2E.3.0.

NOTE: The PSD limit in EIRP shall be converted to conducted requirement depend on the supported post antenna connector gain Gpost connector declared by the UE following the principle described in annex I in [11].

For NR V2X UE supporting SL MIMO, the maximum output power requirements in Table 6.2E.1.0.1-1 shall be met with the SL MIMO configurations specified in Table 6.2D.1.3-2. The maximum output power is defined as the sum of the maximum output power from each UE antenna connector. The period of measurement shall be at least one sub frame (1 ms).

Table 6.2E.1.0.1-1: NR V2X UE Power Class for SL-MIMO

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| n38 |  |  |  |  | 23 | +2/-3 |  |  |
| n47 |  |  |  |  | 23 | +2/-3 |  |  |

If the UE transmits on one antenna connector at a time, the requirements in Table 6.2.1.3-1 shall apply to the active antenna connector.

6.2E.1.0.2 UE maximum output power for V2X con-current operation

For the inter-band con-current NR V2X operation, the maximum output power is specified in Table 6.2E.1.0.2-1. The period of measurement shall be at least one sub frame (1ms).

Table 6.2E.1.0.2-1: NR V2X UE Power Class for inter-band con-current combination (two bands)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR V2X con-current operating band Configuration | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance  (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| V2X\_n71A-n47A |  |  |  |  | 23 | +2/-34 |  |  |
| NOTE 1: The con-current band combinations are used for NR V2X Service.  NOTE 2: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 3: For inter-band con-current aggregation the maximum power requirement apply to the total transmitted power over all component carriers (per UE).  NOTE 4: 4 refers to the transmission bandwidths (Figure 5.6-1) confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB | | | | | | | | |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2E.1

#### 6.2E.1.1 UE maximum output power for V2X / non-concurrent operation

6.2E.1.1.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2E.1.1.2 Test applicability

The requirements in this test are not testable due to lack of appropriate test points since there’s no configuration satisfying MPR=0dB requirements in TS 38.101-1.

No test case details are specified.

#### 6.2E.1.1D UE maximum output power for V2X / non-concurrent operation / SL-MIMO

6.2E.1.1D.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2E.1.1D.2 Test applicability

The requirements in this test are not testable due to lack of appropriate test points since there’s no configuration satisfying MPR=0dB requirements in TS 38.101-1.

No test case details are specified.

### 6.2E.2 UE maximum output power reduction for V2X

#### 6.2E.2.0 Minimum conformance requirements

6.2E.2.0.1 General

When UE is configured for NR V2X sidelink transmissions non-concurrent with NR uplink transmissions for NR V2X operating bands specified in Table 5.2E.1-1, this clause specifies the allowed Maximum Power Reduction (MPR) power for V2X physical channels and signals due to PSCCH/PSSCH, PSFCH and S-SSB transmission.

6.2E.2.0.2 MPR for Power class 3 V2X UE

For contiguous allocation of PSCCH and PSSCH simultaneous transmission, the allowed MPR for the maximum output power for NR V2X physical channels PSCCH and PSSCH shall be as specified in Table 6.2E.2.0.2-1 for Power class 3 NR V2X UE.

Table 6.2E.2.0.2-1: Maximum Power Reduction (MPR) for power class 3 NR V2X

|  |  |  |  |
| --- | --- | --- | --- |
| Modulation | | Channel bandwidth/MPR (dB) | |
|  | | Outer RB allocations | Inner RB allocations |
| CP-OFDM | QPSK | ≤ 4.5 | ≤ 2.5 |
|  | 16QAM | ≤ 4.5 | ≤ 2.5 |
|  | 64 QAM | ≤ 4.5 | |
|  | 256 QAM | ≤ 7.0 | |

Where the following parameters are defined to specify valid RB allocation ranges for Outer and Inner RB allocations:

NRB is the maximum number of RBs for a given Channel bandwidth and sub-carrier spacing defined in Table 5.3.2-1.

RBStart,Low = max(1, floor(LCRB/2))

where max() indicates the largest value of all arguments and floor(x) is the greatest integer less than or equal to x.

RBStart,High = NRB – RBStart,Low – LCRB

The RB allocation is an Inner RB allocation if the following conditions are met

RBStart,Low ≤ RBStart ≤ RBStart,High,and

LCRB ≤ ceil(NRB/2)

where ceil(x) is the smallest integer greater than or equal to x.

The RB allocation is an Outer RB allocation for all other allocations which are not an Inner RB allocation.

For PSFCH with single RB transmission for PC3 NR V2X UE, the required MPR is defined as follow

MPR\_PSFCH = 3.5 dB

For contiguous and non-contiguous allocation for simultaneous PSFCH transmission for PC3 NR V2X UE, the required MPR are specified as follow

MPR\_PSFCH = CEIL {MA\_PSFCH, 0.5}

Where MA\_PSFCH is defined as follows

MA\_PSFCH = 7.5 ; 0.00< NGap/NRB ≤ 0.55

= 12.0 ; 0.55< NGap/NRB ≤1.0

Where,

NGap is the gap RB amount between RBstart and RBend for contiguous and non-contiguous allocation simultaneous PSFCH transmission. (NGap = RBend - RBstart)

CEIL{MA, 0.5} means rounding upwards to closest 0.5dB.

The allowed MPR for the maximum output power for NR V2X physical channels on S-SSB transmission shall be specified in Table 6.2E.2.0.2-2.

Table 6.2E.2.0.2-2: Maximum Power Reduction (MPR) for S-SSB transmission for power class 3 NR V2X

|  |  |  |
| --- | --- | --- |
| Channel | MPRS-SSB (dB) | |
|  | Outer RB allocations1 | Inner RB allocations1 |
| S-SSB | ≤ 6.0 | ≤ 2.5 |

For NR V2X UE with two transmit antenna connectors, the allowed Maximum Power Reduction (MPR) values specified in clause 6.2E.2.0 shall apply to the maximum output power specified in Table 6.2E.1.1.3-1. The requirements shall be met with SL MIMO configurations defined in Table 6.2D.1.3-2. For UE supporting SL MIMO, the maximum output power is defined as the sum of the maximum output power from each UE antenna connector.

For the UE maximum output power modified by MPR, the power limits specified in clause 6.2E.4.0 apply.

6.2E.2.0.3 MPR for Power class 3 V2X con-current operation

For the inter-band con-current NR V2X operation, the allowed maximum power reduction (MPR) for the maximum output power shall be applied per each component carrier. The MPR requirements in clause 6.2.2.3 apply for NR Uu operation in licensed band, and the MPR requirements in in clause 6.2E.2.0 apply for NR sidelink operation in licensed band or Band n47.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2E.2

#### 6.2E.2.1 UE maximum output power reduction for V2X / non-concurrent operation

Editor’s Note: The test case is not completed for PSFCH and PSBCH measurement due to the following aspects are not yet determined:

- Measurement period of PSFCH and PSBCH is FFS.

6.2E.2.1.1 Test purpose

Same test purpose as in 6.2.2.1.

6.2E.2.1.2 Test applicability

This test case applies to all types of UE release 16 and forward that support NR V2X sidelink communication.

NOTE: Test execution is not necessary if TS 38.521-1 6.5E.2.4.1 is executed.

6.2E.2.1.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 6.2E.2.0.

6.2E.2.1.4 Test description

6.2E.2.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in Table 5.2E.1-1 and Table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2E.2.1.4.1-1 to 6.2E.2.1.4.1-3. The details of the V2X reference measurement channels (RMCs) are specified in Annex A.7.5 and the GNSS configuration in TS 38.508-1 [5] subclause 4.11.

Table 6.2E.2.1.4.1-1: Test Configuration Table for contiguous PSCCH and PSSCH allocation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1.8 | | | Low range, High range | |
| Test Channel Bandwidths as specified TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | V2X Configuration to Transmit | | |
|  |  | Modulation | | PSCCH and PSSCH RB allocation  (Note 1) |
| 1 | Default | QPSK | | Outer\_Full |
| 2 | Default | QPSK | | Inner\_Full |
| 3 | Default | 16QAM | | Outer\_Full |
| 4 | Default | 16QAM | | Inner\_Full |
| 5 | Default | 64QAM | | Outer\_Full |
| 6 | Default | 256QAM | | Outer\_Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1E-1. | | | | |

Table 6.2E.2.1.4.1-2: Test Configuration Table for PSFCH

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1.8 | | | Low range, High range |
| Test Channel Bandwidths as specified TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Freq | V2X Configuration to Transmit | |
|  |  | PSFCH RB allocation  (Note 1) | |
| 1 | Low range | PSFCH\_1RB\_Left | |
| 2 | High range | PSFCH\_1RB\_Right | |
| 3 | Low range | PSFCH\_2RB\_Left | |
| 4 | High range | PSFCH\_2RB\_Right | |
| 5 | Default | PSFCH\_Max\_Gap | |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1E-2. | | | |

Table 6.2E.2.1.4.1-3: Test Configuration Table for S-SSB

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1.8 | | | Low range, High range |
| Test Channel Bandwidths as specified TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Freq | V2X Configuration to Transmit | |
|  |  | S-SSB RB allocation  (Note 1) | |
| 1 | Low range | S-SSB\_Low | |
| 2 | High range | S-SSB\_High | |
| 3 | Default | S-SSB\_Mid | |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1E-3. | | | |

1. Connect the SS and GNSS simulator to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.9.1 for TE diagram and section A.3.2.7 for UE diagram.

2. The parameter settings for the NR sidelink transmission over PC5 are pre-configured according to TS 38.508-1 [5] subclause 4.10. Message content exceptions are defined in clause 6.2E.2.1.4.3.

3. The V2X Reference Measurement Channel is set according to Table 6.2E.2.1.4.1-1 to Table 6.2E.2.1.4.1-3.

4. The GNSS simulator is configured for Scenario #1: static in Geographical area #1, as defined in TS 38.508-1 [5] Table 4.11.2-2. Geographical area #1 is also pre-configured in the UE.

5. Propagation conditions are set according to Annex B.0.

6.2E.2.1.4.2 Test procedure

Subtest 1: PSCCH/PSSCH

1. Ensure the UE is in state Out\_of\_Coverage with generic procedure parameters Sidelink *On*, Test Loop Function *On* with UE test loop mode E closed for *Transmit Mode* according to TS 38.508-1 [5] clause 4.5.

2. The UE starts to perform the NR sidelink communication according to *SL-PreconfigurationNR*. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the NR sidelink RMC.

3. Measure the mean power of the UE in the channel bandwidth according to the test configuration from Table 6.2E.2.1.4.1-1. The period of measurement shall be at least continuous duration of one active sub-frame (1ms) excluding guard symbols.

Subtest 2: PSFCH

1. Ensure the UE is in state Out\_of\_Coverage with generic procedure parameters Sidelink *On*, Cast type Unicast, Test Loop Function *On* with UE test loop mode E closed for *Receive Mode* according to TS 38.508-1 [5] clause 4.5.

2. The UE starts to perform the NR sidelink reception according to *SL-PreconfigurationNR*.

3. The UE’s PSFCH transmission occasion is on slot n according to Table 6.2E.2.1.4.1-2. SS transmits PSSCH on combination of slot and subchannel as below:

a) Test ID 1: slot n-6, Lowest sub-channel

b) Test ID 2: slot n-3, Highest sub-channel

c) Test ID 3: slot n-6 and n-5, Lowest sub-channel

d) Test ID 4: slot n-4 and n-3, Highest sub-channel

e) Test ID 5: slot n-6, Highest sub-channel and slot n-3, Highest sub-channel

4. Measure the mean power of the UE on slot n in the channel bandwidth according to the test configuration from Table 6.2E.2.1.4.1-2. The period of measurement is FFS.

Subtest 3: S-SSB

1. Ensure the UE is in state Out\_of\_Coverage with generic procedure parameters Sidelink *On* according to TS 38.508-1 [5] clause 4.5. The UE is synchronized to GNSS,

2. The UE transmits PSBCH according *SL-PreconfigurationNR*.

3. Measure the mean power of the S-SSB in the channel bandwidth according to the test configuration from Table 6.2E.2.1.4.1-3. The period of measurement is FFS.

6.2E.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.10 with the following exceptions.

Table 6.2E.2.1.4.3-1: *SL-ResourcePool* for PSCCH/PSSCH Testing

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.6-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| SL-ResourcePool-r16 ::= SEQUENCE { |  |  |  |
| sl-PSCCH-Config-r16 CHOICE { |  |  |  |
| setup SEQUENCE { |  |  |  |
| sl-TimeResourcePSCCH-r16 | As defined in Table 6.1E-2 |  |  |
| sl-FreqResourcePSCCH-r16 | As defined in Table 6.1E-2 |  |  |
| } |  |  |  |
| } |  |  |  |
| sl-SubchannelSize-r16 | As defined in Table 6.1E-2 |  |  |
| sl-StartRB-Subchannel-r16 | As defined in Table 6.1E-2 |  |  |
| sl-NumSubchannel-r16 | As defined in Table 6.1E-2 |  |  |
| } |  |  |  |

Table 6.2E.2.1.4.3-2: *SL-ResourcePool* for PSFCH Testing

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.6-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| SL-ResourcePool-r16 ::= SEQUENCE { |  |  |  |
| sl-PSFCH-Config-r16 CHOICE { |  |  |  |
| setup SEQUENCE { |  |  |  |
| sl-PSFCH-Period-r16 | sl4 |  |  |
| sl-PSFCH-RB-Set-r16 | As defined in Table 6.1E-2 |  |  |
| sl-NumMuxCS-Pair-r16 | n1 |  |  |
| sl-MinTimeGapPSFCH-r16 | sl3 |  |  |
| sl-PSFCH-HopID-r16 | Not present | Default frequency hopping ID 0 is used |  |
| sl-PSFCH-CandidateResourceType-r16 | startSubCH |  |  |
| } |  |  |  |
| } |  |  |  |
| sl-SubchannelSize-r16 | As defined in Table 6.1E-2 |  |  |
| sl-StartRB-Subchannel-r16 | As defined in Table 6.1E-2 |  |  |
| sl-NumSubchannel-r16 | As defined in Table 6.1E-2 |  |  |
| } |  |  |  |

Table 6.2E.2.1.4.3-3: *SL-FreqConfigCommon* for S-SSB Testing

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.6-11 | | | |
| Information Element | Value/remark | Comment | Condition |
| SL-FreqConfigCommon-r16 ::= SEQUENCE { |  |  |  |
| sl-AbsoluteFrequencySSB-r16 | According to section 4.3.1.8 of TS 38.508-1 [5] |  |  |
| } |  |  |  |

6.2E.2.1.5 Test requirement

The maximum output power, derived in step 3 of Subtest 1, step 4 of Subtest 2 and step 3 of Subtest 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2E.2.1.5-1 to Table 6.2E.2.1.5-3.

Table 6.2E.2.1.5-1: UE MPR test requirement for contiguous PSCCH/PSSCH (Bands n38, n47)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | MPR (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 4.5 | 0 | 18.5 | 4 | 25.0 + TT | 14.5-TT |
| 2 | 23 | 2.5 | 0 | 20.5 | 2.5 | 25.0 + TT | 18-TT |
| 3 | 23 | 4.5 | 0 | 18.5 | 4 | 25.0 + TT | 14.5-TT |
| 4 | 23 | 2.5 | 0 | 20.5 | 2.5 | 25.0 + TT | 18-TT |
| 5 | 23 | 4.5 | 0 | 18.5 | 4 | 25.0 + TT | 14.5-TT |
| 6 | 23 | 7.0 | 0 | 16 | 5 | 25.0 + TT | 11-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2E.2.1.5-4. | | | | | | | |

Table 6.2E.2.1.5-2: UE MPR test requirement for PSFCH (Bands n38, n47)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | MPR (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 3.5 | 0 | 19.5 | 3.5 | 25.0 + TT | 16-TT |
| 2 | 23 | 7.5 | 0 | 15.5 | 5 | 25.0 + TT | 10.5-TT |
| 3 | 23 | 7.5 | 0 | 15.5 | 5 | 25.0 + TT | 10.5-TT |
| 4 | 23 | 12 | 0 | 11 | 6 | 25.0 + TT | 5-TT |
| 5 | 23 | 12 | 0 | 11 | 6 | 25.0 + TT | 5-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2E.2.1.5-4. | | | | | | | |

Table 6.2E.2.1.5-3: UE MPR test requirement for S-SSB (Bands n38, n47)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | MPR (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 6 | 0 | 17 | 5 | 25.0 + TT | 12-TT |
| 2 | 23 | 6 | 0 | 17 | 5 | 25.0 + TT | 12-TT |
| 3 | 23 | 2.5 | 0 | 20.5 | 2.5 | 25.0 + TT | 18-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2E.2.1.5-4. | | | | | | | |

Table 6.2E.2.1.5-4: Test Tolerance (UE maximum output power)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 4.2GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | FFS | FFS |

#### 6.2E.2.1D UE maximum output power reduction for V2X / non-concurrent operation / SL-MIMO

Editor’s Note: The test case is not completed due to the following aspects are not yet determined:

- Uplink RMC is TBD in TS 38.101-1

- Preconfiguration is not complete in 38.508-1

- Test state and generic procedure are TBD in 38.508-1

- Measurement period of PSFCH and PSBCH is FFS.

- Connection diagram for SL-MIMO is TBD

6.2E.2.1D.1 Test purpose

Same test purpose as in 6.2E.2.1.

6.2E.2.1D.2 Test applicability

This test case applies to all types of UE release 16 and forward that support NR V2X sidelink communication and SL-MIMO.

NOTE: Test execution is not necessary if TS 38.521-1 6.5E.2.4.1D is executed.

6.2E.2.1D.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 6.2E.2.0.

6.2E.2.1D.4 Test description

6.2E.2.1D.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.2E.1-1 and table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2E.2.1D.4.1-1. The details of the V2X reference measurement channels (RMCs) are specified in Annexes TBD and the GNSS configuration in TS 38.508-1 [5] subclause 4.11.

Table 6.2E.2.1D.4.1-1: Test Configuration Table for contiguous PSCCH and PSSCH allocation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1.8 | | | Low range, High range | |
| Test Channel Bandwidths as specified TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | V2X Configuration to Transmit | | |
|  |  | Modulation | | PSCCH and PSSCH RB allocation  (Note 1) |
| 1 | Default | QPSK | | Outer\_Full |
| 2 | Default | QPSK | | Inner\_Full |
| 3 | Default | 16QAM | | Outer\_Full |
| 4 | Default | 16QAM | | Inner\_Full |
| 5 | Default | 64QAM | | Outer\_Full |
| 6 | Default | 256QAM | | Outer\_Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1E-1. | | | | |

1. Connect the SS and GNSS simulator to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure TBD for TE diagram and section TBD for UE diagram.

2. The parameter settings for the NR sidelink transmission over PC5 are pre-configured according to TS 38.508-1 [5] subclause 4.10. Message content exceptions are defined in clause 6.2E.2.1D.4.3.

3. The V2X Reference Measurement Channel is set according to Table 6.2E.2.1D.4.1-1.

4. The GNSS simulator is configured for Scenario #1: static in Geographical area #1, as defined in TS38.508-1 [5] Table 4.11.2-2. Geographical area #1 is also pre-configured in the UE.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state 4-A as defined in TS 38.508-1 [4], subclause 4.4A using generic procedure parameter Sidelink (*On*), Cast Type (*Unicast*), GNSS Sync (*On*) and *Transmit Mode with SL-MIMO.*

6.2E.2.1D.4.2 Test procedure

1. The UE starts to perform the NR sidelink communication according to *SL-PreconfigurationNR* with 2-layer MIMO codebook TPMI 0. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the NR sidelink RMC.

2. Measure the sum of mean power of the UE at each transmit antenna connector in the channel bandwidth according to the test configuration from Table 6.2E.2.1D.4.1-1. The period of measurement shall be at least continuous duration of one active sub-frame (1ms) excluding guard symbols.

6.2E.2.1D.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.10 with the following exceptions.

Table 6.2E.2.1D.4.3-1: *SL-ResourcePool* for PSCCH/PSSCH Testing

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.6-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| SL-ResourcePool-r16 ::= SEQUENCE { |  |  |  |
| sl-PSCCH-Config-r16 CHOICE { |  |  |  |
| setup SEQUENCE { |  |  |  |
| sl-TimeResourcePSCCH-r16 | As defined in Table 6.1E-2 |  |  |
| sl-FreqResourcePSCCH-r16 | As defined in Table 6.1E-2 |  |  |
| } |  |  |  |
| } |  |  |  |
| sl-SubchannelSize-r16 | As defined in Table 6.1E-2 |  |  |
| sl-StartRB-Subchannel-r16 | As defined in Table 6.1E-2 |  |  |
| sl-NumSubchannel-r16 | As defined in Table 6.1E-2 |  |  |
| } |  |  |  |

6.2E.2.1D.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2E.2.1D.5-1.

Table 6.2E.2.1D.5-1: UE MPR test requirement for contiguous PSCCH/PSSCH (Bands n38, n47)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | MPR (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | TL,c | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 4.5 | 0 | 18.5 | 5 | 3 | 25.0 + TT | 13.5 + TT |
| 2 | 23 | 2.5 | 0 | 20.5 | 6 | 3 | 25.0 + TT | 14.5 + TT |
| 3 | 23 | 4.5 | 0 | 18.5 | 5 | 3 | 25.0 + TT | 13.5 + TT |
| 4 | 23 | 2.5 | 0 | 20.5 | 6 | 3 | 25.0 + TT | 14.5 + TT |
| 5 | 23 | 4.5 | 0 | 18.5 | 5 | 3 | 25.0 + TT | 13.5 + TT |
| 6 | 23 | 7.0 | 0 | 16 | 5 | 3 | 25.0 + TT | 11.0 + TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2E.2.1D.5-2. | | | | | | | | |

Table 6.2E.2.1D.5-2: Test Tolerance (UE maximum output power)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 4.2GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | FFS | FFS |

#### 6.2E.2.2 UE maximum output power reduction for V2X / concurrent operation

6.2E.2.2.1 Test purpose

To verify that the reduction of UE transmitted power due to higher order modulations and transmit bandwidth configurations is within the allowed range. An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2E.2.2.2 Test applicability

This test case applies to all types of NR UE release 16 and forward that support NR V2X sidelink communication.

6.2E.2.2.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 6.2E.2.0.

6.2E.2.2.4 Test description

6.2E.2.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in Table 5.2E.2-1 and Table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2E.2.2.4.1-1. The details of the V2X reference measurement channels (RMCs) are specified in Annexes A.7.5. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2E.2.2.4.1-1: Test Configuration Table

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | Low range for NR Uu and V2X carrier  High range for NR Uu and V2X carrier | | | |
| Test Channel Bandwidths as specified TS 38.508-1 [5] subclause 4.3.1 | | | | Lowest for NR Uu and V2X carrier  Highest for NR Uu and V2X carrier | | | |
| Test SCS as specified in Table 5.3.5-1 | | | | Lowest for NR Uu and V2X carrier  Highest for NR Uu and V2X carrier | | | |
| Test Parameters for Channel Bandwidths | | | | | | | |
|  | NR Uu Configuration | | | | NR V2X Configuration to Transmit | | |
|  | Freq | Downlink | Uplink Configuration | | Freq | Modulation | PSCCH |
|  |  | Configuration | Modulation | RB allocation  (NOTE 1) |  |  | and PSSCH RB allocation  (Note 2) |
| 1 | Default |  | DFT-s-OFDM QPSK | Inner Full | Default | CP-OFDM QPSK | Inner\_Full |
| 2 | Default | N/A | CP-OFDM 256 QAM | Outer Full | Default | CP-OFDM 256QAM | Outer\_Full |
| 3 | Default |  | DFT-s-OFDM QPSK | Inner Full | Default | CP-OFDM 256QAM | Outer\_Full |
| 4 | Default |  | CP-OFDM 256 QAM | Outer Full | Default | CP-OFDM QPSK | Inner\_Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: The specific configuration of each RB allocation is defined in Table 6.1E-1. | | | | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.9.3 for TE diagram and clause A.3.2.7 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] clause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The V2X Reference Measurement Channel and NR UL Reference Measurement Channel are set according to Table 6.2E.2.2.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameter Connectivity NR, Connected without release on, Test Mode On and Sidelink On according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2E.2.2.4.3.

6.2E.2.2.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2E.2.2.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. SS sends sidelink scheduling information for each SL-HARQ process via PDCCH DCI format 3\_0 for C\_RNTI to schedule the Sidelink RMC according to Table 6.2E.2.2.4.1-1. UE is configured to transmit at Pcmax on the sidelink carrier. Since the UE has no payload and no loopback data to send the UE sends MAC padding bits on the Sidelink RMC.

4. Measure the sum of the mean power of the UE at NR Uu carrier and V2X sidelink carrier in the channel bandwidth according to the test configuration from Table 6.2E.2.2.4.1-1. The period of measurement shall be at least continuous duration of one active sub-frame (1ms) excluding guard symbols.

6.2E.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [5] clause 4.6.

Table 6.2E.2.2.4.3-1: *SL-ResourcePool*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.6-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| SL-ResourcePool-r16 ::= SEQUENCE { |  |  |  |
| sl-PSCCH-Config-r16 CHOICE { |  |  |  |
| setup SEQUENCE { |  |  |  |
| sl-TimeResourcePSCCH-r16 | As defined in Table 6.1E-2 |  |  |
| sl-FreqResourcePSCCH-r16 | As defined in Table 6.1E-2 |  |  |
| } |  |  |  |
| } |  |  |  |
| sl-SubchannelSize-r16 | As defined in Table 6.1E-2 |  |  |
| sl-StartRB-Subchannel-r16 | As defined in Table 6.1E-2 |  |  |
| sl-NumSubchannel-r16 | As defined in Table 6.1E-2 |  |  |
| sl-PowerControl-r16 SEQUENCE { |  |  |  |
| sl-MaxTransPower-r16 | 24 |  |  |
| sl-Alpha-PSSCH-PSCCH-r16 | Not present |  |  |
| dl-Alpha-PSSCH-PSCCH-r16 | Not present |  |  |
| sl-P0-PSSCH-PSCCH-r16 | Not present |  |  |
| dl-P0-PSSCH-PSCCH-r16 | Not present |  |  |
| dl-Alpha-PSFCH-r16 | Not present |  |  |
| dl-P0-PSFCH-r16 | Not present |  |  |
| } |  |  |  |
| } |  |  |  |

6.2E.2.2.5 Test requirement

The maximum output power, derived in step 4 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2E.2.2.5-1.

Table 6.2E.2.2.5-1: UE MPR test requirement for inter-band con-current NR V2X operation

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | PPowerClass,NR  (dBm) | MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c, NR  (dBm) | PCMAX\_H,c, NR  (dB) | PPowerClass,V2X  (dBm) | PCMAX\_H,f,c,V2X (dBm) | PCMAX\_L  (dBm) | PCMAX\_H  (dBm) | T(PCMAX\_L)  (dB) | T(PCMAX\_H)  (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 0 | 0 | 23 | 23 | 23 | 23 | 23 | 26 | 3 | 2 | 28+TT | 20-TT |
| 2 | 23 | 6.5 | 0 | 16.5 | 23 | 23 | 23 | 16.5 | 26 | 5 | 2 | 28+TT | 11.5-TT |
| 3 | 23 | 0 | 0 | 23 | 23 | 23 | 23 | 23 | 26 | 3 | 2 | 28+TT | 20-TT |
| 4 | 23 | 6.5 | 0 | 16.5 | 23 | 23 | 23 | 16.5 | 26 | 5 | 2 | 28+TT | 11.5-TT |

Table 6.2E.2.2.5-2: Test Tolerance (inter-band con-current NR V2X operation)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 4.2GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB |

### 6.2E.3 UE additional maximum output power reduction for V2X

#### 6.2E.3.0 Minimum conformance requirements

6.2E.3.0.1 General

For the applied maximum output power reduction is obtained by taking the maximum value of MPR requirements specified in clause 6.2E.2.0 and A-MPR requirements specified in current clause.

Additional emission requirements can be indicated by the network or pre-configured radio parameters. Each additional emission requirement is associated with a unique network signalling (NS) value indicated in RRC signalling by an NR frequency band number of the applicable operating band and an associated value in the field [additionalSpectrumEmission]. Throughout this specification, the notion of indication or signalling of an NS value refers to the corresponding indication of an NR V2X frequency band number of the applicable operating band, the IE field [freqBandIndicatorNR] and an associated value of [additionalSpectrumEmission] in the relevant RRC information elements [6].

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2.1-1. Unless stated otherwise, the total reduction to UE maximum output power is max(MPR, A-MPR) where MPR is defined in clause 6.2E.2.0. Outer and inner allocation notation used in clause 6.2E.3.0.2 is defined in clause 6.2E.2.0. In absence of modulation and waveform types the A-MPR applies to all modulation and waveform types.

Table 6.2E.3.0.1-1: Additional Maximum Power Reduction (A-MPR) for PC3 NR V2X

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Network Signalling value | Requirements (clause) | NR Band | Channel bandwidth (MHz) | Resources Blocks (NRB) | A-MPR (dB) |
| NS\_01 |  | Table 5.2E.1-1 | 10, 20, 30, 40 | Table 5.3.2-1 | N/A |
| NS\_33 | 6.5E.2.3.0.1 (A-SEM)  6.5E.3.3.0 (A-SE) | n47 | 10 | Clause 6.2E.3.0.2 | |
| NS\_52 | 6.5E.2.3.0.2 (A-SEM) | n47 | 40 | Clause 6.2E.3.0.3 | |

Table 6.2E.3.0.1-2: Mapping of network signalling label

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR V2X operating bands | Value of additionalSpectrumEmission | | | | | | | |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| n38 | NS\_01 |  |  |  |  |  |  |  |
| n47 | NS\_01 | NS\_33 | NS\_52 |  |  |  |  |  |
| NOTE: [additionalSpectrumEmission] corresponds to an information element of the same name defined in clause 6.3.2 of TS 38.331 [7]. | | | | | | | | |

For UE with two transmit antenna connectors, the A-MPR values specified in clause 6.2E.3.0.2 and 6.2E.3.0.3 shall apply to the maximum output power specified in Table 6.2E.1.0.1-1. The requirements shall be met with the SL MIMO configurations specified in Table 6.2D.1-2. For UE supporting SL MIMO, the maximum output power is defined as the sum of the maximum output power from each UE antenna connector. Unless stated otherwise, an A-MPR of 0 dB shall be used.

For the UE maximum output power modified by A-MPR, the power limits specified in clause 6.2E.4.0 apply.

6.2E.3.0.2 A-MPR for Power class 3 V2X UE by NS\_33

When NS\_33 is indicated by the network or pre-configured radio parameters for NR V2X UE, the additional maximum output power reduction specified as

A-MPR = CEIL {MA, 0.5}

Where MA is defined as follows

MA = A-MPRBase + Gpost connector\* A-MPRStep

CEIL{MA, 0.5} means rounding upwards to closest 0.5dB.

A-MPRBase and A-MPRStep are specified in Tables 6.2E.3.0.2-1, 6.2E.3.0.2-2 is allowed when network signalling value is provided. A-MPRBase is the default A-MPR value when no Gpost connector is declared. The supported post antenna connector gain Gpost connector is declared by the UE following the principle described in annex I in [28]. The A-MPRstep is the increase in A-MPR allowance to allow UE to meet tighter conducted A-SE and A-SEM requirements with higher value of declared Gpost connector.

For the contiguous PSSCH and PSCCH transmission when NS\_33 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements.

Table 6.2E.3.0.2-1: A-MPR for PSSCH/PSCCH by NS\_33 (at Fc =5860MHz)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Carrier frequency [MHz] | Resources Blocks (LCRB) | Start Resource  Block | A-MPRBase (dB) | | |
|  |  |  | QPSK/16QAM | 64QAM | 256QAM |
| 5860 | ≥ 10 and ≤ 15 | 0 | ≤ 24 | | |
|  |  | ≥ 1 and ≤ 3 | ≤19 | | |
|  | ≥ 10 and ≤ 15 | ≥ 26 and ≤ 38 | ≤6 | | |
|  | ≥ 10 and ≤ 15 | ≥38 | ≤ 6 | | |
|  | ≥ 10 and ≤ 20 | ≥ 12 and ≤ 14 | ≤11 | | |
|  |  | ≥ 15 and ≤ 19 | ≤9.5 | | |
|  |  | ≥ 20 and ≤ 25 | ≤8.0 | | |
|  | > 15 and < 25 | ≥ 25 | ≤ 8 | | |
|  | ≥ 10 and < 40 | ≥ 4 and ≤7 | ≤ 16 | | |
|  |  | ≥ 8 and ≤ 11 | ≤ 13.5 | | |
|  | ≥ 20 and < 40 | ≥ 0 and ≤ 3 | ≤ 22 | | |
|  | ≥ 25 and < 40 | ≥ 16 and ≤ 21 | ≤ 9.5 | | |
|  |  | ≥ 22 and ≤ 27 | ≤ 8.0 | | |
|  | ≥ 24 and ≤ 40 | ≥ 12 and ≤ 15 | ≤ 12 | | |
|  | 40 and 45 | 0 and 1 | ≤ 19 | | |
|  |  | ≥ 2 and ≤ 5 | ≤ 16 | | |
|  |  | ≥ 6 and ≤ 11 | ≤ 13.5 | | |
|  | >45 | ≥ 0 | ≤ 16 | | |
| NOTE 1: A-MPRstep =1.2 dB is applied for RBstart 0 and 1 and A-MPRstep =0.7 dB is applied for all other RBstart  NOTE 2: Applicable for Channel Bandwidth = 10 MHz | | | | | |

Table 6.2E.3.0.2-2: A-MPR for PSSCH/PSCCH by NS\_33 (at other carrier frequency)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Carrier frequency [MHz] | RB allocations | A-MPRBase (dB) | | | | A-MPRstep (dB) |
|  |  | QPSK | 16QAM | 64QAM | 256QAM |
| 5870, 5880, 5890, 5900, 5910, 5920 | Inner | ≤ 3.0 | | ≤ 5.0 | ≤ 6.0 | 0.5 |
|  | Outer | ≤ 4.5 | |  |  |  |
| NOTE 1: Inner and Outer RB allocations are defined in clause 6.2E.2.2  NOTE 2: Applicable for Channel Bandwidth = 10 MHz | | | | | | |

For the simultaneous PSFCH transmission when NS\_33 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements

Table 6.2E.3.0.2-3: A-MPR for simultaneous PSFCH by NS\_33

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Channel Bandwidth  [MHz] | Centre Frequency  [MHz] | RB allocation | A-MPRBase (dB) | | | A-MPRstep (dB) |
|  |  |  | 0 ≤ NGap / NRB < 0.15 | 0.15≤ NGap / NRB < 0.3 | 0.3≤ NGap / NRB ≤ 1 |  |
| 10 | 5860 | NRB =1 | 19.0 | | | 1.0 |
|  | NRB > 1 | 22.0 | | |  |
|  | 5870, 5880, 5890, 5900, 5910, 5920 | NRB =1 | 5 | | | 0.8 |
| NRB > 1 | 14 | 7 | 18.5 |  |
| Note 1: NGap is the gap RB amount between RBstart and RBend for contiguous and non-contiguous allocation simultaneous PSFCH transmission. (NGap = RBend - RBstart) | | | | | | |

For the S-SSB transmission when NS\_33 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements.

Table 6.2E.3.0.2-4: A-MPR for S-SSB transmission by NS\_33

|  |  |  |  |
| --- | --- | --- | --- |
| Carrier Frequency (MHz) | RBStart \* 12\*SCS  [MHz] | A-MPRBase (dB) | AMPRStep (dB) |
| 5860 | ≤1.0 | ≤ 25 | 0.6 |
|  | >1.0 and ≤2.0 | ≤ 19 |  |
|  | >2.0 and ≤3.24 | ≤ 12 |  |
|  | >3.24 and ≤3.6 | ≤ 10 |  |
|  | >3.6 | ≤ 9 |  |
| 5870, 5880, 5890, 5900, 5910, 5920 | ≤1.0 | ≤ 7.0 | 0.85 |
|  | >1.0 and ≤1.6 | ≤ 6.5 |  |
|  | >1.6 and ≤2.6 | ≤ 5.8 |  |
|  | >2.6 and ≤3.24 | ≤ 4.5 |  |
|  | >3.24 and ≤4.32 | ≤ 5.5 |  |
|  | >4.32 | ≤ 6.5 |  |

6.2E.3.0.3 A-MPR for Power class 3 V2X UE by NS\_52

When NS\_52 is indicated by the network or pre-configured radio parameters for NR V2X UE, the additional maximum output power reduction specified as

A-MPR = CEIL {MA, 0.5}

Where MA is defined as follows

MA = A-MPR

CEIL{MA, 0.5} means rounding upwards to closest 0.5dB.

For the contiguous PSSCH and PSCCH transmission when NS\_52 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements.

Table 6.2E.3.0.3-1: A-MPR for PSSCH/PSCCH by NS\_52

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Carrier frequency(MHz) | Modulation | A-MPR(dB) | | |
|  |  | Region 1 | Region 2 | Region 3 |
| 5885 | QPSK | ≤ 15 | ≤ 8.0 | ≤ 5.5 |
|  | 16QAM |  | ≤ 8.0 | ≤ 5.5 |
|  | 64QAM |  | ≤ 8.5 | ≤ 5.5 |
|  | 256QAM |  | ≤ 8.5 | ≤ 6.0 |
| Note1: Void. | | | | |

Where the following parameters are defined to specify valid RB allocation ranges for Region1, Region2 and Region3 according to RB allocations:

Table 6.2E.3.0.3-1a: A-MPR Region definitions for PSSCH/PSCCH by NS\_52

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel Bandwidth, MHz | Carrier frequency (MHz) | A-MPR parameters for region definitions | | A-MPR |
|  |  | RBstart or RBend | LCRB |  |
| 40 | 5885 | RBstart ≤ floor(NRB\*0.2) or RBend ≥ NRB - floor(NRB\*0.2) | LCRB ≤floor(NRB\*0.2) | Region 1 |
|  |  | The RB allocation is in Region 2 allocation for all other allocations which are not a Region1 or Region3 allocation. | | Region 2 |
|  |  | floor(NRB /3.5) ≤ RBstart ≤ NRB –floor(NRB /3.5) – LCRB | LCRB ≤ceil(NRB/3.5) | Region 3 |

NRB is the maximum number of RBs for a given Channel bandwidth and sub-carrier spacing defined in Table 5.3.2-1 [3].

For the simultaneous PSFCH transmission when NS\_52 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements

Table 6.2E.3.0.3-2: A-MPR for simultaneous PSFCH by NS\_52

|  |  |  |
| --- | --- | --- |
| Channel Bandwidth [MHz] | Carrier frequency [MHz] | A-MPR (dB) |
| 40 MHz | 5885 | 23.5 |

For the S-SSB transmission when NS\_52 is indicated by the network or pre-configured radio parameters for NR V2X UE, the NR UE allow the follow A-MPR requirements

Table 6.2E.3.0.2-3: A-MPR for S-SSB transmission by NS\_52

|  |  |  |
| --- | --- | --- |
| Carrier Frequency [MHz] | RBStart \* 12\*SCS  [MHz] | A-MPR (dB) |
| 5885 | ≤ 7 | ≤ 16 |
|  | > 7 and ≤ 12 | ≤ 10.5 |
|  | > 12 and ≤ 19 | ≤ 4.0 |
|  | > 19 and ≤ 25 | ≤ 10.5 |
|  | > 25 | ≤ 16 |

6.2E.3.0.4 A-MPR for power class 3 V2X con-current operation

For the inter-band con-current NR V2X operation, the allowed additional maximum power reduction (A-MPR) for the maximum output power shall be applied per each component carrier. The A-MPR requirements in clause 6.2.3.3 apply for NR Uu operation in licensed band, and the A-MPR requirements in clause 6.2E.3.0.2 and 6.2E.3.0.3 apply for NR sidelink operation in Band n47.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2E.3.

#### 6.2E.3.1 UE additional maximum output power reduction for V2X / non-concurrent operation

6.2E.3.1.1 Test purpose

To verify that the reduction of UE transmitted power when additional emission requirements are signalled by the network in the field *additionalSpectrumEmission*.

6.2E.3.1.2 Test applicability

This test case applies to all types of UE release 16 and forward that support NR V2X sidelink communication.

NOTE: Test execution is not necessary if TS 38.521-1 6.5E.2.3.1 are executed.

6.2E.3.1.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 6.2E.3.0.

6.2E.3.1.4 Test description

6.2E.3.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in Table 5.2E.1-1 and Table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2E.3.1.4.1-1 to 6.2E.3.1.4.1-3. The details of the V2X reference measurement channels (RMCs) are specified in Annex A.7.5 and the GNSS configuration in TS 38.508-1 [5] subclause 4.11.

Table 6.2E.3.1.4.1-1: Test Configuration Table for contiguous PSCCH and PSSCH allocation for NS\_33

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1.8 | | | (See Freq column) | |
| Test Channel Bandwidths as specified TS 38.508-1 [5] subclause 4.3.1 | | | 10MHz | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | V2X Configuration to Transmit | | |
|  | (MHz) | Modulation | | PSCCH and PSSCH RB allocation |
| 1 | 5860 | 64QAM | | 15@0 |
| 2 | 5860 | 64QAM | | 15@1 |
| 3 | 5860 | 64QAM | | 15@26 |
| 4 | 5860 | 64QAM | | 12@38 |
| 5 | 5860 | 64QAM | | 20@12 |
| 6 | 5860 | 64QAM | | 20@15 |
| 7 | 5860 | 64QAM | | 20@20 |
| 8 | 5860 | 64QAM | | 24@25 |
| 9 | 5860 | 64QAM | | 36@4 |
| 10 | 5860 | 64QAM | | 36@8 |
| 11 | 5860 | 64QAM | | 36@0 |
| 12 | 5860 | 64QAM | | 36@16 |
| 13 | 5860 | 64QAM | | 36@22 |
| 14 | 5860 | 64QAM | | 40@12 |
| 15 | 5860 | 64QAM | | 45@0 |
| 16 | 5860 | 64QAM | | 45@2 |
| 17 | 5860 | 64QAM | | 45@6 |
| 18 | 5860 | 64QAM | | 50@0 |
| 19 | 5920 | 16QAM | | Inner\_Full (Note 1) |
| 20 | 5920 | 64QAM | | Inner\_Full (Note 1) |
| 21 | 5920 | 256QAM | | Inner\_Full (Note 1) |
| 22 | 5920 | 16QAM | | Outer\_Full (Note 1) |
| 23 | 5920 | 64QAM | | Outer\_Full (Note 1) |
| 24 | 5920 | 256QAM | | Outer\_Full (Note 1) |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1E-1. | | | | |

Table 6.2E.3.1.4.1-2: Test Configuration Table for PSFCH for NS\_33

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1.8 | | | (See Freq column) | |
| Test Channel Bandwidths as specified TS 38.508-1 [5] subclause 4.3.1 | | | 10MHz | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | V2X Configuration to Transmit | | |
|  | (MHz) | PSFCH RB allocation | | |
| 1 | 5860 | PSFCH\_1RB\_Left (Note 1) | | |
| 2 | 5860 | PSFCH\_Max\_Gap (Note 1) | | |
| 3 | 5920 | 1@49 | | |
| 4 | 5920 | 1@0 | | 1@7 |
| 5 | 5920 | 1@0 | | 1@15 |
| 6 | 5920 | PSFCH\_Max\_Gap (Note 1) | | |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1E-2. | | | | |

Table 6.2E.3.1.4.1-3: Test Configuration Table for S-SSB for NS\_33

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1.8 | | | (See Freq column) |
| Test Channel Bandwidths as specified TS 38.508-1 [5] subclause 4.3.1 | | | 10MHz |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Freq | V2X Configuration to Transmit | |
|  | (MHz) | S-SSB RB allocation | |
| 1 | 5860 | 11@0 | |
| 2 | 5860 | 11@6 | |
| 3 | 5860 | 11@12 | |
| 4 | 5860 | 11@19 | |
| 5 | 5860 | 11@21 | |
| 6 | 5920 | 11@5 | |
| 7 | 5920 | 11@8 | |
| 8 | 5920 | 11@14 | |
| 9 | 5920 | 11@18 | |
| 10 | 5920 | 11@24 | |
| 11 | 5920 | 11@41 | |

1. Connect the SS and GNSS simulator to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.9.1 for TE diagram and section A.3.2.7 for UE diagram.

2. The parameter settings for the NR sidelink transmission over PC5 are pre-configured according to TS 38.508-1 [5] subclause 4.10. Message content exceptions are defined in clause 6.2E.3.1.4.3.

3. The V2X Reference Measurement Channel is set according to Table 6.2E.3.1.4.1-1 to Table 6.2E.3.1.4.1-3.

4. The GNSS simulator is configured for Scenario #1: static in Geographical area #1, as defined in TS 38.508-1 [5] Table 4.11.2-2. Geographical area #1 is also pre-configured in the UE.

5. Propagation conditions are set according to Annex B.0.

6.2E.3.1.4.2 Test procedure

Subtest 1: PSCCH/PSSCH

1. Ensure the UE is in state Out\_of\_Coverage with generic procedure parameters Sidelink On, Test Loop Function On with UE test loop mode E closed for Transmit Mode according to TS 38.508-1 [5] clause 4.5.

2. The UE starts to perform the NR sidelink communication according to SL-PreconfigurationNR. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the NR sidelink RMC.

3. Measure the mean power of the UE in the channel bandwidth according to the test configuration from Table 6.2E.3.1.4.1-1. The period of measurement shall be at least continuous duration of one active sub-frame (1ms) excluding guard symbols.

Subtest 2: PSFCH

1. Ensure the UE is in state Out\_of\_Coverage with generic procedure parameters Sidelink On, Cast type Unicast, Test Loop Function On with UE test loop mode E closed for Receive Mode according to TS 38.508-1 [5] clause 4.5.

2. The UE starts to perform the NR sidelink reception according to SL-PreconfigurationNR.

3. The UE’s PSFCH transmission occasion is on slot n according to Table 6.2E.3.1.4.1-2. SS transmits PSSCH on combination of slot and subchannel as below:

a) Test ID 1: slot n-6, Lowest sub-channel

b) Test ID 2, 4, 5 and 6: slot n-6, Lowest sub-channel and slot n-3, Highest sub-channel

c) Test ID 3: slot n-3, Highest sub-channel

4. Measure the mean power of the UE on slot n in the channel bandwidth according to the test configuration from Table 6.2E.3.1.4.1-2. The cumulative measurement period is at least 1ms.

Subtest 3: S-SSB

1. Ensure the UE is in state Out\_of\_Coverage with generic procedure parameters Sidelink On according to TS 38.508-1 [5] clause 4.5. The UE is synchronized to GNSS,

2. The UE transmits PSBCH according SL-PreconfigurationNR.

3. Measure the mean power of the S-SSB in the channel bandwidth according to the test configuration from Table 6.2E.3.1.4.1-3. The cumulative measurement period is at least 1ms.

6.2E.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.10 with the following exceptions.

6.2E.3.1.4.3.1 Message contents exceptions (network signalling value “NS\_33”)

Table 6.2E.3.1.4.3.1-1: Network signalling value "NS\_33"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] clause 4.6.3, Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_33) |  |  |

Table 6.2E.3.1.4.3.1-2: SL-ResourcePool for PSCCH/PSSCH Testing for NS\_33

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.6-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| SL-ResourcePool-r16 ::= SEQUENCE { |  |  |  |
| sl-PSCCH-Config-r16 CHOICE { |  |  |  |
| setup SEQUENCE { |  |  |  |
| sl-TimeResourcePSCCH-r16 | 10 |  |  |
| sl-FreqResourcePSCCH-r16 | 3 |  |  |
| } |  |  |  |
| } |  |  |  |
| sl-SubchannelSize-r16 | 10 |  | Test ID 5, 6, 7, 14, 18 |
|  | 12 |  | Test ID 4, 8, 9, 10, 11, 12, 13 |
|  | 15 |  | Test ID 1, 2, 3, 15, 16, 17 |
| sl-StartRB-Subchannel-r16 | 0 |  | Test ID 1, 11, 15, 18 |
|  | 1 |  | Test ID 2 |
|  | 26 |  | Test ID 3 |
|  | 38 |  | Test ID 4 |
|  | 12 |  | Test ID 5, 14 |
|  | 15 |  | Test ID 6 |
|  | 20 |  | Test ID 7 |
|  | 25 |  | Test ID 8 |
|  | 4 |  | Test ID 9 |
|  | 8 |  | Test ID 10 |
|  | 16 |  | Test ID 12 |
|  | 22 |  | Test ID 13 |
|  | 2 |  | Test ID 16 |
|  | 6 |  | Test ID 17 |
| sl-NumSubchannel-r16 | 1 |  | Test ID 1, 2, 3, 4 |
|  | 2 |  | Test ID 5, 6, 7, 8, |
|  | 3 |  | Test ID 9, 10, 11, 12, 13, 15, 16, 17 |
|  | 4 |  | Test ID 14 |
|  | 5 |  | Test ID 18 |
| } |  |  |  |

Table 6.2E.3.1.4.3.1-3: SL-ResourcePool for PSFCH Testing for NS\_33

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.6-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| SL-ResourcePool-r16 ::= SEQUENCE { |  |  |  |
| sl-PSFCH-Config-r16 CHOICE { |  |  |  |
| setup SEQUENCE { |  |  |  |
| sl-PSFCH-Period-r16 | sl4 |  |  |
| sl-PSFCH-RB-Set-r16 | Bitstring of length 50, The leftmost 4 bits and rightmost 4 bits are set to "1" and the rest are set to "0" |  | Test ID 1, 2, 3, 6 |
|  | Bitstring of length 50, The leftmost 8 bits are set to "1" and the rest are set to "0" |  | Test ID 4 |
|  | Bitstring of length 50, The leftmost 4 bits and bits 12~15 are set to "1" and the rest are set to "0" |  | Test ID 5 |
| sl-NumMuxCS-Pair-r16 | n1 |  |  |
| sl-MinTimeGapPSFCH-r16 | sl3 |  |  |
| sl-PSFCH-HopID-r16 | Not present | Default frequency hopping ID 0 is used |  |
| sl-PSFCH-CandidateResourceType-r16 | startSubCH |  |  |
| } |  |  |  |
| } |  |  |  |
| sl-SubchannelSize-r16 | 25 |  |  |
| sl-StartRB-Subchannel-r16 | 0 |  |  |
| sl-NumSubchannel-r16 | 2 |  |  |
| } |  |  |  |

Table 6.2E.3.1.4.3.1-4: SL-FreqConfigCommon for S-SSB Testing

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.6-11 | | | |
| Information Element | Value/remark | Comment | Condition |
| SL-FreqConfigCommon-r16 ::= SEQUENCE { |  |  |  |
| sl-AbsoluteFrequencySSB-r16 | According to section 4.3.1.8 of TS 38.508-1 [5] |  |  |
| } |  |  |  |

6.2E.3.1.5 Test requirement

The maximum output power, derived in step 3 of Subtest 1, step 4 of Subtest 2 and step 3 of Subtest 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2E.3.1.5-1 to Table 6.2E.3.1.5-3.

Table 6.2E.3.1.5-0: Test Tolerance (UE maximum output power)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7dB | 1.0dB |

Table 6.2E.3.1.5-1: UE AMPR test requirement for contiguous PSCCH/PSSCH for NS\_33

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | MPR (dB) | AMPR (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 12 | 23 | 4.5 | 24 | 0 | -1 | 7 | 25.0 + TT | -8-TT |
| 22 | 23 | 4.5 | 19 | 0 | 4 | 7 | 25.0 + TT | -3-TT |
| 32 | 23 | 4.5 | 6 | 0 | 17 | 5 | 25.0 + TT | 13-TT |
| 42 | 23 | 4.5 | 6 | 0 | 17 | 5 | 25.0 + TT | 13-TT |
| 52 | 23 | 4.5 | 11 | 0 | 12 | 6 | 25.0 + TT | 6-TT |
| 62 | 23 | 4.5 | 9.5 | 0 | 13.5 | 6 | 25.0 + TT | 7.5-TT |
| 72 | 23 | 4.5 | 8 | 0 | 15 | 6 | 25.0 + TT | 9-TT |
| 82 | 23 | 4.5 | 8 | 0 | 15 | 6 | 25.0 + TT | 9-TT |
| 92 | 23 | 4.5 | 16 | 0 | 7 | 7 | 25.0 + TT | 0-TT |
| 102 | 23 | 4.5 | 13.5 | 0 | 9.5 | 7 | 25.0 + TT | 2.5-TT |
| 112 | 23 | 4.5 | 22 | 0 | 1 | 7 | 25.0 + TT | -6-TT |
| 122 | 23 | 4.5 | 9.5 | 0 | 13.5 | 6 | 25.0 + TT | 7.5-TT |
| 132 | 23 | 4.5 | 8 | 0 | 15 | 6 | 25.0 + TT | 9-TT |
| 142 | 23 | 4.5 | 12 | 0 | 11 | 6 | 25.0 + TT | 5-TT |
| 152 | 23 | 4.5 | 19 | 0 | 4 | 7 | 25.0 + TT | -3-TT |
| 162 | 23 | 4.5 | 16 | 0 | 7 | 7 | 25.0 + TT | 0-TT |
| 172 | 23 | 4.5 | 13.5 | 0 | 9.5 | 7 | 25.0 + TT | 2.5-TT |
| 182 | 23 | 4.5 | 16 | 0 | 7 | 7 | 25.0 + TT | 0-TT |
| 19 | 23 | 2.5 | 3 | 0 | 20 | 6 | 25.0 + TT | 14-TT |
| 20 | 23 | 4.5 | 5 | 0 | 18 | 5 | 25.0 + TT | 13-TT |
| 21 | 23 | 7.0 | 6 | 0 | 16 | 5 | 25.0 + TT | 11-TT |
| 22 | 23 | 4.5 | 4.5 | 0 | 18.5 | 5 | 25.0 + TT | 13.5-TT |
| 23 | 23 | 4.5 | 5 | 0 | 18 | 5 | 25.0 + TT | 13-TT |
| 24 | 23 | 7.0 | 6 | 0 | 16 | 5 | 25.0 + TT | 11-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2E.3.1.5-0.  NOTE 2: If the supported post antenna connector gain Gpost connector is declared by the UE, the lower limit is further lower down by Gpost connector\* A-MPRStep. A-MPRstep =1.2 dB is applied for RBstart 0 and 1 and A-MPRstep =0.7 dB is applied for all other RBstart. | | | | | | | | |

Table 6.2E.3.1.5-2: UE MPR test requirement for PSFCH for NS\_33

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | MPR (dB) | AMPR  (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 3.5 | 19 | 0 | 4 | 7 | 25.0 + TT | -3-TT |
| 2 | 23 | 12 | 22 | 0 | 1 | 7 | 25.0 + TT | -6-TT |
| 3 | 23 | 3.5 | 5 | 0 | 18 | 5 | 25.0 + TT | 13-TT |
| 4 | 23 | 7.5 | 14 | 0 | 9 | 7 | 25.0 + TT | 2-TT |
| 5 | 23 | 7.5 | 7 | 0 | 16 | 5 | 25.0 + TT | 11-TT |
| 6 | 23 | 12 | 18.5 | 0 | 4.5 | 7 | 25.0 + TT | -2.5-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2E.3.1.5-0. | | | | | | | | |

Table 6.2E.3.1.5-3: UE MPR test requirement for S-SSB for NS\_33

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | MPR (dB) | AMPR  (dBm) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 6 | 25 | 0 | -2 | 7 | 25.0 + TT | -9-TT |
| 2 | 23 | 2.5 | 19 | 0 | 4 | 7 | 25.0 + TT | -3-TT |
| 3 | 23 | 2.5 | 12 | 0 | 11 | 6 | 25.0 + TT | 5-TT |
| 4 | 23 | 2.5 | 10 | 0 | 13 | 6 | 25.0 + TT | 7-TT |
| 5 | 23 | 2.5 | 9 | 0 | 14 | 6 | 25.0 + TT | 8-TT |
| 6 | 23 | 6 | 7 | 0 | 16 | 5 | 25.0 + TT | 11-TT |
| 7 | 23 | 2.5 | 6.5 | 0 | 16.5 | 5 | 25.0 + TT | 11.5-TT |
| 8 | 23 | 2.5 | 5.8 | 0 | 17.2 | 5 | 25.0 + TT | 12.2-TT |
| 9 | 23 | 2.5 | 4.5 | 0 | 18.5 | 5 | 25.0 + TT | 13.5-TT |
| 10 | 23 | 2.5 | 5.5 | 0 | 17.5 | 5 | 25.0 + TT | 12.5-TT |
| 11 | 23 | 6 | 6.5 | 0 | 16.5 | 5 | 25.0 + TT | 11.5-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2E.3.1.5-0. | | | | | | | | |

#### 6.2E.3.1D UE additional maximum output power reduction for V2X / non-concurrent operation / SL-MIMO

6.2E.3.1D.1 Test purpose

Same test purpose as in 6.2E.3.1.

6.2E.3.1D.2 Test applicability

This test case applies to all types of UE release 16 and forward that support NR V2X sidelink communication and SL-MIMO.

NOTE: Test execution is not necessary if TS 38.521-1 6.5E.2.3.1D are executed.

6.2E.3.1D.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 6.2E.3.0.

6.2E.3.1D.4 Test description

6.2E.3.1D.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.2E.1-1 and table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2E.3.1D.4.1-1. The details of the V2X reference measurement channels (RMCs) are specified in Annex A.7.5 and the GNSS configuration in TS 38.508-1 [5] subclause 4.11.

Table 6.2E.3.1D.4.1-1: Test Configuration Table for contiguous PSCCH and PSSCH allocation for NS\_33

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1.8 | | | (See Freq column) | |
| Test Channel Bandwidths as specified TS 38.508-1 [5] subclause 4.3.1 | | | 10MHz | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | V2X Configuration to Transmit | | |
|  | (MHz) | Modulation | | PSCCH and PSSCH RB allocation |
| 1 | 5860 | 64QAM | | 15@0 |
| 2 | 5860 | 64QAM | | 15@1 |
| 3 | 5860 | 64QAM | | 15@26 |
| 4 | 5860 | 64QAM | | 12@38 |
| 5 | 5860 | 64QAM | | 20@12 |
| 6 | 5860 | 64QAM | | 20@15 |
| 7 | 5860 | 64QAM | | 20@20 |
| 8 | 5860 | 64QAM | | 24@25 |
| 9 | 5860 | 64QAM | | 36@4 |
| 10 | 5860 | 64QAM | | 36@8 |
| 11 | 5860 | 64QAM | | 36@0 |
| 12 | 5860 | 64QAM | | 36@16 |
| 13 | 5860 | 64QAM | | 36@22 |
| 14 | 5860 | 64QAM | | 40@12 |
| 15 | 5860 | 64QAM | | 45@0 |
| 16 | 5860 | 64QAM | | 45@2 |
| 17 | 5860 | 64QAM | | 45@6 |
| 18 | 5860 | 64QAM | | 50@0 |
| 19 | 5920 | 16QAM | | Inner\_Full (Note 1) |
| 20 | 5920 | 64QAM | | Inner\_Full (Note 1) |
| 21 | 5920 | 256QAM | | Inner\_Full (Note 1) |
| 22 | 5920 | 16QAM | | Outer\_Full (Note 1) |
| 23 | 5920 | 64QAM | | Outer\_Full (Note 1) |
| 24 | 5920 | 256QAM | | Outer\_Full (Note 1) |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1E-1. | | | | |

1. Connect the SS and GNSS simulator to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.9.2 for TE diagram and section A.3.2.7 for UE diagram.

2. The parameter settings for the NR sidelink transmission over PC5 are pre-configured according to TS 38.508-1 [5] subclause 4.10. Message content exceptions are defined in clause 6.2E.3.1D.4.3.

3. The V2X Reference Measurement Channel is set according to Table 6.2E.3.1D.4.1-1.

4. The GNSS simulator is configured for Scenario #1: static in Geographical area #1, as defined in TS38.508-1 [5] Table 4.11.2-2. Geographical area #1 is also pre-configured in the UE.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state 4-A as defined in TS 38.508-1 [4], subclause 4.4A using generic procedure parameter Sidelink (On), Cast Type (Unicast), GNSS Sync (On) and Transmit Mode with SL-MIMO.

6.2E.3.1D.4.2 Test procedure

1. The UE starts to perform the NR sidelink communication according to SL-PreconfigurationNR with 2-layer MIMO codebook TPMI 0. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the NR sidelink RMC.

2. Measure the sum of mean power of the UE at each transmit antenna connector in the channel bandwidth according to the test configuration from Table 6.2E.3.1D.4.1-1. The period of measurement shall be at least continuous duration of one active sub-frame (1ms) excluding guard symbols.

6.2E.3.1D.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.10 with the following exceptions.

Table 6.2E.3.1D.4.3-1: SL-ResourcePool for PSCCH/PSSCH Testing for NS\_33

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.6-25 | | | |
| Information Element | Value/remark | Comment | Condition |
| SL-ResourcePool-r16 ::= SEQUENCE { |  |  |  |
| sl-PSCCH-Config-r16 CHOICE { |  |  |  |
| setup SEQUENCE { |  |  |  |
| sl-TimeResourcePSCCH-r16 | 10 |  |  |
| sl-FreqResourcePSCCH-r16 | 3 |  |  |
| } |  |  |  |
| } |  |  |  |
| sl-SubchannelSize-r16 | 10 |  | Test ID 5, 6, 7, 14, 18 |
|  | 12 |  | Test ID 4, 8, 9, 10, 11, 12, 13 |
|  | 15 |  | Test ID 1, 2, 3, 15, 16, 17 |
| sl-StartRB-Subchannel-r16 | 0 |  | Test ID 1, 11, 15, 18 |
|  | 1 |  | Test ID 2 |
|  | 26 |  | Test ID 3 |
|  | 38 |  | Test ID 4 |
|  | 12 |  | Test ID 5, 14 |
|  | 15 |  | Test ID 6 |
|  | 20 |  | Test ID 7 |
|  | 25 |  | Test ID 8 |
|  | 4 |  | Test ID 9 |
|  | 8 |  | Test ID 10 |
|  | 16 |  | Test ID 12 |
|  | 22 |  | Test ID 13 |
|  | 2 |  | Test ID 16 |
|  | 6 |  | Test ID 17 |
| sl-NumSubchannel-r16 | 1 |  | Test ID 1, 2, 3, 4 |
|  | 2 |  | Test ID 5, 6, 7, 8, |
|  | 3 |  | Test ID 9, 10, 11, 12, 13, 15, 16, 17 |
|  | 4 |  | Test ID 14 |
|  | 5 |  | Test ID 18 |
| } |  |  |  |

6.2E.3.1D.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2E.3.1D.5-1.

Table 6.2E.3.1D.5-0: Test Tolerance (UE maximum output power)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7dB | 1.0dB |

Table 6.2E.3.1D.5-1: UE MPR test requirement for contiguous PSCCH/PSSCH for NS\_33

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | MPR (dB) | AMPR (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 12 | 23 | 4.5 | 24 | 0 | -1 | 7 | 25.0 + TT | -8-TT |
| 22 | 23 | 4.5 | 19 | 0 | 4 | 7 | 25.0 + TT | -3-TT |
| 32 | 23 | 4.5 | 6 | 0 | 17 | 5 | 25.0 + TT | 13-TT |
| 42 | 23 | 4.5 | 6 | 0 | 17 | 5 | 25.0 + TT | 13-TT |
| 52 | 23 | 4.5 | 11 | 0 | 12 | 6 | 25.0 + TT | 6-TT |
| 62 | 23 | 4.5 | 9.5 | 0 | 13.5 | 6 | 25.0 + TT | 7.5-TT |
| 72 | 23 | 4.5 | 8 | 0 | 15 | 6 | 25.0 + TT | 9-TT |
| 82 | 23 | 4.5 | 8 | 0 | 15 | 6 | 25.0 + TT | 9-TT |
| 92 | 23 | 4.5 | 16 | 0 | 7 | 7 | 25.0 + TT | 0-TT |
| 102 | 23 | 4.5 | 13.5 | 0 | 9.5 | 7 | 25.0 + TT | 2.5-TT |
| 112 | 23 | 4.5 | 22 | 0 | 1 | 7 | 25.0 + TT | -6-TT |
| 122 | 23 | 4.5 | 9.5 | 0 | 13.5 | 6 | 25.0 + TT | 7.5-TT |
| 132 | 23 | 4.5 | 8 | 0 | 15 | 6 | 25.0 + TT | 9-TT |
| 142 | 23 | 4.5 | 12 | 0 | 11 | 6 | 25.0 + TT | 5-TT |
| 152 | 23 | 4.5 | 19 | 0 | 4 | 7 | 25.0 + TT | -3-TT |
| 162 | 23 | 4.5 | 16 | 0 | 7 | 7 | 25.0 + TT | 0-TT |
| 172 | 23 | 4.5 | 13.5 | 0 | 9.5 | 7 | 25.0 + TT | 2.5-TT |
| 182 | 23 | 4.5 | 16 | 0 | 7 | 7 | 25.0 + TT | 0-TT |
| 19 | 23 | 2.5 | 3 | 0 | 20 | 6 | 25.0 + TT | 14-TT |
| 20 | 23 | 4.5 | 5 | 0 | 18 | 5 | 25.0 + TT | 13-TT |
| 21 | 23 | 7.0 | 6 | 0 | 16 | 5 | 25.0 + TT | 11-TT |
| 22 | 23 | 4.5 | 4.5 | 0 | 18.5 | 5 | 25.0 + TT | 13.5-TT |
| 23 | 23 | 4.5 | 5 | 0 | 18 | 5 | 25.0 + TT | 13-TT |
| 24 | 23 | 7.0 | 6 | 0 | 16 | 5 | 25.0 + TT | 11-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2E.3.1D.5-0.  NOTE 2: If the supported post antenna connector gain Gpost connector is declared by the UE, the lower limit is further lower down by Gpost connector\* A-MPRStep. A-MPRstep =1.2 dB is applied for RBstart 0 and 1 and A-MPRstep =0.7 dB is applied for all other RBstart. | | | | | | | | |

#### 6.2E.3.2 UE maximum output power reduction for V2X / concurrent operation

6.2E.3.2.1 Test purpose

Same test purpose as in 6.2E.3.1 for concurrent operation.

6.2E.3.2.2 Test applicability

No test case details are specified. The AMPR requirements for concurrent operation apply and are tested in clauses 6.2.3 for NR Uu operation and 6.2E.3.1 for NR sidelink option.

## 6.2F Transmitter power for shared spectrum channel access

### 6.2F.1 UE maximum output power for shared spectrum channel access

Editor’s Note: This test is incomplete. The following aspects are not yet determined:

- No test points are defined since there is no configuration satisfying MPR=0dB requirements in RAN4. Testing with 1.5dB MPR has been covered in [6.2F.2].

- MU and TT for >6GHz (band n96) are working assumption based on analysis of single TE vendor. Values will be revisited once analysis from other TE vendors is available.

- RMC in Annex A.

- Test coverage for UL-MIMO

- Message exceptions

- Test state and generic procedure are TBD in 38.508-1

6.2F.1.1 Test purpose

Same test purpose as in 6.2.1.1

6.2F.1.2 Test applicability

This test case applies to all types of NR UE release 16 and forward that support NR standalone shared spectrum channel access.

6.2F.1.3 Minimum conformance requirements

The following UE Power Classes define the maximum output power for any transmission bandwidth within the channel bandwidth of shared spectrum channel access carrier unless otherwise stated. The period of measurement shall be at least one sub frame (1ms).

Table 6.2F.1.3-1: UE Power Class

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 5 (dBm) | Tolerance (dB) |
| n46 |  |  |  |  |  |  | 20 | +2/-3 |
| n96 |  |  |  |  |  |  | 20 | +2/-3 |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 2: Powerclass 5 is default power class unless otherwise stated. | | | | | | | | |

The UE operating shall meet the following additional requirements for maximum mean transmission power density specified in Table 6.2F.1.3-2 when NS is signalled and when transmission overlaps with any portion of the specified frequency range. In case transmission overlaps multiple frequency ranges, the lowest power density requirement applies.

Table 6.2F.1.3-2: Additional requirements for transmit power density

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NR Band | NS value | Channel bandwidth (MHz) | Frequency range (MHz) | Maximum mean power density (dBm/MHz) |
| n46 | NS\_28 | 20, 40, 60, 80 | 5150 – 5350 | 10 |
|  |  |  | 5470 – 5725 |  |
|  | NS\_29 | 20 | 5170 – 5330 | 10 |
|  |  |  | 5490 – 5730 |  |
|  |  | 40 | 5170 – 5330 | 7 |
|  |  |  | 5490 – 5730 |  |
|  |  | 60, 80 | 5170 – 5330 | 4 |
|  |  |  | 5490 – 5730 |  |
|  | NS\_30 | 20, 40, 60, 80 | 5150 – 5350 | 11 |
|  |  |  | 5470 – 5725 |  |
|  | NS\_31 | 20 | 5150 - 5230 | 10 |
|  |  |  | 5250 – 5350 |  |
|  |  |  | 5470 – 5725 |  |
|  |  |  | 5725 - 5850 |  |
|  |  |  | 5230 – 5250 | 4 |
|  |  | 40 | 5150 - 5230 | 7 |
|  |  |  | 5250 – 5350 |  |
|  |  |  | 5470 – 5725 |  |
|  |  |  | 5725 - 5850 |  |
|  |  |  | 5230 – 5250 | 4 |
|  |  | 60, 80 | 5150 - 5230 | 4 |
|  |  |  | 5250 – 5350 |  |
|  |  |  | 5470 – 5725 |  |
|  |  |  | 5725 - 5850 |  |
|  |  |  | 5230 – 5250 |  |
| n96 | NS\_53 | 20, 40, 60, 80 | 5925 – 7125 | -1 |
|  | NS\_54 | 20, 40, 60, 80 | 5925 – 6425 | 17 |
|  | 6525 – 6875 |  |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2F.1.

6.2F.1.4 Test description

6.2F.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1 that are restricted to shared channel access. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2F.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2F.1.4.1-1: Test Configuration Table

FFS

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2F.1.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2F.1.4.3.

6.2F.1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2F.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the mean power of the UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. Symbols with transient periods are not under test.

6.2F.1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 with the following exceptions.

6.2F.1.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2F.1.5-1.

Table 6.2F.1.5-1: Maximum Output Power test requirement for Power Class 5

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 5 (dBm) | Tolerance (dB) |
| n46 |  |  |  |  |  |  | 20 | +2+TT/-3-TT |
| n96 |  |  |  |  |  |  | 20 | +2+TT/-3-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 2: Powerclass 5 is default power class unless otherwise stated. | | | | | | | | |

Table 6.2F.1.5-2: Test Tolerance (UE maximum output power)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 4.2GHz | 4.2GHz < f ≤ 5.925GHz | 5.925GHz < f ≤ 7.125GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB | 1.0 dB | 1.0 dB |
| 40MHz < BW ≤ 100MHz | 1.0 dB | 1.0 dB | 1.0 dB | 1.0 dB |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2F.1A UE maximum output power for CA for shared spectrum access

Editor’s Note: This test is incomplete. The following aspects are not yet determined:

- No test points are defined since there is no configuration satisfying MPR=0dB requirements in RAN4. Testing with 1.5dB MPR has been covered in [6.2F.2].

- MU and TT for >6GHz (band n96).

- Test state and generic procedure are TBD in 38.508-1

6.2F.1A.1 Test purpose

To verify that the error of the UE maximum output power in two uplink carrier aggregation does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

6.2F.1A.2 Test applicability

This test case applies to all types of NR UE release 16 and forward that support NR standalone shared spectrum channel access that support NR 2UL CA.

6.2F.1A.3 Minimum conformance requirements

6.2F.1A.3.1 UE maximum output power for inter-band CA

For inter-band carrier aggregation with one uplink carrier assigned to one NR band, the transmitter power requirements in clause 6.2 apply.

For inter-band carrier aggregation with uplink assigned to two NR bands, UE maximum output power shall be measured over all component carriers from different bands. If each band has separate antenna connectors, maximum output power is defined as the sum of maximum output power from each UE antenna connector. The period of measurement shall be at least one sub frame (1 ms). The maximum output power is specified in Table 6.2F.1A.3.1-1.

Table 6.2F.1A.3.1-1 UE Power Class for uplink inter-band CA (two bands)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Uplink CA Configuration | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance  (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| CA\_n46A-n48A |  |  |  |  | 23 | +2/-32 |  |  |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2F.1A.

6.2F.1A.4 Test description

6.2F.1A.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1 that are restricted to shared channel access. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2F.1A.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2F.1.4A.1-1: Test Configuration Table for uplink inter-band

NOTE: No test points are defined since there is no configuration satisfying MPR=0dB requirements in RAN4.

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2F.1A.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2F.1A.4.3.

6.2F.1A.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2F.1A.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the mean power of the UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. Symbols with transient periods are not under test.

6.2F.1A.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 with the following exceptions.

6.2F.1A.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2F.1A.5-1.

Table 6.2F.1A.5-1: UE Output Power for inter-band CA (2 UL CA) test requirements

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Uplink CA Configuration | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance  (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| CA\_n46A-n48A |  |  |  |  | 23 | +2+TT/-32 -TT |  |  |

Table 6.2F.1A.5-2: Test Tolerance (UE maximum output power)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 4.2GHz | 4.2GHz < f ≤ 5.925GHz | 5.925GHz < f ≤ 7.125GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB | 1.0 dB | TBD |
| 40MHz < BW ≤ 100MHz | 1.0 dB | 1.0 dB | 1.0 dB | TBD |

### 6.2F.2 UE maximum output power reduction for shared spectrum access

Editor’s Note: This test is incomplete. The following aspects are not yet determined:

- MU and TT for >6GHz (band n96).

- RMC in Annex A.

- Test coverage for UL-MIMO

- Message exceptions

- Test state and generic procedure are TBD in 38.508-1

- RB allocation table is missing for NR-U

6.2F.2.1 Test purpose

The number of RB identified in Table 6.2F.2.3-1 is based on meeting the requirements for adjacent channel leakage ratio and the maximum power reduction (MPR) due to Cubic Metric (CM).

6.2F.2.2 Test applicability

This test case applies to all types of NR UE release 16 and forward that support NR standalone shared spectrum channel access.

6.2F.2.3 Minimum conformance requirements

For UE maximum output power reduction, the general requirements of clause 6.2.2 do not apply but instead the UE is allowed to reduce the maximum output power due to higher order modulations and transmit bandwidth configurations for power class 5 according to Table 6.2F.2-1 and Table 6.2F.2-2.

Table 6.2F.2-1: Maximum power reduction (MPR) for shared spectrum access UE power class 5

|  |  |  |  |
| --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation | |
|  |  | Full2 (dB) | Partial3 (dB) |
| DFT-s-OFDM | Pi/2 BPSK4 | ≤ 1.5 | ≤ 2.5 |
|  | QPSK | ≤ 1.5 | ≤ 2.5 |
|  | 16 QAM | ≤ 2.0 | ≤ 3.0 |
|  | 64 QAM | ≤ 3.5 | ≤ 4.5 |
|  | 256 QAM | ≤ 5.0 | ≤ 5.5 |
| CP-OFDM | QPSK | ≤ 3.5 | ≤ 3.5 |
|  | 16 QAM | ≤ 4.0 | ≤ 4.0 |
|  | 64 QAM | ≤ 5.5 | ≤ 5.5 |
|  | 256 QAM | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: The MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously allocated in the channel. The MPR applies to interlaced allocations with uplink resource allocation type 2 as specified in TS 38.214 [10].  NOTE 2: Full RB allocation MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and sub-bands are transmitted according to configuration A in Table 6.2F.2-2.  NOTE 3: Partial RB allocation MPR applies when one or more RB’s in one or more sub-bands are not allocated or when the transmitted sub-bands for wideband operation are transmitted according to configuration B in Table 6.2F.2-2.  NOTE 4: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0. | | | |

Table 6.2F.2-2: MPR mapping for wideband operation

|  |  |  |
| --- | --- | --- |
| Wideband operation channel bandwidth (MHz) | Sub-band configuration | |
|  | A | B |
| 40 | 11 | 10, 01 |
| 60 | 111, 011, 110, 001, 010, 100 | None |
| 80 | 1111, 0111, 1110, 0110, 0001, 1000 | 1100, 0011, 0100, 0010 |
| NOTE 1: The sub-band configuration is represented as a bitmap where ‘1’ indicates that a sub-band is transmitted and ‘0’ indicates a sub-band is not transmitted. The bitmap is ordered with MSB mapped to the lowest frequency sub-band and LSB mapped to highest frequency sub-band within the wideband channel. | | |

For the UE maximum output power modified by MPR, the power limits specified in clause 6.2F.4 apply.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2F.2.

6.2F.2.4 Test description

6.2F.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1 that are restricted to shared channel access. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2F.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2F.2.4.1-1: Test Configuration Table for power class 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | 20 MHz, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 12 | Default |  | DFT-s-OFDM Pi/2 BPSK | Full |
| 2 | Default |  | DFT-s-OFDM QPSK | Full |
| 3 | Default |  | DFT-s-OFDM 16 QAM | Full |
| 4 | Default |  | DFT-s-OFDM 64 QAM | Full |
| 5 | Default |  | DFT-s-OFDM 256 QAM | Full |
| 6 | Low |  | CP-OFDM QPSK | Partial\_Left |
| 7 | High |  | CP-OFDM QPSK | Partial\_Right |
| 8 | Default |  | CP-OFDM QPSK | Full |
| 9 | Low |  | CP-OFDM 16 QAM | Partial\_Left |
| 10 | High |  | CP-OFDM 16 QAM | Partial\_Right |
| 11 | Default |  | CP-OFDM 16 QAM | Full |
| 12 | Low |  | CP-OFDM 64 QAM | Partial\_Left |
| 13 | High |  | CP-OFDM 64 QAM | Partial\_Right |
| 14 | Default |  | CP-OFDM 64 QAM | Full |
| 15 | Low |  | CP-OFDM 256 QAM | Partial\_Left |
| 16 | High |  | CP-OFDM 256 QAM | Partial\_Right |
| 17 | Default |  | CP-OFDM 256 QAM | Full |
| 18 | Default |  | DFT-s-OFDM Pi/2 BPSK w Pi/2 BPSK DMRS3 | Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1F-1.  NOTE 2: DFT-s-OFDM Pi/2 BPSK test applies only for UEs which supports Pi/2 BPSK in FR1 and when IE powerBoostPi2BPSK is set to 0.  NOTE 3: Applicable to UEs indicating support for UE capability *lowPAPR-DMRS-PUSCHwithPrecoding-r16*. | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2F.1.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2F.1.4.3.

6.2F.1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2F.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the mean power of the UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. Symbols with transient periods are not under test.

NOTE 1: When switching to DFT-s-OFDM waveform, as specified in the test configuration Table 6.2F.2.4.1-1, Table 6.2F.2.4.1-2, send an NR RRCReconfiguration message according to TS 38.508-1 [5] clause 4.6.3 Table 4.6.3-118 PUSCH-Config with TRANSFORM\_PRECODER\_ENABLED condition.

6.2F.2.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 with the following exceptions:

TBD

6.2F.2.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2F.2.5-1.

Table 6.2F.2.5-1: Test requirements for Power Class 3

TBD

### 6.2F.3 UE additional maximum output power reduction for shared spectrum access

Editor’s Note: This test is incomplete. The following aspects are not yet determined:

- Test points are TBD except for NS\_28 and NS\_29

- MU and TT for >6GHz (band n96) are working assumption based on analysis of single TE vendor. Values will be revisited once analysis from other TE vendors is available.

- RMC in Annex A.

- Test coverage for UL-MIMO

- Message exceptions

- Test state and generic procedure are TBD in 38.508-1

6.2F.3.1 Test purpose

Same test purpose as in 6.2.3.1

6.2F.3.2 Test applicability

This test case applies to all types of NR UE release 16 and forward that support NR standalone shared spectrum channel access.

6.2F.3.3 Minimum conformance requirements

6.2F.3.3.1 General

Additional emission requirements can be signalled by the network. Each additional emission requirement is associated with a unique network signalling (NS) value indicated in RRC signalling by an NR frequency band number of the applicable operating band and an associated value in the field *additionalSpectrumEmission.* Throughout this specification, the notion of indication or signalling of an NS value refers to the corresponding indication of an NR frequency band number of the applicable operating band, the IE field *freqBandIndicatorNR* and an associated value of *additionalSpectrumEmission* in the relevant RRC information elements [7]*.*

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2F.1.3-1. Unless stated otherwise, the total reduction to UE maximum output power is max (MPR, A-MPR) where MPR is defined in clause 6.2F.2.

Table 6.2F.3.3.1-1 specifies the additional requirements with their associated network signalling values and the allowed A-MPR and applicable operating band(s) for each NS value. The mapping of NR frequency band numbers and values of the *additionalSpectrumEmission* to network signalling labels is specified in Table 6.2F.3.3.1-1A.

Table 6.2F.3.3.1-1: Additional maximum power reduction (A-MPR)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Network signalling label | Requirements (clause) | NR Band | Channel bandwidth (MHz) | Resources blocks (*N*RB) | A-MPR (clause) |
| NS\_01 |  | n46, n96 | 20, 40, 60, 80 |  | N/A |
| NS\_28 |  | n46 | 20, 40, 60, 80 |  | 6.2F.3.3.2 |
| NS\_29 |  | n46 | 20, 40, 60, 80 |  | 6.2F.3.3.3 |
| NS\_30 |  | n46 | 20, 40, 60, 80 |  | 6.2F.3.3.4 |
| NS\_31 |  | n46 | 20, 40, 60, 80 |  | 6.2F.3.3.5 |
| NS\_53 |  | n96 | 20, 40, 60, 80 |  | 6.2F.3.3.6 |
| NS\_54 |  | n96 | 20, 40, 60, 80 |  | 6.2F.3.3.7 |
| NOTE 1: The A-MPR shall apply to all active 20 MHz sub-bands contiguously allocated in the channel. | | | | | |

[The NS\_01 label with the field *additionalPmax* [7] absent is default for all NR bands.]

Table 6.2F.3.3.1-1A: Mapping of network signalling label

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Value of additionalSpectrumEmission | | | | | | | |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| n46 | NS\_01 | NS\_28 | NS\_29 | NS\_30 | NS\_31 |  |  |  |
| n96 | NS\_01 | NS\_53 | NS\_54 |  |  |  |  |  |
| NOTE: *additionalSpectrumEmission* corresponds to an information element of the same name defined in clause 6.3.2 of TS 38.331 [6]. | | | | | | | | |

6.2F.3.3.2 A-MPR for NS\_28

When "NS\_28" is indicated in the cell, the A-MPR is specified in Table 6.2F.3.3.2-1.

Table 6.2F.3.3.2-1: A-MPR for NS\_28 power class 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation (Note 2) | | RB Allocation (Note 3) |
|  |  | Full (dB) | Partial (dB) | Full/Partial |
| DFT-s-OFDM | PI/2 BPSK**4** | ≤ 4.0 | ≤ 6.0 | See Table 6.2F.2-1 |
| QPSK | ≤ 4.0 | ≤ 6.0 |
|  | 16 QAM | ≤ 4.5 | ≤ 6.0 |
|  | 64 QAM | ≤ 4.5 | ≤ 6.5 |
|  | 256 QAM | ≤ 5.5 | ≤ 6.5 |
| CP-OFDM | QPSK | ≤ 6.0 | ≤ 7.0 |
|  | 16 QAM | ≤ 6.0 | ≤ 7.5 |  |
|  | 64 QAM | ≤ 6.5 | ≤ 7.5 |  |
|  | 256 QAM | ≤ 7.0 | ≤ 7.5 |  |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated or when not all transmitted sub-bands for wideband operation are transmitted.  NOTE 2: Applicable for 20 MHz channels centered at the nearest NR-ARFCN corresponding to 5160, 5340, 5480, and 5700 MHz, 40 MHz channels centered at the nearest NR-ARFCN corresponding to 5170, 5190, 5310, 5330, 5490, and 5510 MHz, 60 MHz channels centered at the nearest NR-ARFCN corresponding to 5180, 5200, 5220, 5280, 5300, 5320, 5500, 5520, 5540, 5680 MHz, and 80 MHz channels centered at the nearest NR-ARFCN corresponding to 5190, 5210, 5290, 5310, 5510, and 5530 MHz.  NOTE 3: Applicable for all valid channels other than those enumerated under NOTE 2.  NOTE 4: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0.  NOTE 5: In current release larger CBW than 80MHz are not applicable for this network signalling. | | | | |

6.2F.3.3.3 A-MPR for NS\_29

When "NS\_29" is indicated in the cell, the A-MPR is specified in Table 6.2F.3.3.3-1.

Table 6.2F.3.3.3-1: A-MPR for NS\_29 power class 5

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | |
|  |  | 20 MHz | 40 MHz | | 60 MHz, 80 MHz | |
|  |  | Full/Partial | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-OFDM | PI/2 BPSK2 | See Table 6.2F.2-1 | ≤ 2.0 | ≤ 4.0 | ≤ 4.0 | ≤ 6.0 |
| QPSK | ≤ 2.0 | ≤ 4.0 | ≤ 4.0 | ≤ 6.0 |
|  | 16 QAM | ≤ 2.5 | ≤ 4.0 | ≤ 4.0 | ≤ 6.0 |
|  | 64 QAM | ≤ 3.5 | ≤ 4.5 | ≤ 4.5 | ≤ 6.0 |
|  | 256 QAM | ≤ 5.0 | ≤ 5.5 | ≤ 5.5 | ≤ 6.0 |
| CP-OFDM | QPSK |  | ≤ 3.5 | ≤ 4.5 | ≤ 4.0 | ≤ 6.0 |
|  | 16 QAM |  | ≤ 4.0 | ≤ 4.5 | ≤ 4.0 | ≤ 6.0 |
|  | 64 QAM |  | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 6.5 |
|  | 256 QAM |  | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies.  NOTE 2: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0.  NOTE 3: Larger CBW than 80MHz are not applicable for this network signalling. | | | | | | |

6.2F.3.3.4 A-MPR for NS\_30

When "NS\_30" is indicated in the cell, the A-MPR is specified in Table 6.2F.3.3.4-1.

Table 6.2F.3.3.4-1: A-MPR for NS\_30 power class 5

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation (Note 2) | | RB Allocation (Note 3) | | RB Allocation (Note 4) |
|  |  | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full/Partial |
| DFT-s-ODFM | QPSK | ≤ 9.0 | ≤ 15.0 | ≤ 2.5 | ≤ 5.0 | See Table 6.2F.2.3-1 |
|  | 16 QAM | ≤ 9.0 | ≤ 15.5 | ≤ 3.0 | ≤ 5.0 |  |
|  | 64 QAM | ≤ 9.0 | ≤ 15.5 | ≤ 4.5 | ≤ 5.5 |  |
|  | 256 QAM | ≤ 9.0 | ≤ 16.0 | ≤ 5.5 | ≤ 5.5 |  |
| CP-OFDM | QPSK | ≤ 9.0 | ≤ 14.0 | ≤ 4.0 | ≤ 6.0 |  |
|  | 16 QAM | ≤ 9.5 | ≤ 14.5 | ≤ 4.0 | ≤ 6.0 |  |
|  | 64 QAM | ≤ 9.5 | ≤ 15.0 | ≤ 5.5 | ≤ 6.5 |  |
|  | 256 QAM | ≤ 9.5 | ≤ 15.0 | ≤ 7.0 | ≤ 7.0 |  |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated or when not all transmitted sub-bands for wideband operation are transmitted.  NOTE 2: Applicable for 20 MHz channels centred at the nearest NR-ARFCN corresponding to 5160, 5340, 5480, and 5700 MHz, 40 MHz channels centred at the nearest NR-ARFCN corresponding to 5170, 5190, 5310, 5330, 5490, and 5510 MHz, 60 MHz channels centred at the nearest NR-ARFCN corresponding to 5180, 5200, 5220, 5280, 5300, 5320, 5500, 5520, 5540, 5680 MHz, and 80 MHz channels centred at the nearest NR-ARFCN corresponding to 5190, 5210, 5290, 5310, 5510, and 5530 MHz.  NOTE 3: Applicable for 20 MHz channels centred at the nearest NR-ARFCN corresponding to 5180 and 5320 MHz, and 40 MHz channels centred at the nearest NR-ARFCN corresponding to 5230 and 5270 MHz.  NOTE 4: Applicable for all valid channels other than those enumerated under NOTE 2 and NOTE 3. | | | | | | |

6.2F.3.3.5 A-MPR for NS\_31

When "NS\_31" is indicated in the cell, the A-MPR is specified in Table 6.2F.3.3.5-1.

Table 6.2F.3.3.5-1: A-MPR for NS\_31 power class 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation (Note 2) | RB Allocation (Note 3) | |
|  |  | Full/Partial | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | See Table 6.2F.2-1 | ≤ 4.0 | ≤ 6.5 |
|  | 16 QAM |  | ≤ 4.0 | ≤ 6.5 |
|  | 64 QAM |  | ≤ 4.0 | ≤ 6.5 |
|  | 256 QAM |  | ≤ 5.0 | ≤ 6.5 |
| CP-OFDM | QPSK |  | ≤ 5.5 | ≤ 6.5 |
|  | 16 QAM |  | ≤ 5.5 | ≤ 7.0 |
|  | 64 QAM |  | ≤ 5.5 | ≤ 7.0 |
|  | 256 QAM |  | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated or when not all transmitted sub-bands for wideband operation are transmitted.  NOTE 2: Applicable for 20 MHz channels centred at the nearest NR-ARFCN corresponding to 5180, 5200, 5220, 5280, 5300, 5320, 5500, 5520, 5540, 5560, 5580, 5600, 5620, 5640, 5660, 5680, 5745, 5765, 5785, and 5805 MHz.  NOTE 3: Applicable for all valid channels and bandwidths other than those enumerated in NOTE 2. | | | | |

6.2F.3.3.6 A-MPR for NS\_53

When "NS\_53" is indicated in the cell, the A-MPR is specified in Table 6.2F.3.3.6-1.

Table 6.2F.3.3.6-1: A-MPR for NS\_53 power class 5

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
|  |  | 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
|  |  | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 3.0 | ≤ 5.5 |
|  | 16 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 3.0 | ≤ 5.5 |
|  | 64 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 |
|  | 256 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 5.0 | ≤ 7.0 | ≤ 5.0 | ≤ 5.5 |
| CP-OFDM | QPSK | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 |
|  | 16 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 |
|  | 64 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 5.5 | ≤ 6.5 | ≤ 5.5 | ≤ 5.5 |
|  | 256 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 7.0 | ≤ 8.5 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies. | | | | | | | | | |

6.2F.3.3.7 A-MPR for NS\_54

When "NS\_54" is indicated in the cell, the A-MPR is specified in Table 6.2F.3.3.7-1.

Table 6.2F.3.3.7-1: A-MPR for NS\_54 power class 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation (Note 2) | RB Allocation (Note 3) | |
|  |  | Full/Partial | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | See Table 6.2F.2-1 | ≤ 2.5 | ≤ 5.0 |
|  | 16 QAM |  | ≤ 3.0 | ≤ 5.0 |
|  | 64 QAM |  | ≤ 3.5 | ≤ 5.0 |
|  | 256 QAM |  | ≤ 5.0 | ≤ 6.0 |
| CP-OFDM | QPSK |  | ≤ 4.5 | ≤ 6.0 |
|  | 16 QAM |  | ≤ 4.5 | ≤ 6.0 |
|  | 64 QAM |  | ≤ 5.5 | ≤ 6.0 |
|  | 256 QAM |  | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated or when not all transmitted sub-bands for wideband operation are transmitted.  NOTE 2: Applicable for all valid channels and bandwidths other than those enumerated in NOTE 3.  NOTE 3: Applicable for 40 MHz channels centred at the nearest NR-ARFCN corresponding to [5965 MHz], 60 MHz channels centred at the nearest NR-ARFCN corresponding to [5975 and 5995 MHz], and 80 MHz channels centred at the nearest NR-ARFCN corresponding to [5985 MHz]. | | | | |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2F.3.

6.2F.3.4 Test description

6.2F.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1 that are restricted to shared channel access. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2F.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2F.3.4.1-1: Test Configuration Table for NS\_28 and NS\_29

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | 20,40,60 and 80 MHz | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | Lowest, Highest | |
| A-MPR test parameters for NS\_28, NS\_29 | | | | | | | | |
| Test ID | Freq | ChBw | SCS | Downlink Configuration | Uplink Configuration | | | |
| Modulation  (Note 2) | | | RB allocation (Note 1, Note 3) |
|  |  |  |  | N/A for A-MPR test cases | DFT-s OFDM |  | |  |
| 1 | Default | 20 | Default | PI/2 BPSK | | Full |
| 2 | Default | 20 | Default | QPSK | | Full |
| 3 | Default | 20 | Default | 16 QAM | | Full |
| 4 | Default | 20 | Default | 64 QAM | | Full |
| 5 | Default | 20 | Default | 256 QAM | | Full |
| 6 | Default | 40 | Default | PI/2 BPSK | | Full |
| 7 | Default | 40 | Default | QPSK | | Full |
| 8 | Default | 40 | Default | 16 QAM | | Full |
| 9 | Default | 40 | Default | 64 QAM | | Full |
| 10 | Default | 40 | Default | 256 QAM | | Full |
| 11 | Default | 60 | Default | PI/2 BPSK | | Full |
| 12 | Default | 60 | Default | QPSK | | Full |
| 13 | Default | 60 | Default | 16 QAM | | Full |
| 14 | Default | 60 | Default | 64 QAM | | Full |
| 15 | Default | 60 | Default | 256 QAM | | Full |
| 16 | Default | 80 | Default | PI/2 BPSK | | Full |
| 17 | Default | 80 | Default | QPSK | | Full |
| 18 | Default | 80 | Default | 16 QAM | | Full |
| 19 | Default | 80 | Default | 64 QAM | | Full |
| 20 | Default | 80 | Default | 256 QAM | | Full |
| 21 | Low | 20 | Default | CP-s OFDM | QPSK | | Partial\_Left |
| 22 | High | 20 | Default | QPSK | | Partial\_Right |
| 23 | Default | 20 | Default | QPSK | | Full |
| 24 | Low | 20 | Default | 16 QAM | | Partial\_Left |
| 25 | High | 20 | Default | 16 QAM | | Partial\_Right |
| 26 | Default | 20 | Default | 16 QAM | | Full |
| 27 | Low | 20 | Default | 64 QAM | | Partial\_Left |
| 28 | High | 20 | Default | 64 QAM | | Partial\_Right |
| 29 | Default | 20 | Default | 64 QAM | | Full |
| 30 | Low | 20 | Default | 256 QAM | | Partial\_Left |
| 31 | High | 20 | Default | 256 QAM | | Partial\_Right |
| 32 | Default | 20 | Default | 256 QAM | | Full |
| 33 | High | 40 | Default | QPSK | | Partial\_Left |
| 34 | Default | 40 | Default | QPSK | | Partial\_Right |
| 35 | Low | 40 | Default | 16 QAM | | Full |
| 36 | High | 40 | Default | 16 QAM | | Partial\_Left |
| 37 | Default | 40 | Default | 16 QAM | | Partial\_Right |
| 38 | Low | 40 | Default | 64 QAM | | Full |
| 39 | High | 40 | Default | 64 QAM | | Partial\_Left |
| 40 | Default | 40 | Default | 64 QAM | | Partial\_Right |
| 41 | Low | 40 | Default | 256 QAM | | Full |
| 42 | High | 40 | Default | 256 QAM | | Partial\_Left |
| 43 | Default | 40 | Default | 256 QAM | | Partial\_Right |
| 44 | High | 60 | Default | QPSK | | Full |
| 45 | Default | 60 | Default | QPSK | | Partial\_Left |
| 46 | Low | 60 | Default | 16 QAM | | Partial\_Right |
| 47 | High | 60 | Default | 16 QAM | | Full |
| 48 | Default | 60 | Default | 16 QAM | | Partial\_Left |
| 49 | Low | 60 | Default | 64 QAM | | Partial\_Right |
| 50 | High | 60 | Default | 64 QAM | | Full |
| 51 | Default | 60 | Default | 64 QAM | | Partial\_Left |
| 52 | Low | 60 | Default | 256 QAM | | Partial\_Right |
| 53 | High | 60 | Default | 256 QAM | | Full |
| 54 | Default | 60 | Default | 256 QAM | | Partial\_Left |
| 55 | High | 80 | Default | QPSK | | Partial\_Right |
| 56 | Default | 80 | Default | QPSK | | Full |
| 57 | Low | 80 | Default | 16 QAM | | Partial\_Left |
| 58 | High | 80 | Default | 16 QAM | | Partial\_Right |
| 59 | Default | 80 | Default | 16 QAM | | Full |
| 60 | Low | 80 | Default | 64 QAM | | Partial\_Left |
| 61 | High | 80 | Default | 64 QAM | | Partial\_Right |
| 62 | Default | 80 | Default | 64 QAM | | Full |
| 63 | Low | 80 | Default | 256 QAM | | Partial\_Left |
| 64 | High | 80 | Default | 256 QAM | | Partial\_Right |
| 65 | Default | 80 | Default | 256 QAM | | Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1F-1 unless otherwise stated in this table.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: Partial RB allocation consists of non-contiguous RB allocation in one or several interlaces and therefore DFT-s-OFDM is not applicable. | | | | | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2F.3.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2F.3.4.3.

6.2F.3.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2F.3.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the mean power of the UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. Symbols with transient periods are not under test.

6.2F.3.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 with the following exceptions.

Information element additionalSpectrumEmission is set in the *SIB1* as part of the cell broadcast message.

Table 6.2.3.4.3-1: *AdditionalSpectrumEmission*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [10] clause 4.6.3, Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| AdditionalSpectrumEmission | 1 (NS\_28),  2 (NS\_29),  3 (NS\_30),  4(NS\_31) | for band n46 |  |
| AdditionalSpectrumEmission | 1 (NS\_53),  2 (NS\_54) | for band n96 |  |

FFS

6.2F.3.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2F.3.5-1.

Table 6.2F.3.5-1: Test requirement for NS\_28 Power Class 5

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 20 | 1.5 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 2 | 20 | 1.5 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 3 | 20 | 2.0 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 4 | 20 | 3.5 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 5 | 20 | 5.0 | 5.5 | 0 | 14.5 | 5.0 | 3 | 22+TT | 9.5-TT |
| 6 | 20 | 1.5 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 7 | 20 | 1.5 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 8 | 20 | 2.0 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 9 | 20 | 3.5 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 10 | 20 | 5.0 | 5.5 | 0 | 14.5 | 5.0 | 3 | 22+TT | 9.5-TT |
| 11 | 20 | 1.5 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 12 | 20 | 1.5 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 13 | 20 | 2.0 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 14 | 20 | 3.5 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 15 | 20 | 5.0 | 5.5 | 0 | 14.5 | 5.0 | 3 | 22+TT | 9.5-TT |
| 16 | 20 | 1.5 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 17 | 20 | 1.5 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 18 | 20 | 2.0 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 19 | 20 | 3.5 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 20 | 20 | 5.0 | 5.5 | 0 | 14.5 | 5.0 | 3 | 22+TT | 9.5-TT |
| 21 | 20 | 3.5 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 23 | 20 | 3.5 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 24 | 20 | 4.0 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 26 | 20 | 4.0 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 27 | 20 | 5.5 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 29 | 20 | 5.5 | 6.5 | 0 | 13.5 | 5.0 | 3 | 22+TT | 8.5-TT |
| 30 | 20 | 7.0 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 32 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 34 | 20 | 3.5 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 35 | 20 | 4.0 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 37 | 20 | 4.0 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 38 | 20 | 5.5 | 6.5 | 0 | 13.5 | 5.0 | 3 | 22+TT | 8.5-TT |
| 40 | 20 | 5.5 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 41 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 43 | 20 | 7.0 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 45 | 20 | 3.5 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 46 | 20 | 4.0 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 48 | 20 | 4.0 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 49 | 20 | 5.5 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 51 | 20 | 5.5 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 52 | 20 | 7.0 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 54 | 20 | 7.0 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 56 | 20 | 3.5 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 57 | 20 | 4.0 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 59 | 20 | 4.0 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 60 | 20 | 5.5 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 62 | 20 | 5.5 | 6.5 | 0 | 13.5 | 5.0 | 3 | 22+TT | 8.5-TT |
| 63 | 20 | 7.0 | 7.5 | 0 | 12.5 | 6.0 | 3 | 22+TT | 6.5-TT |
| 65 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2F.3.5-3. | | | | | | | | | |

Table 6.2F.3.5-1b: Test requirement for NS\_29 Power Class 5

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 6 | 20 | 1.5 | 2 | 0 | 18 | 4.0 | 3 | 22+TT | 14-TT |
| 7 | 20 | 1.5 | 2 | 0 | 18 | 4.0 | 3 | 22+TT | 14-TT |
| 8 | 20 | 2.0 | 2.5 | 0 | 17.5 | 5.0 | 3 | 22+TT | 12.5-TT |
| 9 | 20 | 3.5 | 3.5 | 0 | 16.5 | 5.0 | 3 | 22+TT | 11.5-TT |
| 10 | 20 | 5.0 | 5 | 0 | 15 | 5.0 | 3 | 22+TT | 10-TT |
| 11 | 20 | 1.5 | 2 | 0 | 18 | 4.0 | 3 | 22+TT | 14-TT |
| 12 | 20 | 1.5 | 2 | 0 | 18 | 4.0 | 3 | 22+TT | 14-TT |
| 13 | 20 | 2.0 | 2.5 | 0 | 17.5 | 5.0 | 3 | 22+TT | 12.5-TT |
| 14 | 20 | 3.5 | 3.5 | 0 | 16.5 | 5.0 | 3 | 22+TT | 11.5-TT |
| 15 | 20 | 5.0 | 5 | 0 | 15 | 5.0 | 3 | 22+TT | 10-TT |
| 16 | 20 | 1.5 | 2 | 0 | 18 | 4.0 | 3 | 22+TT | 14-TT |
| 17 | 20 | 1.5 | 2 | 0 | 18 | 4.0 | 3 | 22+TT | 14-TT |
| 18 | 20 | 2.0 | 2.5 | 0 | 17.5 | 5.0 | 3 | 22+TT | 12.5-TT |
| 19 | 20 | 3.5 | 3.5 | 0 | 16.5 | 5.0 | 3 | 22+TT | 11.5-TT |
| 20 | 20 | 5.0 | 5 | 0 | 15 | 5.0 | 3 | 22+TT | 10-TT |
| 33 | 20 | 3.5 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 34 | 20 | 3.5 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 35 | 20 | 4.0 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 36 | 20 | 4.0 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 37 | 20 | 4.0 | 4.5 | 0 | 15.5 | 5.0 | 3 | 22+TT | 10.5-TT |
| 38 | 20 | 5.5 | 5.5 | 0 | 14.5 | 5.0 | 3 | 22+TT | 9.5-TT |
| 39 | 20 | 5.5 | 5.5 | 0 | 14.5 | 5.0 | 3 | 22+TT | 9.5-TT |
| 40 | 20 | 5.5 | 5.5 | 0 | 14.5 | 5.0 | 3 | 22+TT | 9.5-TT |
| 41 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 42 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 43 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 44 | 20 | 3.5 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 45 | 20 | 3.5 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 46 | 20 | 4.0 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 47 | 20 | 4.0 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 48 | 20 | 4.0 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 49 | 20 | 5.5 | 6.5 | 0 | 13.5 | 5.0 | 3 | 22+TT | 8.5-TT |
| 50 | 20 | 5.5 | 5.5 | 0 | 14.5 | 5.0 | 3 | 22+TT | 9.5-TT |
| 51 | 20 | 5.5 | 6.5 | 0 | 13.5 | 5.0 | 3 | 22+TT | 8.5-TT |
| 52 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 53 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 54 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 55 | 20 | 3.5 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 56 | 20 | 3.5 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 57 | 20 | 4.0 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 58 | 20 | 4.0 | 6 | 0 | 14 | 5.0 | 3 | 22+TT | 9-TT |
| 59 | 20 | 4.0 | 4 | 0 | 16 | 5.0 | 3 | 22+TT | 11-TT |
| 60 | 20 | 5.5 | 6.5 | 0 | 13.5 | 5.0 | 3 | 22+TT | 8.5-TT |
| 61 | 20 | 5.5 | 6.5 | 0 | 13.5 | 5.0 | 3 | 22+TT | 8.5-TT |
| 62 | 20 | 5.5 | 5.5 | 0 | 14.5 | 5.0 | 3 | 22+TT | 9.5-TT |
| 63 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 64 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| 65 | 20 | 7.0 | 7 | 0 | 13 | 5.0 | 3 | 22+TT | 8-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2F.3.5-3. | | | | | | | | | |

Table 6.2F.3.5-2: Test Tolerance (UE maximum output power)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 4.2GHz | 4.2GHz < f ≤ 5.925GHz | 5.925GHz < f ≤ 7.125GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB | 1.0 dB | 1.0 dB |
| 40MHz < BW ≤ 100MHz | 1.0 dB | 1.0 dB | 1.0 dB | 1.0 dB |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2F.4 Configured transmitted power for shared spectrum access

Editor’s Note: This test is incomplete. The following aspects are not yet determined:

- MU and TT for >6GHz (band n96) are working assumption based on analysis of single TE vendor. Values will be revisited once analysis from other TE vendors is available.

- Test coverage for UL-MIMO

- Message exceptions

- Test state and generic procedure are TBD in 38.508-1

6.2F.4.1 Test purpose

To verify the measured UE configured maximum output power PUMAX,f,c is within the specified bounds.

6.2F.4.2 Test applicability

This test case applies to all types of NR UE release 16 and forward that support NR standalone shared spectrum channel access.

6.2F.4.3 Minimum conformance requirements

Same minimum conformance requirements as in 6.2.4.3.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2F.4.

6.2F.4.4 Test description

6.2F.4.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2F.4.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2F.4.4.1-1: Test Configuration Table

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Mid range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest | |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  |  | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 | N/A | DFT-s-OFDM Pi/2 BPSK | Full |
| 2 |  | DFT-s-OFDM Pi/2 QPSK | Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1F-1. | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2F.4.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in State RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2F.4.4.3.

6.2F.4.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2F.4.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step to ensure that the UE reaches the Pumax level of the test point.

3. Measure the mean power of the UE in the channel bandwidth for each test point in table 6.2F.4.5-1 according to the test configuration from table 6.2F.4.4.1-1. The period of measurement shall be at least the continuous duration of one active slot and in the uplink symbols. For TDD slots with transient periods are not under test.

6.2F.4.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 with the following exceptions:

Table 6.2F.4.4.3-1: *PUSCH-Config*

|  |
| --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED |

Table 6.2F.4.4.3-2: FrequencyInfoUL-SIB: Test point 1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | -10 |  |  |

Table 6.2F.4.4.3-3: FrequencyInfoUL-SIB: Test point 2

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 10 |  |  |

Table 6.2F.4.4.3-4: FrequencyInfoUL-SIB: Test point 3

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 15 |  |  |

6.2F.4.5 Test requirement

The maximum output power measured shall not exceed the values specified in Table 6.2F.4.5-1.

Table 6.2F.4.5-1: PCMAX configured UE output power

|  |  |
| --- | --- |
|  | Maximum output power |
|  |  |
| Measured UE output power test point 1 | -10 dBm ± (7+TT) |
| Measured UE output power test point 2 | 10 dBm ± (6+TT) |
| Measured UE output power test point 3 | 15 dBm ± (5+TT) |
| Note 1: TT for each frequency and channel bandwidth is specified in Table 6.2.4.5-2. | |

Table 6.2F.4.5-2: Test Tolerance (Configured transmitted power)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 4.2GHz | 4.2GHz < f ≤ 5.925GHz | 5.925GHz < f ≤ 7.125GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB | 1.0 dB | 1.0 dB |
| 40MHz < BW ≤ 100MHz | 1.0 dB | 1.0 dB | 1.0 dB | 1.0 dB |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration or inter-band EN-DC configuration, ΔTIB,c as specified in clause 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clauses 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and clause 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clauses 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and clause 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

## 6.2G Transmitter power for Tx Diversity

### 6.2G.1 UE maximum output power for Tx Diversity

Editor’s Note: The following aspects are either missing or not yet determined:

- No test points are defined for Power Class 1.5 non-FWA UEs since there is no configuration satisfying MPR=0dB requirements in TS 38.101-1. Testing with minimum MPR has been covered in 6.2G.2.

6.2G.1.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2G.1.2 Test applicability

This test case applies to all types of NR Power Class 1.5 FWA UE, Power Class 2 and Power Class 3 UE release 15 and forward that support Tx diversity.

6.2G.1.3 Minimum conformance requirements

For UE supporting Tx Diversity, the maximum output power as indicated by UE power class in Table 6.2G.1.3-1 is defined as the sum of the maximum output power from both UE antenna connectors. The period of measurement shall be at least one sub frame (1 ms).

When a UE indicates PC1.5 for a given band it achieves maximum power by means of TxD in the current version of the spec.

Table 6.2G.1.3-1: UE Power Class

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1 (dBm) | Tolerance (dB) | Class 1.5 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) |
| n1 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n2 |  |  |  |  |  |  | 23 | ±23 |
| n3 |  |  |  |  | 26 | +2/-33 | 23 | ±23 |
| n5 |  |  |  |  |  |  | 23 | ±2 |
| n7 |  |  |  |  |  |  | 23 | ±23 |
| n8 |  |  |  |  |  |  | 23 | ±23 |
| n12 |  |  |  |  |  |  | 23 | ±23 |
| n14 |  |  |  |  |  |  | 23 | ±2 |
| n20 |  |  |  |  |  |  | 23 | ±23 |
| n24 |  |  |  |  |  |  | 23 | +2/-33 |
| n25 |  |  |  |  |  |  | 23 | ±23 |
| n26 |  |  |  |  |  |  | 23 | ±23 |
| n28 |  |  |  |  |  |  | 23 | +2/-2.5 |
| n30 |  |  |  |  |  |  | 23 | ±2 |
| n34 |  |  | 297 | +2/-3 | 26 | +2/-3 | 23 | ±2 |
| n38 |  |  |  |  |  |  | 23 | ±2 |
| n39 |  |  | 297 | +2/-3 | 26 | +2/-3 | 23 | ±2 |
| n40 |  |  | 297 | +2/-3 | 26 | +2/-3 | 23 | ±2 |
| n41 |  |  | 297 | +2/-33 | 26 | +2/-33 | 23 | ±23 |
| n48 |  |  |  |  |  |  | 23 | +2/-3 |
| n50 |  |  |  |  |  |  | 23 | ±2 |
| n51 |  |  |  |  |  |  | 23 | ±2 |
| n53 |  |  |  |  |  |  | 23 | ±2 |
| n65 |  |  |  |  |  |  | 23 | ±2 |
| n66 |  |  |  |  |  |  | 23 | ±2 |
| n70 |  |  |  |  |  |  | 23 | ±2 |
| n71 |  |  |  |  |  |  | 23 | +2/-2.5 |
| n74 |  |  |  |  |  |  | 23 | ±2 |
| n77 |  |  | 297 | +2/-3 | 26 | +2/-3 | 23 | +2/-3 |
| n78 |  |  | 297 | +2/-3 | 26 | +2/-3 | 23 | +2/-3 |
| n79 |  |  | 297 | +2/-3 | 26 | +2/-3 | 23 | +2/-3 |
| n80 |  |  |  |  |  |  | 23 | ±23 |
| n81 |  |  |  |  |  |  | 23 | ±2 |
| n82 |  |  |  |  |  |  | 23 | ±2 |
| n83 |  |  |  |  |  |  | 23 | +2/-2.5 |
| n84 |  |  |  |  |  |  | 23 | ±2 |
| n86 |  |  |  |  |  |  | 23 | ±2 |
| n95 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n97 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n99 |  |  |  |  |  |  | 23 | +2/-33 |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 2: Powerclass 3 is default power class unless otherwise stated  NOTE 3: Refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB.  NOTE 4: FFS  NOTE 5: FFS  NOTE 6: Generally, PC1 UE for Band n14 is not targeted for smartphone form factor. The UE power class 1 requirements for Band n14 are applicable for public safety scenario only.  NOTE 7: Achieved via dual Tx | | | | | | | | |

If a UE supports a different power class than the default UE power class for the band and the supported power class enables the higher maximum output power than that of the default power class:

- if the field of UE capability *maxUplinkDutyCycle-PC2-FR1* is absent and the field of UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16* is absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than 50% (The exact evaluation period is no less than one radio frame); or

- if the field of UE capability *maxUplinkDutyCycle-PC2-FR1* is not absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than *maxUplinkDutyCycle-PC2-FR1* as defined in TS 38.306 (The exact evaluation period is no less than one radio frame); or

- if the field of UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16* is not absent and half the percentage of uplink symbols transmitted in a certain evaluation period is larger than *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16* as defined in TS 38.306 (The exact evaluation period is no less than one radio frame); or

- if the IE P-Max as defined in TS 38.331 [7] is provided and set to the maximum output power of the default power class or lower;

- shall apply all requirements for the default power class to the supported power class and set the configured transmitted power as specified in clause 6.2.4;

- else if the UE does not support a power class with higher maximum output power than PC2; or

- if the field of UE capability *maxUplinkDutyCycle-PC2-FR1* is absent and the field of UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16* is absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than 25% (The exact evaluation period is no less than one radio frame); or

- if the field of UE capability *maxUplinkDutyCycle-PC2-FR1* is not absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than 0.5\**maxUplinkDutyCycle-PC2-FR1* (The exact evaluation period is no less than one radio frame); or

- if the field of UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16* is not absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16* as defined in TS 38.306 (The exact evaluation period is no less than one radio frame); or

- if the IE P-Max as defined in TS 38.331 [6] is provided and set to the maximum output power of the power class 2 or lower;

- shall apply all requirements for power class 2 to the supported power class and set the configured transmitted power as specified in clause 6.2.4;

- else shall apply all requirements for the supported power class and set the configured transmitted power as specified in clause 6.2.4.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2.1 and 6.2G.1.

6.2G.1.4 Test description

6.2G.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in Table 6.2G.1.4.1-1 and Table 6.2G.1.4.1-2. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2G.1.4.1-1: Test Configuration Table for Power Class 2 indicating TxD support

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Low range, Mid range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest, Highest | |
| Test Parameters | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A for maximum output | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 | power test case | DFT-s-OFDM PI/2 BPSK | Inner Full |
| 2 |  | DFT-s-OFDM PI/2 BPSK | Inner 1RB Left |
| 3 |  | DFT-s-OFDM PI/2 BPSK | Inner 1RB Right |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: For *P-Max* test (Step 4 and Step 5 in Section 6.2G.1.4.2) and *maxUplinkDutyCycle* test (Step 6, Step 7, Step 8 and Step 9 in Section 6.2G.1.4.2), only “Normal” test environment, “Low range” test frequencies, “Lowest” Test Channel Bandwidth, “Lowest” test SCS and “Inner Full” RB allocation to be used. | | | |

Table 6.2G.1.4.1-2: Test Configuration Table for Power Class 1.5 non-FWA UE

NOTE 1: No test points are defined for Power Class 1.5 non-FWA UE since there is no configuration satisfying MPR=0dB requirements in TS 38.101-1.

Table 6.2G.1.4.1-3: Test Configuration Table for Power Class 3 indicating TxD support

NOTE 2: Test points defined for single Tx Power Class 3 in Table Table 6.2.2.3-1 to be reused as test points defined for Power Class 3 indicating TxD support since single Tx Power Class 3 and TxD Power Class 3 share the same MPR requirements.

Table 6.2G.1.4.1-4: Test Configuration Table for Power Class 1.5 FWA UE

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Low range, Mid range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest, Highest | |
| Test Parameters | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A for maximum output | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 | power test case | DFT-s-OFDM PI/2 BPSK | Inner Full |
| 2 |  | DFT-s-OFDM PI/2 BPSK | Inner 1RB Left |
| 3 |  | DFT-s-OFDM PI/2 BPSK | Inner 1RB Right |
| 4 |  | DFT-s-OFDM QPSK | Inner Full |
| 5 |  | DFT-s-OFDM QPSK | Inner 1RB Left |
| 6 |  | DFT-s-OFDM QPSK | Inner 1RB Right |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1. | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2G.1.4.1-1 and Table 6.2G.1.4.1-2.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2G.1.4.3.

6.2G.1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2G.1.4.1-1, Table 6.2G.1.4.1-3 and Table 6.2G.1.4.1-4. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the sum of the mean power of the UE at each antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. For TDD symbols with transient periods are not under test.

4. For UEs supporting Power Class 1.5, repeat steps 1~3 on the applicable bands with message exception of P-Max defined in Table 6.2G.1.4.3-2. For P-Max=23, UL RMC shall be set according to Table 6.2G.1.4.1-3. For P-Max=26, UL RMC shall be set according to Table 6.2G.1.4.1-1.

5. For UEs supporting Power Class 2, repeat steps 1~3 on the applicable bands with message exception of P-Max defined in Table 6.2G.1.4.3-2. UL RMC shall be set according to Table 6.2G.1.4.1-3.

6. For UEs supporting Power Class 1.5 with UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16*, repeat steps 1~3 on the applicable bands with message exception of TDD UL-DL pattern defined in Table 6.2.1.4.3-4, Table 6.2.1.4.3-5, Table 6.2G.1.4.3-3, Table 6.2G.1.4.3-4, Table 6.2G.1.4.3-5, Table 6.2G.1.4.3-6, Table 6.2G.1.4.3-7, Table 6.2G.1.4.3-8, Table 6.2G.1.4.3-9 and Table 6.2G.1.4.3-10 which the UplinkDutyCycle is closest less than or equal to the *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16* reported by UE. Before Step 3, wait for at least 10ms for the UE to complete the evaluation period. UL RMC shall be set according to Table 6.2G.1.4.1-4.

7. For UEs supporting Power Class 1.5 with UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16*, repeat steps 1~3 on the applicable bands with message exception of TDD UL-DL pattern defined in Table 6.2.1.4.3-4, Table 6.2.1.4.3-5, Table 6.2G.1.4.3-3, Table 6.2G.1.4.3-4, Table 6.2G.1.4.3-5, Table 6.2G.1.4.3-6, Table 6.2G.1.4.3-7, Table 6.2G.1.4.3-8, Table 6.2G.1.4.3-9 and Table 6.2G.1.4.3-10 which the UplinkDutyCycle is closest larger than *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16* and half the UplinkDutyCycle is no larger than *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16* reported by UE. Before Step 3, wait for at least 10ms for the UE to complete the evaluation period. UL RMC shall be set according to Table 6.2G.1.4.1-1.

8. For UEs supporting Power Class 1.5 with UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16*, repeat steps 1~3 on the applicable bands with message exception of TDD UL-DL pattern defined in Table 6.2.1.4.3-4, Table 6.2.1.4.3-5, Table 6.2G.1.4.3-3, Table 6.2G.1.4.3-4, Table 6.2G.1.4.3-5, Table 6.2G.1.4.3-6, Table 6.2G.1.4.3-7, Table 6.2G.1.4.3-8, Table 6.2G.1.4.3-9 and Table 6.2G.1.4.3-10 which half the UplinkDutyCycle is larger than *maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16* reported by UE. Before Step 3, wait for at least 10ms for the UE to complete the evaluation period. UL RMC shall be set according to Table 6.2G.1.4.1-3.

9. For TDD UEs supporting Power Class 2 with UE capability *maxUplinkDutyCycle-PC2-FR1*, repeat steps 1~3 on the applicable bands with message exception of TDD UL-DL pattern defined in Table 6.2.1.4.3-4 and Table 6.2.1.4.3-5 which the UplinkDutyCycle is closest less than or equal to the *maxUplinkDutyCycle-PC2-FR1* reported by UE. Before Step 3, wait for at least 10ms for the UE to complete the evaluation period.

6.2G.1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 with the following exceptions:

UplinkDutyCycle in Table 6.2G.1.4.3-3, Table 6.2G.1.4.3-4, Table 6.2G.1.4.3-5, Table 6.2G.1.4.3-6, Table 6.2G.1.4.3-7, Table 6.2G.1.4.3-8, Table 6.2G.1.4.3-9 and Table 6.2G.1.4.3-10 is the percentage of uplink slots transmitted in one radio frame.

Table 6.2G.1.4.3-1: *PUSCH-Config*

|  |
| --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED |

Table 6.2G.1.4.3-2: *P-Max* (Step 4)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-89 | | | |
| Information Element | Value/remark | Comment | Condition |
| P-Max | 23 | PC2 UE or PC1.5 UE will fallback to PC3 UE with P-Max=23 | PC2 UE or PC1.5 UE |
| 26 | PC1.5 UE will fallback to PC2 UE with P-Max=26 | PC1.5 UE |

Table 6.2G.1.4.3-3: TDD UL-DL pattern for SCS 15 KHz (*UplinkDutyCycle=10%*)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | UL-DL pattern |
| TDD Slot Configuration pattern (Note 1) | |  | 7DS2U |
| Special Slot Configuration (Note 2) | |  | 6D+4G+4U |
| UL-DL configuration (*tdd-UL-DL-ConfigurationCommon*) | *referenceSubcarrierSpacing* | kHz | 15 |
| *dl-UL-TransmissionPeriodicity* | ms | 10 |
| *nrofDownlinkSlots* |  | 7 |
| *nrofDownlinkSymbols* |  | 6 |
| *nrofUplinkSlot* |  | 2 |
| *nrofUplinkSymbols* |  | 4 |
| K1 value  (PDSCH-to-HARQ-timing-indicator) | |  | [8] if mod(i,10) = 0 [7] if mod(i,10) = 1 [6] if mod(i,10) = 2 [5] if mod(i,10) = 3 |
| Note 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  Note 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  Note 3: i is the slot index per frame; i = {0,…,9}  Note 4: There shall be no PUSCH or PUCCH or SRS transmitted in slot 7 and slot 9 to meet the specific UplinkDutyCycle. | | | |

Table 6.2G.1.4.3-4: TDD UL-DL pattern for SCS 15 KHz (*UplinkDutyCycle=20%*)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | UL-DL pattern |
| TDD Slot Configuration pattern (Note 1) | |  | 7DS2U |
| Special Slot Configuration (Note 2) | |  | 6D+4G+4U4 |
| UL-DL configuration (*tdd-UL-DL-ConfigurationCommon*) | *referenceSubcarrierSpacing* | kHz | 15 |
| *dl-UL-TransmissionPeriodicity* | ms | 10 |
| *nrofDownlinkSlots* |  | 7 |
| *nrofDownlinkSymbols* |  | 6 |
| *nrofUplinkSlot* |  | 2 |
| *nrofUplinkSymbols* |  | 4 |
| K1 value  (PDSCH-to-HARQ-timing-indicator) | |  | [8] if mod(i,10) = 0 [7] if mod(i,10) = 1 [6] if mod(i,10) = 2 [5] if mod(i,10) = 3 [5] if mod(i,10) = 4 [4] if mod(i,10) = 5 [3] if mod(i,10) = 6 [2] if mod(i,10) = 7 |
| Note 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  Note 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  Note 3: i is the slot index per frame; i = {0,…,9}  Note 4: There shall be no PUSCH or PUCCH or SRS transmitted in slot 7 to meet the specific UplinkDutyCycle. | | | |

Table 6.2G.1.4.3-5: TDD UL-DL pattern for SCS 15 KHz (*UplinkDutyCycle=30%*)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | UL-DL pattern |
| TDD Slot Configuration pattern (Note 1) | |  | DDDSUDDSUU |
| Special Slot Configuration (Note 2) | |  | 10D+2G+2U |
| UL-DL configuration1 (*tdd-UL-DL-ConfigurationCommon*) | *referenceSubcarrierSpacing* | kHz | 15 |
| *dl-UL-TransmissionPeriodicity* | ms | 5 dual |
| *nrofDownlinkSlots* |  | 3 |
| *nrofDownlinkSymbols* |  | 10 |
| *nrofUplinkSlot* |  | 1 |
| *nrofUplinkSymbols* |  | 2 |
| UL-DL configuration2 (*tdd-UL-DL-ConfigurationCommon2*) | *referenceSubcarrierSpacing* | kHz | 30 |
| *dl-UL-TransmissionPeriodicity* | ms | 5 dual |
| *nrofDownlinkSlots* |  | 2 |
| *nrofDownlinkSymbols* |  | 10 |
| *nrofUplinkSlot* |  | 2 |
| *nrofUplinkSymbols* |  | 2 |
| K1 value (PDSCH-to-HARQ-timing-indicator) | |  | [4] if mod(i,10) = 0 [3] if mod(i,10) = 1 [6] if mod(i,10) = 2 [5] if mod(i,10) = 3 [4] if mod(i,10) = 5 [3] if mod(i,10) = 6 [2] if mod(i,10) = 7 |
| Note 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  Note 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  Note 3: i is the slot index per frame; i = {0,…,9}  Note 4: There shall be no PUSCH or PUCCH or SRS transmitted in slot 3 and slot 7 to meet the specific UplinkDutyCycle. | | | |

Table 6.2G.1.4.3-6: TDD UL-DL pattern for SCS 15 KHz (*UplinkDutyCycle=40%*)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | UL-DL patte4rn |
| TDD Slot Configuration pattern (Note 1) | |  | DDSUU |
| Special Slot Configuration (Note 2) | |  | 10D+2G+2U |
| UL-DL configuration (*tdd-UL-DL-ConfigurationCommon*) | *referenceSubcarrierSpacing* | kHz | 15 |
| *dl-UL-TransmissionPeriodicity* | ms | 5 |
| *nrofDownlinkSlots* |  | 2 |
| *nrofDownlinkSymbols* |  | 10 |
| *nrofUplinkSlot* |  | 2 |
| *nrofUplinkSymbols* |  | 2 |
| K1 value  (PDSCH-to-HARQ-timing-indicator) | |  | [4] if mod(i,5) = 0 [7] if mod(i,5) = 1 [6] if mod(i,5) = 2 |
| Note 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  Note 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  Note 3: i is the slot index per frame; i = {0,…,9}  Note 4: There shall be no PUSCH or PUCCH or SRS transmitted in slot 2 and slot 7 to meet the specific UplinkDutyCycle. | | | |

Table6.2G.1.4.3-7: TDD UL-DL pattern for SCS 30 KHz (*UplinkDutyCycle=10%*)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | UL-DL pattern |
| TDD Slot Configuration pattern (Note 1) | |  | 7DS2U |
| Special Slot Configuration (Note 2) | |  | 6D+4G+4U |
| UL-DL configuration (*tdd-UL-DL-ConfigurationCommon*) | *referenceSubcarrierSpacing* | kHz | 30 |
| *dl-UL-TransmissionPeriodicity* | ms | 5 |
| *nrofDownlinkSlots* |  | 7 |
| *nrofDownlinkSymbols* |  | 6 |
| *nrofUplinkSlot* |  | 2 |
| *nrofUplinkSymbols* |  | 4 |
| K1 value  (PDSCH-to-HARQ-timing-indicator) | |  | [8] if mod(i,10) = 0 [7] if mod(i,10) = 1 [6] if mod(i,10) = 2 [5] if mod(i,10) = 3 [5] if mod(i,10) = 4 [4] if mod(i,10) = 5 [3] if mod(i,10) = 6 [2] if mod(i,10) = 7 |
| Note 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  Note 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  Note 3: i is the slot index per frame; i = {0,…,19}  Note 4: There shall be no PUSCH or PUCCH or SRS transmitted in slot 7, slot 17, slot 18 and slot 19 to meet the specific UplinkDutyCycle. | | | |

Table6.2G.1.4.3-8: TDD UL-DL pattern for SCS 30 KHz (*UplinkDutyCycle=20%*)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | UL-DL pattern |
| TDD Slot Configuration pattern (Note 1) | |  | 7DS2U |
| Special Slot Configuration (Note 2) | |  | 6D+4G+4U |
| UL-DL configuration (*tdd-UL-DL-ConfigurationCommon*) | *referenceSubcarrierSpacing* | kHz | 30 |
| *dl-UL-TransmissionPeriodicity* | ms | 5 |
| *nrofDownlinkSlots* |  | 7 |
| *nrofDownlinkSymbols* |  | 6 |
| *nrofUplinkSlot* |  | 2 |
| *nrofUplinkSymbols* |  | 4 |
| K1 value  (PDSCH-to-HARQ-timing-indicator) | |  | [8] if mod(i,10) = 0 [7] if mod(i,10) = 1 [6] if mod(i,10) = 2 [5] if mod(i,10) = 3 [5] if mod(i,10) = 4 [4] if mod(i,10) = 5 [3] if mod(i,10) = 6 [2] if mod(i,10) = 7 |
| Note 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  Note 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  Note 3: i is the slot index per frame; i = {0,…,19}  Note 4: There shall be no PUSCH or PUCCH or SRS transmitted in slot 7 and slot 17 to meet the specific UplinkDutyCycle. | | | |

Table 6.2G.1.4.3-9: TDD UL-DL pattern for SCS 30 KHz (*UplinkDutyCycle=30%*)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | UL-DL pattern |
| TDD Slot Configuration pattern (Note 1) | |  | DDDSU DDSUU |
| Special Slot Configuration (Note 2) | |  | 10D+2G+2U4 |
| UL-DL configuration (*tdd-UL-DL-ConfigurationCommon*) | *referenceSubcarrierSpacing* | kHz | 30 |
| *dl-UL-TransmissionPeriodicity* | ms | 2.5 dual |
| *nrofDownlinkSlots* |  | 3 |
| *nrofDownlinkSymbols* |  | 10 |
| *nrofUplinkSlot* |  | 1 |
| *nrofUplinkSymbols* |  | 2 |
| UL-DL configuration2 (*tdd-UL-DL-ConfigurationCommon2*) | *referenceSubcarrierSpacing* | kHz | 30 |
| *dl-UL-TransmissionPeriodicity* | ms | 2.5 dual |
| *nrofDownlinkSlots* |  | 2 |
| *nrofDownlinkSymbols* |  | 10 |
| *nrofUplinkSlot* |  | 2 |
| *nrofUplinkSymbols* |  | 2 |
| K1 value (PDSCH-to-HARQ-timing-indicator) | |  | [4] if mod(i,10) = 0 [3] if mod(i,10) = 1 [6] if mod(i,10) = 2 [5] if mod(i,10) = 3 [4] if mod(i,10) = 5 [3] if mod(i,10) = 6 [2] if mod(i,10) = 7 |
| Note 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  Note 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  Note 3: i is the slot index per frame; i = {0,…,19}  Note 4: There shall be no PUSCH or PUCCH or SRS transmitted in slot 3, slot 7, slot 13 and slot 17 to meet the specific UplinkDutyCycle. | | | |

Table 6.2G.1.4.3-10: TDD UL-DL pattern for SCS 30 KHz (*UplinkDutyCycle=40%*)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | UL-DL pattern |
| TDD Slot Configuration pattern (Note 1) | |  | DDSUU |
| Special Slot Configuration (Note 2) | |  | 10D+2G+2U4 |
| UL-DL configuration (*tdd-UL-DL-ConfigurationCommon*) | *referenceSubcarrierSpacing* | kHz | 30 |
| *dl-UL-TransmissionPeriodicity* | ms | 2.5 single |
| *nrofDownlinkSlots* |  | 2 |
| *nrofDownlinkSymbols* |  | 10 |
| *nrofUplinkSlot* |  | 2 |
| *nrofUplinkSymbols* |  | 2 |
| K1 value  (PDSCH-to-HARQ-timing-indicator) | |  | [4] if mod(i,5) = 0 [7] if mod(i,5) = 1 [6] if mod(i,5) = 2 |
| Note 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  Note 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  Note 3: i is the slot index per frame; i = {0,…,19}  Note 4: There shall be no PUSCH or PUCCH or SRS transmitted in slot 2, slot 7, slot 12 and slot 17 to meet the specific UplinkDutyCycle. | | | |

6.2G.1.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2G.1.5-1 for Power Class 2, Table 6.2G.1.5-2 for Power Class 1.5 and Table 6.2G.1.5-4 for Power Class 3.

The maximum output power, derived in step 4 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2G.1.5-4 for Power Class 3 and Table 6.2G.1.5-1 for Power Class 2.

The maximum output power, derived in step 5 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2G.1.5-4 for Power Class 3.

The maximum output power, derived in step 6 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2G.1.5-2 for Power Class 1.5.

The maximum output power, derived in step 7 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2G.1.5-1 for Power Class 2.

The maximum output power, derived in step 8 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2G.1.5-4 for Power Class 3.

The maximum output power, derived in step 9 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2G.1.5-1 for Power Class 2.

Table 6.2G.1.5-1: Maximum Output Power test requirement for Power Class 2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) |
| n1 |  |  | 26 | +2+TT/-3-TT |  |  |
| n3 |  |  | 26 | +2+TT/-33-TT |  |  |
| n34 |  |  | 26 | +2+TT/-3-TT |  |  |
| n39 |  |  | 26 | +2+TT/-3-TT |  |  |
| n40 |  |  | 26 | +2+TT/-3-TT |  |  |
| n41 |  |  | 26 | +2+TT/-33-TT |  |  |
| n77 |  |  | 26 | +2+TT/-3-TT |  |  |
| n78 |  |  | 26 | +2+TT/-3-TT |  |  |
| n79 |  |  | 26 | +2+TT/-3-TT |  |  |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 2: Power class 3 is default power class unless otherwise stated  NOTE 3: Refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 4: TT for each frequency and channel bandwidth is specified in Table 6.2G.1.5-3 | | | | | | |

Table 6.2G.1.5-2: Maximum Output Power test requirement for Power Class 1.5

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1.5 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) |
| n34 | 295 | +2+TT/-3-TT |  |  |  |  |
| n39 | 295 | +2+TT/-3-TT |  |  |  |  |
| n40 | 295 | +2+TT/-3-TT |  |  |  |  |
| n41 | 295 | +2+TT/-33-TT |  |  |  |  |
| n77 | 295 | +2+TT/-3-TT |  |  |  |  |
| n78 | 295 | +2+TT/-3-TT |  |  |  |  |
| n79 | 295 | +2+TT/-3-TT |  |  |  |  |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 2: Power class 3 is default power class unless otherwise stated  NOTE 3: Refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 4: TT for each frequency and channel bandwidth is specified in Table 6.2G.1.5-3  NOTE 5: Achieved via dual Tx  NOTE 6: No test required since there is no satisfying test points defined. | | | | | | |

Table 6.2G.1.5-3: Test Tolerance (UE maximum output power)

|  |  |  |  |
| --- | --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 4.2GHz | 4.2GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB | 1.0 dB |
| 40MHz < BW ≤ 100MHz | 1.0 dB | 1.0 dB | 1.0 dB |

Table 6.2G.1.5-4: Maximum Output Power test requirement for Power Class 3

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) |
| n1 |  |  |  |  | 23 | +2+TT/-3-TT |
| n2 |  |  |  |  | 23 | +2+TT/-33-TT |
| n3 |  |  |  |  | 23 | +2+TT/-33-TT |
| n5 |  |  |  |  | 23 | +2+TT/-3-TT |
| n7 |  |  |  |  | 23 | +2+TT/-33-TT |
| n8 |  |  |  |  | 23 | +2+TT/-33-TT |
| n12 |  |  |  |  | 23 | +2+TT/-33-TT |
| n14 |  |  |  |  | 23 | +2+TT/-3-TT |
| n20 |  |  |  |  | 23 | +2+TT/-33-TT |
| n24 |  |  |  |  | 23 | +2+TT/-33-TT |
| n25 |  |  |  |  | 23 | +2+TT/-33-TT |
| n26 |  |  |  |  | 23 | +2+TT/-33-TT |
| n28 |  |  |  |  | 23 | +2+TT/-3-TT |
| n30 |  |  |  |  | 23 | +2+TT/-3-TT |
| n34 |  |  |  |  | 23 | +2+TT/-3-TT |
| n38 |  |  |  |  | 23 | +2+TT/-3-TT |
| n39 |  |  |  |  | 23 | +2+TT/-3-TT |
| n40 |  |  |  |  | 23 | +2+TT/-3-TT |
| n41 |  |  |  |  | 23 | +2+TT/-33-TT |
| n48 |  |  |  |  | 23 | +2+TT/-3-TT |
| n50 |  |  |  |  | 23 | +2+TT/-3-TT |
| n51 |  |  |  |  | 23 | +2+TT/-3-TT |
| n53 |  |  |  |  | 23 | +2+TT/-3-TT |
| n65 |  |  |  |  | 23 | +2+TT/-3-TT |
| n66 |  |  |  |  | 23 | +2+TT/-3-TT |
| n70 |  |  |  |  | 23 | +2+TT/-3-TT |
| n71 |  |  |  |  | 23 | +2+TT/-3-TT |
| n74 |  |  |  |  | 23 | +2+TT/-3-TT |
| n77 |  |  |  |  | 23 | +2+TT/-3-TT |
| n78 |  |  |  |  | 23 | +2+TT/-3-TT |
| n79 |  |  |  |  | 23 | +2+TT/-3-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 2: Power class 3 is default power class unless otherwise stated  NOTE 3: Refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 4: TT for each frequency and channel bandwidth is specified in Table 6.2G.1.5-3 | | | | | | |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2G.2 UE maximum output power reduction for Tx Diversity

6.2G.2.1 Test purpose

The number of RB identified in Table 6.2D.2.3-1 and Table 6.2D.2.3-2 is based on meeting the requirements for adjacent channel leakage ratio and the maximum power reduction (MPR) due to Cubic Metric (CM).

6.2G.2.2 Test applicability

This test case applies to all types of NR Power Class 1.5, Power Class 2 and Power Class 3 UE release 15 and forward that support Tx diversity.

NOTE: Test execution is not necessary if TS 38.521-1 6.5G.2.3.1 is executed.

6.2G.2.3 Minimum conformance requirements

For UE supporting Tx diversity, the allowed MPR for the maximum output power is specified in Table 6.2.2-1, Table 6.2D.2.3-1, Table 6.2D.2.3-2 and Table 6.2D.2.3-3 for UE power class 3, 2 and 1.5 respectively. For UE power class 1.5, the allowed maximum power reduction (MPR) defined in Table 6.2D.2.3-3 is in accordance with the indicated *modifiedMPR-Behavior* specified in Table L.1-1 for channel bandwidths ≤ 100 MHz. The maximum output power is defined as the sum of the maximum output power at each UE antenna connector. If a UE that supports PC1.5 has to apply the requirements of PC2 according to the rules in clause 6.2.1, the MPR requirements in Table 6.2.2-2 apply.

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2G.4 apply.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2G.2.

6.2G.2.4 Test description

6.2G.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, channel bandwidths and sub-carrier spacing based on NR operating bands specified in Table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in Table 6.2G.2.4.1-1, Table 6.2G.2.4.1-2, and Table 6.2G.2.4.1-3. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2G.2.4.1-1: Test Configuration Table for power class 2 (contiguous allocation)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A for Maximum Power | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 | Default | Reduction (MPR) test case | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 2 | Low |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Left |
| 3 | High |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Right |
| 4 | Default |  | DFT-s-OFDM Pi/2 BPSK | Outer Full |
| 5 | Default |  | DFT-s-OFDM QPSK | Inner Full |
| 6 | Low |  | DFT-s-OFDM QPSK | Edge\_1RB\_Left |
| 7 | High |  | DFT-s-OFDM QPSK | Edge\_1RB\_Right |
| 8 | Default |  | DFT-s-OFDM QPSK | Outer Full |
| 9 | Default |  | DFT-s-OFDM 16 QAM | Inner Full |
| 10 | Low |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Left |
| 11 | High |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Right |
| 12 | Default |  | DFT-s-OFDM 16 QAM | Outer Full |
| 13 | Low |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Left |
| 14 | High |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Right |
| 15 | Default |  | DFT-s-OFDM 64 QAM | Outer Full |
| 16 | Low |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Left |
| 17 | High |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Right |
| 18 | Default |  | DFT-s-OFDM 256 QAM | Outer Full |
| 19 | Default |  | CP-OFDM QPSK | Inner Full |
| 20 | Low |  | CP-OFDM QPSK | Edge\_1RB\_Left |
| 21 | High |  | CP-OFDM QPSK | Edge\_1RB\_Right |
| 22 | Default |  | CP-OFDM QPSK | Outer Full |
| 23 | Default |  | CP-OFDM 16 QAM | Inner Full |
| 24 | Low |  | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 25 | High |  | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 26 | Default |  | CP-OFDM 16 QAM | Outer Full |
| 27 | Low |  | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 28 | High |  | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 29 | Default |  | CP-OFDM 64 QAM | Outer Full |
| 30 | Low |  | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 31 | High |  | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 32 | Default |  | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM Pi/2 BPSK test applies only for UEs which supports Pi/2 BPSK in FR1. | | | | |

Table 6.2G.2.4.1-2: Test Configuration Table for power class 1.5 UE and power class 1.5 FWA (contiguous allocation)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A for Maximum Power | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 | Default | Reduction (MPR) test case | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 2 | Low |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Left |
| 3 | High |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Right |
| 4 | Default |  | DFT-s-OFDM Pi/2 BPSK | Outer Full |
| 5 | Default |  | DFT-s-OFDM QPSK | Inner Full |
| 6 | Low |  | DFT-s-OFDM QPSK | Edge\_1RB\_Left |
| 7 | High |  | DFT-s-OFDM QPSK | Edge\_1RB\_Right |
| 8 | Default |  | DFT-s-OFDM QPSK | Outer Full |
| 9 | Default |  | DFT-s-OFDM 16 QAM | Inner Full |
| 10 | Low |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Left |
| 11 | High |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Right |
| 12 | Default |  | DFT-s-OFDM 16 QAM | Outer Full |
| 13 | Default |  | DFT-s-OFDM\_64\_QAM | Inner Full |
| 14 | Low |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Left |
| 15 | High |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Right |
| 16 | Default |  | DFT-s-OFDM 64 QAM | Outer Full |
| 17 | Default |  | DFT-s-OFDM\_256\_QAM | Inner Full |
| 18 | Low |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Left |
| 19 | High |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Right |
| 20 | Default |  | DFT-s-OFDM 256 QAM | Outer Full |
| 21 | Default |  | CP-OFDM QPSK | Inner Full |
| 22 | Low |  | CP-OFDM QPSK | Edge\_1RB\_Left |
| 23 | High |  | CP-OFDM QPSK | Edge\_1RB\_Right |
| 24 | Default |  | CP-OFDM QPSK | Outer Full |
| 25 | Default |  | CP-OFDM 16 QAM | Inner Full |
| 26 | Low |  | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 27 | High |  | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 28 | Default |  | CP-OFDM 16 QAM | Outer Full |
| 29 | Default |  | CP-OFDM 64 QAM | Inner Full |
| 30 | Low |  | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 31 | High |  | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 32 | Default |  | CP-OFDM 64 QAM | Outer Full |
| 33 | Default |  | CP-OFDM 256 QAM | Inner Full |
| 34 | Low |  | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 35 | High |  | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 36 | Default |  | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM Pi/2 BPSK test applies only for UEs which supports Pi/2 BPSK in FR1. | | | | |

Table 6.2G.2.4.1-2a: Test Configuration Table for power class 3 (contiguous allocation)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A for Maximum Power | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 13 | Default | Reduction (MPR) test case | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 23 | Low |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Left |
| 33 | High |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Right |
| 43 | Default |  | DFT-s-OFDM Pi/2 BPSK | Outer Full |
| 54 | Default |  | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 64 | Low |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Left |
| 74 | High |  | DFT-s-OFDM Pi/2 BPSK | Edge\_1RB\_Right |
| 84 | Default |  | DFT-s-OFDM Pi/2 BPSK | Outer Full |
| 9 | Default |  | DFT-s-OFDM QPSK | Inner Full |
| 10 | Low |  | DFT-s-OFDM QPSK | Edge\_1RB\_Left |
| 11 | High |  | DFT-s-OFDM QPSK | Edge\_1RB\_Right |
| 12 | Default |  | DFT-s-OFDM QPSK | Outer Full |
| 13 | Default |  | DFT-s-OFDM 16 QAM | Inner Full |
| 14 | Low |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Left |
| 15 | High |  | DFT-s-OFDM 16 QAM | Edge\_1RB\_Right |
| 16 | Default |  | DFT-s-OFDM 16 QAM | Outer Full |
| 17 | Low |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Left |
| 18 | High |  | DFT-s-OFDM 64 QAM | Edge\_1RB\_Right |
| 19 | Default |  | DFT-s-OFDM 64 QAM | Outer Full |
| 20 | Low |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Left |
| 21 | High |  | DFT-s-OFDM 256 QAM | Edge\_1RB\_Right |
| 22 | Default |  | DFT-s-OFDM 256 QAM | Outer Full |
| 23 | Default |  | CP-OFDM QPSK | Inner Full |
| 24 | Low |  | CP-OFDM QPSK | Edge\_1RB\_Left |
| 25 | High |  | CP-OFDM QPSK | Edge\_1RB\_Right |
| 26 | Default |  | CP-OFDM QPSK | Outer Full |
| 27 | Default |  | CP-OFDM 16 QAM | Inner Full |
| 28 | Low |  | CP-OFDM 16 QAM | Edge\_1RB\_Left |
| 29 | High |  | CP-OFDM 16 QAM | Edge\_1RB\_Right |
| 30 | Default |  | CP-OFDM 16 QAM | Outer Full |
| 31 | Low |  | CP-OFDM 64 QAM | Edge\_1RB\_Left |
| 32 | High |  | CP-OFDM 64 QAM | Edge\_1RB\_Right |
| 33 | Default |  | CP-OFDM 64 QAM | Outer Full |
| 34 | Low |  | CP-OFDM 256 QAM | Edge\_1RB\_Left |
| 35 | High |  | CP-OFDM 256 QAM | Edge\_1RB\_Right |
| 36 | Default |  | CP-OFDM 256 QAM | Outer Full |
| 374,5 | Low |  | DFT-s-OFDM Pi/2 BPSK w Pi/2 BPSK DMRS | Edge\_1RB\_Left |
| 384,5 | High |  | DFT-s-OFDM Pi/2 BPSK w Pi/2 BPSK DMRS | Edge\_1RB\_Right |
| 394,5 | Default |  | DFT-s-OFDM Pi/2 BPSK w Pi/2 BPSK DMRS | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM Pi/2 BPSK test applies only for UEs which supports Pi/2 BPSK in FR1.  NOTE 3: UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and the IE *powerBoostPi2BPSK* is set to 1 for bands n40, n41, n77, n78 and n79.  NOTE 4: UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79, or in TDD mode the IE *powerBoostPi2BPSK* is set to 0 for bands n40, n41, n77, n78 and n79.  NOTE 5: Applicable to UEs indicating support for UE capability *lowPAPR-DMRS-PUSCHwithPrecoding-r16*. | | | | |

Table 6.2G.2.4.1-3: Test Configuration Table for power class 2 and 3 (almost contiguous allocation)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test ID | Freq | Downlink Configuration | Uplink Configuration | |
|  |  | N/A for Maximum Power | Modulation | RB allocation (NOTE 1) |
| 1 | Default |  | CP-OFDM QPSK | Inner Full |
| 2 | Default |  | CP-OFDM QPSK | Outer Full |
| 3 | Default |  | CP-OFDM 16 QAM | Inner Full |
| 4 | Default |  | CP-OFDM 16 QAM | Outer Full |
| 5 | Default |  | CP-OFDM 64 QAM | Outer Full |
| 6 | Default |  | CP-OFDM 256 QAM | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.2.2.4.1-4, 6.2.2.4.1-4a and 6.2.2.4.1-4b.  NOTE 2: Test applies only for UEs which support almost contiguous UL CP-OFDM transmissions. For PC2 UE which support almost contiguous UL CP-OFDM transmissions, test is only applicable for Release 16 and forward. | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.2.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2G.2.4.1-1, Table 6.2G.2.4.1-2 and Table 6.2G.2.4.1-3.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in State RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2G.2.4.3.

6.2G.2.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2G.2.4.1-1, Table 6.2G.2.4.1-2, Table 6.2G.2.4.1-2a and Table 6.2G.2.4.1-3. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms for the UE to reach PUMAX level.

3. Measure the sum of the mean power of the UE at each antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms over consecutive active uplink slots. For TDD, only slots consisting of only UL symbols are under test.

4. For UEs supporting Power Class 1.5 and Power Class 2, repeat steps 1~3 for Test ID 16 and 22 in Table 6.2G.2.4.1-2a on the applicable bands with message exception of P-Max defined in Table 6.2G.2.4.3-2.

5. For UEs supporting Power Class 1.5, repeat steps 1~3 for all Test IDs in Table 6.2G.2.4.1-1 on the applicable bands with message exception of P-Max defined in Table 6.2G.2.4.3-3.

NOTE 1: When switching to DFT-s-OFDM waveform, as specified in the test configuration Table 6.2G.2.4.1-1 and Table 6.2G.2.4.1-2, send an NR RRCReconfiguration message according to TS 38.508-1 [5] clause 4.6.3 Table 4.6.3-118 PUSCH-Config with TRANSFORM\_PRECODER\_ENABLED condition.

6.2G.2.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 with the following exceptions:

Table 6.2G.2.4.3-1: *PUSCH-Config*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] subclause 4.6.3 Table 4.6.3-118 PUSCH-Config | | | |
| Information Element | Value/remark | Comment | Condition |
| PUSCH-Config ::= SEQUENCE { |  |  |  |
| resourceAllocation | resourceAllocationType0 |  | Almost contiguous allocation |
|  | resourceAllocationType1 |  | Contiguous allocation |
| } |  |  |  |

Table 6.2G.2.4.3-2: *P-Max* (Step 4)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-89 | | | |
| Information Element | Value/remark | Comment | Condition |
| P-Max | 23 |  | PC2 UE or  PC1.5 UE |

Table 6.2G.2.4.3-3: *P-Max* (Step 5)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-89 | | | |
| Information Element | Value/remark | Comment | Condition |
| P-Max | 26 |  | PC1.5 UE |

6.2G.2.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2G.2.5-1 to Table 6.2G.2.5-12.

The maximum output power, derived in step 4 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2G.2.5-5 to Table 6.2G.2.5-12.

The maximum output power, derived in step 5 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2G.2.5-2b.

Table 6.2G.2.5-1: UE Power Class test requirements (for Bands n34, n39, n40, n41, n77, n78, n79) for Power Class 2 (contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 26 | 0 | 0 | 0 | （1.52） | 26.0 | （24.52） | 3.0 |  | 3 | 28.0 + TT | 23.0 - TT | （21.5 - TT2） |
| 2 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 3 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0- TT2） |
| 4 | 26 | 0 | 1 | 0 | （1.52） | 25.0 | （23.52） | 3.0 |  | 3 | 28.0 + TT | 22.0 - TT | （20.5- TT2） |
| 5 | 26 | 0 | 0.5 | 0 | （1.52） | 25.5 | （24.02） | 3.0 |  | 3 | 28.0 + TT | 22.5 - TT | （21.0 - TT2） |
| 6 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 7 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 8 | 26 | 0 | 2 | 0 | （1.52） | 24.0 | （22.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | （17.5 - TT2） |
| 9 | 26 | 0 | 1.5 | 0 | （1.52） | 24.5 | （23.02） | 3.0 |  | 3 | 28.0 + TT | 21.5 - TT | （20.0 - TT2） |
| 10 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 11 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 12 | 26 | 0 | 2.5 | 0 | （1.52） | 23.5 | （22.02） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.5 - TT | （17.0 - TT2） |
| 13 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 14 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0- TT2） |
| 15 | 26 | 0 | 3 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.0 - TT | （16.5 - TT2） |
| 16 | 26 | 0 | 5.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 28.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 17 | 26 | 0 | 5.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 28.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 18 | 26 | 0 | 5.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 28.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 19 | 26 | 0 | 2 | 0 | （1.52） | 24.0 | （22.52） | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | （17.5 - TT2） |
| 20 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 21 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5- TT2） |
| 22 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 23 | 26 | 0 | 2.5 | 0 | （1.52） | 23.5 | （22.02） | 3.0 | （5.02） | 3 | 28.0 + TT | 20.5 - TT | （17.0 - TT2） |
| 24 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 25 | 26 | 0 | 4.0 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 28.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 26 | 26 | 0 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 27 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 28 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 29 | 26 | 0 | 4.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 30 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 |  | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| 31 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 |  | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| 32 | 26 | 0 | 8.0 | 0 | （1.52） | 18.0 | （16.52） | 5.0 |  | 3 | 28.0 + TT | 13.0 - TT | （11.5 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4. | | | | | | | | | | | | | |

Table 6.2G.2.5-2: UE Power Class test requirements (for Band n34, n39, n40, n41, n77, n78, n79) for Power Class 1.5 (contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 29 | 0 | 0.5 | 0 | （1.52） | 28.5 | (27.0²) | 3.0 |  | 3 | 31.0 + TT | 25.5 - TT | (24.0 - TT²) |
| 2 | 29 | 0 | 6 | 0 | （1.52） | 23.0 | (21.5²) | 3.0 | （5.02） | 3 | 31.0 + TT | 20.0 - TT | (16.5 - TT²) |
| 3 | 29 | 0 | 6 | 0 | （1.52） | 23.0 | (21.5²) | 3.0 | （5.02） | 3 | 31.0 + TT | 20.0 - TT | (16.5 - TT²) |
| 4 | 29 | 0 | 2 | 0 | （1.52） | 27.0 | (25.5²) | 3.0 |  | 3 | 31.0 + TT | 24.0 - TT | (22.5 - TT²) |
| 5 | 29 | 0 | 0.5 | 0 | （1.52） | 28.5 | (27.0²) | 3.0 |  | 3 | 31.0 + TT | 25.5 - TT | (24.0 - TT²) |
| 6 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 7 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 8 | 29 | 0 | 2.5 | 0 | （1.52） | 26.5 | (25.0²) | 3.0 |  | 3 | 31.0 + TT | 23.5 - TT | (22.0 - TT²) |
| 9 | 29 | 0 | 1.5 | 0 | （1.52） | 27.5 | (26.0²) | 3.0 |  | 3 | 31.0 + TT | 24.5 - TT | (23.0 - TT²) |
| 10 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 11 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 12 | 29 | 0 | 3.5 | 0 | （1.52） | 25.5 | (24.0²) | 3.0 |  | 3 | 31.0 + TT | 22.5 - TT | (21.0 - TT²) |
| 13 | 29 | 0 | 3.5 | 0 | （1.52） | 25.5 | (24.0²) | 3.0 |  | 3 | 31.0 + TT | 22.5 - TT | (21.0 - TT²) |
| 14 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 15 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 16 | 29 | 0 | 4 | 0 | （1.52） | 25.0 | (23.5²) | 3.0 |  | 3 | 31.0 + TT | 22.0 - TT | (20.5 - TT²) |
| 17 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 18 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 19 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 20 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 21 | 29 | 0 | 2 | 0 | （1.52） | 27.0 | (25.5²) | 3.0 |  | 3 | 31.0 + TT | 24.0 - TT | (22.5 - TT²) |
| 22 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 23 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 24 | 29 | 0 | 4.5 | 0 | （1.52） | 24.5 | (23.0²) | 3.0 |  | 3 | 31.0 + TT | 21.5 - TT | (20.0 - TT²) |
| 25 | 29 | 0 | 2.5 | 0 | （1.52） | 26.5 | (25.0²) | 3.0 |  | 3 | 31.0 + TT | 23.5 - TT | (22.0 - TT²) |
| 26 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 27 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 28 | 29 | 0 | 4.5 | 0 | （1.52） | 24.5 | (23.0²) | 3.0 |  | 3 | 31.0 + TT | 21.5 - TT | (20.0 - TT²) |
| 29 | 29 | 0 | 4.5 | 0 | （1.52） | 24.5 | (23.0²) | 3.0 |  | 3 | 31.0 + TT | 21.5 - TT | (20.0 - TT²) |
| 30 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 31 | 29 | 0 | 6.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 32 | 29 | 0 | 5 | 0 | （1.52） | 24.0 | (22.5²) | 3.0 | （5.02） | 3 | 31.0 + TT | 21.0 - TT | (17.5 - TT²) |
| 33 | 29 | 0 | 8.5 | 0 | （1.52） | 20.5 | (19.0²) | 6.0 | （5.02） | 3 | 31.0 + TT | 14.5 - TT | (14.0 - TT²) |
| 34 | 29 | 0 | 8.5 | 0 | （1.52） | 20.5 | (19.0²) | 6.0 | （5.02） | 3 | 31.0 + TT | 14.5 - TT | (14.0 - TT²) |
| 35 | 29 | 0 | 8.5 | 0 | （1.52） | 20.5 | (19.0²) | 6.0 | （5.02） | 3 | 31.0 + TT | 14.5 - TT | (14.0 - TT²) |
| 36 | 29 | 0 | 8.5 | 0 | （1.52） | 20.5 | (19.0²) | 6.0 | （5.02） | 3 | 31.0 + TT | 14.5 - TT | (14.0 - TT²) |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4. | | | | | | | | | | | | | |

Table 6.2G.2.5-2a: UE Power Class test requirements (for Band n34, n39, n40, n41, n77, n78, n79) for Power Class 1.5 FWA (contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 29 | 0 | 0 | 0 | （1.53） | 29.0 | (27.53) | 3.0 |  | 3 | 31.0 + TT | 26.0 - TT | (24.5 – TT3) |
| 2 | 29 | 0 | 6 | 0 | （1.53） | 23.0 | (21.53) | 3.0 | (5.03) | 3 | 31.0 + TT | 20.0 - TT | (16.5 – TT3) |
| 3 | 29 | 0 | 6 | 0 | （1.53） | 23.0 | (21.53) | 3.0 | (5.03) | 3 | 31.0 + TT | 20.0 - TT | (16.5 – TT3) |
| 4 | 29 | 0 | 1.5 | 0 | （1.53） | 27.5 | (26.03) | 3.0 |  | 3 | 31.0 + TT | 24.5 - TT | (23.0 – TT3) |
| 5 | 29 | 0 | 0 | 0 | （1.53） | 29.0 | (27.53) | 3.0 |  | 3 | 31.0 + TT | 26.0 - TT | (24.5 – TT3) |
| 6 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 7 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 8 | 29 | 0 | 2 | 0 | （1.53） | 27.0 | (25.53) | 3.0 |  | 3 | 31.0 + TT | 24.0 - TT | (22.5 – TT3) |
| 9 | 29 | 0 | 1 | 0 | （1.53） | 28.0 | (26.53) | 3.0 |  | 3 | 31.0 + TT | 25.0 - TT | (23.5 – TT3) |
| 10 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 11 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 12 | 29 | 0 | 3.5 | 0 | （1.53） | 25.5 | (24.03) | 3.0 |  | 3 | 31.0 + TT | 22.5 - TT | (21.0 – TT3) |
| 13 | 29 | 0 | 3 | 0 | （1.53） | 26.0 | (24.53) | 3.0 |  | 3 | 31.0 + TT | 23.0 - TT | (21.5 – TT3) |
| 14 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 15 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 16 | 29 | 0 | 3.5 | 0 | （1.53） | 25.5 | (24.03) | 3.0 |  | 3 | 31.0 + TT | 22.5 - TT | (21.0 – TT3) |
| 17 | 29 | 0 | 5.5 | 0 | （1.53） | 23.5 | (22.03) | 3.0 |  | 3 | 31.0 + TT | 20.5 - TT | (19.0 – TT3) |
| 18 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 19 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 20 | 29 | 0 | 5.5 | 0 | （1.53） | 23.5 | (22.03) | 3.0 | (5.03) | 3 | 31.0 + TT | 20.5 - TT | (17.0 – TT3) |
| 21 | 29 | 0 | 1.5 | 0 | （1.53） | 27.5 | (26.03) | 3.0 |  | 3 | 31.0 + TT | 24.5 - TT | (23.0 – TT3) |
| 22 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 23 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 24 | 29 | 0 | 4 | 0 | （1.53） | 25.0 | (23.53) | 3.0 |  | 3 | 31.0 + TT | 22.0 - TT | (20.5 – TT3) |
| 25 | 29 | 0 | 2 | 0 | （1.53） | 27.0 | (25.53) | 3.0 |  | 3 | 31.0 + TT | 24.0 - TT | (22.5 – TT3) |
| 26 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 27 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 28 | 29 | 0 | 4 | 0 | （1.53） | 25.0 | (23.53) | 3.0 |  | 3 | 31.0 + TT | 22.0 - TT | (20.5 – TT3) |
| 29 | 29 | 0 | 4 | 0 | （1.53） | 25.0 | (23.53) | 3.0 |  | 3 | 31.0 + TT | 22.0 - TT | (20.5 – TT3) |
| 30 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 31 | 29 | 0 | 6.5 | 0 | （1.53） | 22.5 | (21.03) | 5.0 |  | 3 | 31.0 + TT | 17.5 - TT | (16.0 – TT3) |
| 32 | 29 | 0 | 4.5 | 0 | （1.53） | 24.5 | (23.03) | 3.0 |  | 3 | 31.0 + TT | 21.5 - TT | (20.0 – TT3) |
| 33 | 29 | 0 | 7.5 | 0 | （1.53） | 21.5 | (20.03) | 5.0 | （6.03） | 3 | 31.0 + TT | 16.5 - TT | (14.0 – TT3) |
| 34 | 29 | 0 | 7.5 | 0 | （1.53） | 21.5 | (20.03) | 5.0 | （6.03） | 3 | 31.0 + TT | 16.5 - TT | (14.0 – TT3) |
| 35 | 29 | 0 | 7.5 | 0 | （1.53） | 21.5 | (20.03) | 5.0 | （6.03） | 3 | 31.0 + TT | 16.5 - TT | (14.0 – TT3) |
| 36 | 29 | 0 | 7.5 | 0 | （1.53） | 21.5 | (20.03) | 5.0 | （6.03） | 3 | 31.0 + TT | 16.5 - TT | (14.0 – TT3) |
| NOTE 1: This table is targeted to large FWA form factor with 20 dB or above antenna isolation.  NOTE 2: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 3: For Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 4: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4. | | | | | | | | | | | | | |

Table 6.2G.2.5-2b: UE Power Class test requirements (for Band n34, n39, n40 n41, n77, n78, n79) for Power Class 1.5 falling back to Power Class 2 (contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 29 | 3 | 0 | 0 | （1.52） | 26.0 | (24.5²) | 3.0 |  | 3 | 28.0 + TT | 23.0 - TT | (21.5 - TT²) |
| 2 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 3 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 4 | 29 | 3 | 0.5 | 0 | （1.52） | 25.5 | (24.0²) | 3.0 |  | 3 | 28.0 + TT | 22.5 - TT | (21.0 - TT²) |
| 5 | 29 | 3 | 0 | 0 | （1.52） | 26.0 | (24.5²) | 3.0 |  | 3 | 28.0 + TT | 23.0 - TT | (21.5 - TT²) |
| 6 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 7 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 8 | 29 | 3 | 1 | 0 | （1.52） | 25.0 | (23.5²) | 3.0 |  | 3 | 28.0 + TT | 22.0 - TT | (20.5 - TT²) |
| 9 | 29 | 3 | 1 | 0 | （1.52） | 25.0 | (23.5²) | 3.0 |  | 3 | 28.0 + TT | 22.0 - TT | (20.5 - TT²) |
| 10 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 11 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 12 | 29 | 3 | 2 | 0 | （1.52） | 24.0 | (22.5²) | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | (17.5 - TT²) |
| 13 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 14 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 15 | 29 | 3 | 2.5 | 0 | （1.52） | 23.5 | (22.0²) | 3.0 | （5.02） | 3 | 28.0 + TT | 20.5 - TT | (17.0 - TT²) |
| 16 | 29 | 3 | 4.5 | 0 | （1.52） | 21.5 | (20.0²) | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | (14.0 - TT²) |
| 17 | 29 | 3 | 4.5 | 0 | （1.52） | 21.5 | (20.0²) | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | (14.0 - TT²) |
| 18 | 29 | 3 | 4.5 | 0 | （1.52） | 21.5 | (20.0²) | 5.0 | （6.02） | 3 | 28.0 + TT | 16.5 - TT | (14.0 - TT²) |
| 19 | 29 | 3 | 1.5 | 0 | （1.52） | 24.5 | (23.0²) | 3.0 |  | 3 | 28.0 + TT | 21.5 - TT | (20.0 - TT²) |
| 20 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 21 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 22 | 29 | 3 | 3 | 0 | （1.52） | 23.0 | (21.5²) | 3.0 | （5.02） | 3 | 28.0 + TT | 20.0 - TT | (16.5 - TT²) |
| 23 | 29 | 3 | 2 | 0 | （1.52） | 24.0 | (22.5²) | 3.0 | （5.02） | 3 | 28.0 + TT | 21.0 - TT | (17.5 - TT²) |
| 24 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 25 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 26 | 29 | 3 | 3 | 0 | （1.52） | 23.0 | (21.5²) | 3.0 | （5.02） | 3 | 28.0 + TT | 20.0 - TT | (16.5 - TT²) |
| 27 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 28 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 29 | 29 | 3 | 3.5 | 0 | （1.52） | 22.5 | (21.0²) | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | (16.0 - TT²) |
| 30 | 29 | 3 | 6.5 | 0 | （1.52） | 19.5 | (18.0²) | 5.0 |  | 3 | 28.0 + TT | 14.5 - TT | (13.0 - TT²) |
| 31 | 29 | 3 | 6.5 | 0 | （1.52） | 19.5 | (18.0²) | 5.0 |  | 3 | 28.0 + TT | 14.5 - TT | (13.0 - TT²) |
| 32 | 29 | 3 | 6.5 | 0 | （1.52） | 19.5 | (18.0²) | 5.0 |  | 3 | 28.0 + TT | 14.5 - TT | (13.0 - TT²) |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4. | | | | | | | | | | | | | |

Table 6.2G.2.5-3: UE Power Class test requirements (for Bands n34, n39, n40, n41, n77, n78, n79) for Power Class 2 (almost contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | MPR increase (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 14 | 26 | 0 | 2 | 1.5 | 0 | 1.52 | 22.5 | 21.02 | 5.0 | 5.02 | 3 | 28.0 + TT | 17.5 - TT | 16 - TT2 |
| 15 | 26 | 0 | 2 | 1 | 0 | 1.52 | 23.0 | 21.52 | 3.0 | 5.02 | 3 | 28.0 + TT | 20.0 - TT | 16.5 - TT2 |
| 26 | 26 | 0 | 3.5 | 1.5 | 0 | 1.52 | 21.0 | 19.52 | 5.0 | 5.02 | 3 | 28.0 + TT | 16.0 - TT | 14.5 - TT2 |
| 27 | 26 | 0 | 3.5 | 1 | 0 | 1.52 | 21.5 | 20.02 | 5.0 | 6.02 | 3 | 28.0 + TT | 16.5 - TT | 14.0 - TT2 |
| 34 | 26 | 0 | 2.5 | 1.5 | 0 | 1.52 | 22.0 | 20.52 | 5.0 | 6.02 | 3 | 28.0 + TT | 17.0 - TT | 14.5 - TT2 |
| 35 | 26 | 0 | 2.5 | 1 | 0 | 1.52 | 22.5 | 21.02 | 5.0 | 5.02 | 3 | 28.0 + TT | 17.5 - TT | 16.0 - TT2 |
| 46 | 26 | 0 | 3.5 | 1.5 | 0 | 1.52 | 21.0 | 19.52 | 5.0 | 5.02 | 3 | 28.0 + TT | 16.0 - TT | 14.5 - TT2 |
| 47 | 26 | 0 | 3.5 | 1 | 0 | 1.52 | 21.5 | 20.02 | 5.0 | 6.02 | 3 | 28.0 + TT | 16.5 - TT | 14.0 - TT2 |
| 56 | 26 | 0 | 4.5 | 1.5 | 0 | 1.52 | 20.0 | 18.52 | 6.0 | 5.02 | 3 | 28.0 + TT | 14.0 - TT | 13.5 - TT2 |
| 57 | 26 | 0 | 4.5 | 1 | 0 | 1.52 | 20.5 | 19.02 | 6.0 | 5.02 | 3 | 28.0 + TT | 14.5 - TT | 14.0 - TT2 |
| 66 | 26 | 0 | 8 | 1.5 | 0 | 1.52 | 16.5 | 152 | 5.0 | 5.02 | 3 | 28.0 + TT | 11.5 - TT | 10.0 - TT2 |
| 67 | 26 | 0 | 8 | 1 | 0 | 1.52 | 17.0 | 15.52 | 5.0 | 5.02 | 3 | 28.0 + TT | 12.0 - TT | 10.5 - TT2 |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4.  NOTE 4: Applicable for CBW/SCS combinations other than CBW=40MHz when SCS=60kHz.  NOTE 5: Only applicable for CBW 40MHz when SCS is 60kHz.  NOTE 6: Applicable for CBW/SCS combinations other than CBW=30MHz when SCS=15kHz and CBW=30MHz, 60MHz, 90MHz when SCS=30kHz and CBW=25MHz, 60MHz, 90MHz when SCS=60kHz.  NOTE 7: Only applicable for CBW=30MHz when SCS=15kHz and CBW=30MHz, 60MHz, 90MHz when SCS=30kHz and CBW=25MHz, 60MHz, 90MHz when SCS=60kHz.  NOTE 8: Test applies only for UEs which support almost contiguous UL CP-OFDM transmissions. For PC2 UE which support almost contiguous UL CP-OFDM transmissions, test is only applicable for Release 16 and forward. | | | | | | | | | | | | | | |

Table 6.2G.2.5-4: Test Tolerance (Maximum Power Reduction (MPR))

|  |  |  |  |
| --- | --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 4.2GHz | 4.2GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB | 1.0 dB |
| 40MHz < BW ≤ 100MHz | 1.0 dB | 1.0 dB | 1.0 dB |

Table 6.2G.2.5-5: UE Power Class test requirements(for Bands n1, n2, n3, n5, n7, n8, n12, n14, n20, n25, n26, n30, n34, n38, n39, n40, n41, n50, n51, n53, n65, n66, n70, n74) for Power Class 3 (contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 23 | -3 | 0.2 | 0 | （1.52） | 25.8 | （24.32） | 3.0 |  | 2 | 28.0 + TT | 22.8 - TT | （21.3 - TT2） |
| 2 | 23 | -3 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 2 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 3 | 23 | -3 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 2 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 4 | 23 | -3 | 1.2 | 0 | （1.52） | 24.8 | （23.32） | 3.0 |  | 2 | 28.0 + TT | 21.8 - TT | （20.3 - TT2） |
| 5 | 23 | 0 | 0 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 2 | 25.0 + TT | 20.0 - TT | （16.5 - TT2） |
| 6 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 2 | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 7 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 2 | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 8 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 2 | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 9 | 23 | 0 | 0 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 2 | 25.0 + TT | 20.0 - TT | （16.5 - TT2） |
| 10 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 2 | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 11 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 2 | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 12 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 2 | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 13 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 2 | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 14 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 2 | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 15 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 2 | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 16 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 2 | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 17 | 23 | 0 | 2.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 18 | 23 | 0 | 2.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 19 | 23 | 0 | 2.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 20 | 23 | 0 | 4.5 | 0 | （1.52） | 18.5 | （17.02） | 5.0 |  | 2 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 21 | 23 | 0 | 4.5 | 0 | （1.52） | 18.5 | （17.02） | 5.0 |  | 2 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 22 | 23 | 0 | 4.5 | 0 | （1.52） | 18.5 | （17.02） | 5.0 |  | 2 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 23 | 23 | 0 | 1.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 2 | 25.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 24 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 25 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 26 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 27 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 2 | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 28 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 29 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 30 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 31 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 2 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 32 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 2 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 33 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 2 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 34 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 2 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 35 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 2 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 36 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 2 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 37 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 2 | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 38 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 2 | 25.0 + TT | 17.5 - TT | (16.0 - TT2) |
| 39 | 23 | 0 | 0 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 2 | 25.0 + TT | 20.0 - TT | （16.5 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n2, n3, n7, n8, n12, n20, n25, n26, n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4. | | | | | | | | | | | | | |

Table 6.2G.2.5-6: UE Power Class test requirements (for Bands n24, n48, n77, n78, n79) for Power Class 3 (contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 1 | 23 | -3 | 0.2 | 0 | （1.52） | 25.8 | （24.32） | 3.0 |  | 3 | 28.0 + TT | 22.8 - TT | （21.3 - TT2） |
| 2 | 23 | -3 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 3 | 23 | -3 | 3.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 28.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 4 | 23 | -3 | 1.2 | 0 | （1.52） | 24.8 | （23.32） | 3.0 |  | 3 | 28.0 + TT | 21.8 - TT | （20.3 - TT2） |
| 5 | 23 | 0 | 0 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 3 | 25.0 + TT | 20.0 - TT | （16.5 - TT2） |
| 6 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 7 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 8 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 3 | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 9 | 23 | 0 | 0 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 3 | 25.0 + TT | 20.0 - TT | （16.5 - TT2） |
| 10 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 11 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 12 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 13 | 23 | 0 | 1 | 0 | （1.52） | 22.0 | （20.52） | 5.0 | （6.02） | 3 | 25.0 + TT | 17.0 - TT | （14.5 - TT2） |
| 14 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 3 | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 15 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 3 | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 16 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 3 | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 17 | 23 | 0 | 2.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 18 | 23 | 0 | 2.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 19 | 23 | 0 | 2.5 | 0 | （1.52） | 20.5 | （19.02） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 20 | 23 | 0 | 4.5 | 0 | （1.52） | 18.5 | （17.02） | 5.0 |  | 3 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 21 | 23 | 0 | 4.5 | 0 | （1.52） | 18.5 | （17.02） | 5.0 |  | 3 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 22 | 23 | 0 | 4.5 | 0 | （1.52） | 18.5 | （17.02） | 5.0 |  | 3 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 23 | 23 | 0 | 1.5 | 0 | （1.52） | 21.5 | （20.02） | 5.0 | （6.02） | 3 | 25.0 + TT | 16.5 - TT | （14.0 - TT2） |
| 24 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 25 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 26 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 27 | 23 | 0 | 2 | 0 | （1.52） | 21.0 | （19.52） | 5.0 |  | 3 | 25.0 + TT | 16.0 - TT | （14.5 - TT2） |
| 28 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 29 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 30 | 23 | 0 | 3 | 0 | （1.52） | 20.0 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 31 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 3 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 32 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 2 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 33 | 23 | 0 | 3.5 | 0 | （1.52） | 19.5 | （18.02） | 5.0 |  | 2 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 34 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 2 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 35 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 2 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 36 | 23 | 0 | 6.5 | 0 | （1.52） | 16.5 | （15.02） | 5.0 | （6.02） | 2 | 25.0 + TT | 11.5 - TT | （9.0 - TT2） |
| 37 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 2 | 25.0 + TT | 17.5 - TT | （16.0 - TT2） |
| 38 | 23 | 0 | 0.5 | 0 | （1.52） | 22.5 | （21.02） | 5.0 |  | 2 | 25.0 + TT | 17.5 - TT | (16.0 - TT2) |
| 39 | 23 | 0 | 0 | 0 | （1.52） | 23.0 | （21.52） | 3.0 | （5.02） | 2 | 25.0 + TT | 20.0 - TT | （16.5 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n24, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4. | | | | | | | | | | | | | |

Table 6.2G.2.5-7: UE Power Class test requirements (for Bands n28 with channel bandwidth other than 30MHz, n71) for Power Class 3 (contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 5 | 23 | 0 | 0 | 0 | 23.0 | 3.0 | 2.5 | 25.0 + TT | 20.0 - TT |
| 6 | 23 | 0 | 0.5 | 0 | 22.5 | 5.0 | 2.5 | 25.0 + TT | 17.5 - TT |
| 7 | 23 | 0 | 0.5 | 0 | 22.5 | 5.0 | 2.5 | 25.0 + TT | 17.5 - TT |
| 8 | 23 | 0 | 0.5 | 0 | 22.5 | 5.0 | 2.5 | 25.0 + TT | 17.5 - TT |
| 9 | 23 | 0 | 0 | 0 | 23.0 | 3.0 | 2.5 | 25.0 + TT | 20.0 - TT |
| 10 | 23 | 0 | 1 | 0 | 22.0 | 5.0 | 2.5 | 25.0 + TT | 17.0 - TT |
| 11 | 23 | 0 | 1 | 0 | 22.0 | 5.0 | 2.5 | 25.0 + TT | 17.0 - TT |
| 12 | 23 | 0 | 1 | 0 | 22.0 | 5.0 | 2.5 | 25.0 + TT | 17.0 - TT |
| 13 | 23 | 0 | 1 | 0 | 22.0 | 5.0 | 2.5 | 25.0 + TT | 17.0 - TT |
| 14 | 23 | 0 | 2 | 0 | 21.0 | 5.0 | 2.5 | 25.0 + TT | 16.0 - TT |
| 15 | 23 | 0 | 2 | 0 | 21.0 | 5.0 | 2.5 | 25.0 + TT | 16.0 - TT |
| 16 | 23 | 0 | 2 | 0 | 21.0 | 5.0 | 2.5 | 25.0 + TT | 16.0 - TT |
| 17 | 23 | 0 | 2.5 | 0 | 20.5 | 6.0 | 2.5 | 25.0 + TT | 14.5 - TT |
| 18 | 23 | 0 | 2.5 | 0 | 20.5 | 6.0 | 2.5 | 25.0 + TT | 14.5 - TT |
| 19 | 23 | 0 | 2.5 | 0 | 20.5 | 6.0 | 2.5 | 25.0 + TT | 14.5 - TT |
| 20 | 23 | 0 | 4.5 | 0 | 18.5 | 5.0 | 2.5 | 25.0 + TT | 13.5 - TT |
| 21 | 23 | 0 | 4.5 | 0 | 18.5 | 5.0 | 2.5 | 25.0 + TT | 13.5 - TT |
| 22 | 23 | 0 | 4.5 | 0 | 18.5 | 5.0 | 2.5 | 25.0 + TT | 13.5 - TT |
| 23 | 23 | 0 | 1.5 | 0 | 21.5 | 5.0 | 2.5 | 25.0 + TT | 16.5 - TT |
| 24 | 23 | 0 | 3 | 0 | 20.0 | 6.0 | 2.5 | 25.0 + TT | 14.0 - TT |
| 25 | 23 | 0 | 3 | 0 | 20.0 | 6.0 | 2.5 | 25.0 + TT | 14.0 - TT |
| 26 | 23 | 0 | 3 | 0 | 20.0 | 6.0 | 2.5 | 25.0 + TT | 14.0 - TT |
| 27 | 23 | 0 | 2 | 0 | 21.0 | 5.0 | 2.5 | 25.0 + TT | 16.0 - TT |
| 28 | 23 | 0 | 3 | 0 | 20.0 | 6.0 | 2.5 | 25.0 + TT | 14.0 - TT |
| 29 | 23 | 0 | 3 | 0 | 20.0 | 6.0 | 2.5 | 25.0 + TT | 14.0 - TT |
| 30 | 23 | 0 | 3 | 0 | 20.0 | 6.0 | 2.5 | 25.0 + TT | 14.0 - TT |
| 31 | 23 | 0 | 3.5 | 0 | 19.5 | 5.0 | 2.5 | 25.0 + TT | 14.5 - TT |
| 32 | 23 | 0 | 3.5 | 0 | 19.5 | 5.0 | 2.5 | 25.0 + TT | 14.5 - TT |
| 33 | 23 | 0 | 3.5 | 0 | 19.5 | 5.0 | 2.5 | 25.0 + TT | 14.5 - TT |
| 34 | 23 | 0 | 6.5 | 0 | 16.5 | 5.0 | 2.5 | 25.0 + TT | 11.5 - TT |
| 35 | 23 | 0 | 6.5 | 0 | 16.5 | 5.0 | 2.5 | 25.0 + TT | 11.5 - TT |
| 36 | 23 | 0 | 6.5 | 0 | 16.5 | 5.0 | 2.5 | 25.0 + TT | 11.5 - TT |
| 37 | 23 | 0 | 0.5 | 0 | 22.5 | 5.0 | 2.5 | 25.0 + TT | 17.5 - TT |
| 38 | 23 | 0 | 0.5 | 0 | 22.5 | 5.0 | 2.5 | 25.0 + TT | 17.5 - TT |
| 39 | 23 | 0 | 0 | 0 | 23 | 3.0 | 2.5 | 25.0 + TT | 20.0 - TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4. | | | | | | | | | |

Table 6.2G.2.5-8: UE Power Class test requirements (for Band n28 with 30MHz channel bandwidth) for Power Class 3 (contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 5 | 23 | 0 | 0.5 | 0 | 22.5 | 5 | 2.5 | 25.0 + TT | 17.5-TT |
| 6 | 23 | 0 | 1 | 0 | 22 | 5 | 2.5 | 25.0 + TT | 17.0-TT |
| 7 | 23 | 0 | 1 | 0 | 22 | 5 | 2.5 | 25.0 + TT | 17.0-TT |
| 8 | 23 | 0 | 1 | 0 | 22 | 5 | 2.5 | 25.0 + TT | 17.0-TT |
| 9 | 23 | 0 | 0.5 | 0 | 22.5 | 5 | 2.5 | 25.0 + TT | 17.5-TT |
| 10 | 23 | 0 | 1.5 | 0 | 21.5 | 5 | 2.5 | 25.0 + TT | 16.5-TT |
| 11 | 23 | 0 | 1.5 | 0 | 21.5 | 5 | 2.5 | 25.0 + TT | 16.5-TT |
| 12 | 23 | 0 | 1.5 | 0 | 21.5 | 5 | 2.5 | 25.0 + TT | 16.5-TT |
| 13 | 23 | 0 | 1.5 | 0 | 21.5 | 5 | 2.5 | 25.0 + TT | 16.5-TT |
| 14 | 23 | 0 | 2.5 | 0 | 20.5 | 6 | 2.5 | 25.0 + TT | 14.5-TT |
| 15 | 23 | 0 | 2.5 | 0 | 20.5 | 6 | 2.5 | 25.0 + TT | 14.5-TT |
| 16 | 23 | 0 | 2.5 | 0 | 20.5 | 6 | 2.5 | 25.0 + TT | 14.5-TT |
| 17 | 23 | 0 | 3 | 0 | 20 | 6 | 2.5 | 25.0 + TT | 14.0-TT |
| 18 | 23 | 0 | 3 | 0 | 20 | 6 | 2.5 | 25.0 + TT | 14.0-TT |
| 19 | 23 | 0 | 3 | 0 | 20 | 6 | 2.5 | 25.0 + TT | 14.0-TT |
| 20 | 23 | 0 | 5 | 0 | 18 | 5 | 2.5 | 25.0 + TT | 13.0-TT |
| 21 | 23 | 0 | 5 | 0 | 18 | 5 | 2.5 | 25.0 + TT | 13.0-TT |
| 22 | 23 | 0 | 5 | 0 | 18 | 5 | 2.5 | 25.0 + TT | 13.0-TT |
| 23 | 23 | 0 | 2 | 0 | 21 | 5 | 2.5 | 25.0 + TT | 16.0-TT |
| 24 | 23 | 0 | 3.5 | 0 | 19.5 | 5 | 2.5 | 25.0 + TT | 14.5-TT |
| 25 | 23 | 0 | 3.5 | 0 | 19.5 | 5 | 2.5 | 25.0 + TT | 14.5-TT |
| 26 | 23 | 0 | 3.5 | 0 | 19.5 | 5 | 2.5 | 25.0 + TT | 14.5-TT |
| 27 | 23 | 0 | 2.5 | 0 | 20.5 | 6 | 2.5 | 25.0 + TT | 14.5-TT |
| 28 | 23 | 0 | 3.5 | 0 | 19.5 | 5 | 2.5 | 25.0 + TT | 14.5-TT |
| 29 | 23 | 0 | 3.5 | 0 | 19.5 | 5 | 2.5 | 25.0 + TT | 14.5-TT |
| 30 | 23 | 0 | 3.5 | 0 | 19.5 | 5 | 2.5 | 25.0 + TT | 14.5-TT |
| 31 | 23 | 0 | 4 | 0 | 19 | 5 | 2.5 | 25.0 + TT | 14.0-TT |
| 32 | 23 | 0 | 4 | 0 | 19 | 5 | 2.5 | 25.0 + TT | 14.0-TT |
| 33 | 23 | 0 | 4 | 0 | 19 | 5 | 2.5 | 25.0 + TT | 14.0-TT |
| 34 | 23 | 0 | 7 | 0 | 16 | 5 | 2.5 | 25.0 + TT | 11.0-TT |
| 35 | 23 | 0 | 7 | 0 | 16 | 5 | 2.5 | 25.0 + TT | 11.0-TT |
| 36 | 23 | 0 | 7 | 0 | 16 | 5 | 2.5 | 25.0 + TT | 11.0-TT |
| 37 | 23 | 0 | 1 | 0 | 22 | 5 | 2.5 | 25.0 + TT | 17.0-TT |
| 38 | 23 | 0 | 1 | 0 | 22 | 5 | 2.5 | 25.0 + TT | 17.0-TT |
| 39 | 23 | 0 | 0.5 | 0 | 22.5 | 5 | 2.5 | 25.0 + TT | 17.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4. | | | | | | | | | |

Table 6.2G.2.5-9: UE Power Class test requirements (for Bands n1, n2, n3, n5, n7, n8, n12, n14, n20, n25, n26, n30, n34, n38, n39, n40, n41, n50, n51, n53, n65, n66, n70, n74) for Power Class 3 (almost contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | MPR increase (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 14 | 23 | 0 | 1.5 | 1.5 | 0 | （1.52） | 20 | （18.52） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 15 | 23 | 0 | 1.5 | 1 | 0 | （1.52） | 20.5 | （192） | 6.0 | （5.02） | 2 | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 26 | 23 | 0 | 3 | 1.5 | 0 | （1.52） | 18.5 | （172） | 5.0 | （5.02） | 2 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 27 | 23 | 0 | 3 | 1 | 0 | （1.52） | 19 | （17.52） | 5.0 | （5.02） | 2 | 25.0 + TT | 14.0 - TT | （12.5 - TT2） |
| 34 | 23 | 0 | 2 | 1.5 | 0 | （1.52） | 19.5 | （182） | 5.0 | （5.02） | 2 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 35 | 23 | 0 | 2 | 1 | 0 | （1.52） | 20 | （18.52） | 6.0 | （6.02） | 2 | 25.0 + TT | 14.0 - TT | （12.5 - TT2） |
| 46 | 23 | 0 | 3 | 1.5 | 0 | （1.52） | 18.5 | （172） | 5.0 | （5.02） | 2 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 47 | 23 | 0 | 3 | 1 | 0 | （1.52） | 19 | （17.52） | 5.0 | （5.02） | 2 | 25.0 + TT | 14.0 - TT | （12.5 - TT2） |
| 56 | 23 | 0 | 3.5 | 1.5 | 0 | （1.52） | 18 | （16.52） | 5.0 | （5.02） | 2 | 25.0 + TT | 13.0 - TT | （11.5 - TT2） |
| 57 | 23 | 0 | 3.5 | 1 | 0 | （1.52） | 18.5 | （172） | 5.0 | （5.02） | 2 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 66 | 23 | 0 | 6.5 | 1.5 | 0 | （1.52） | 15 | （13.52） | 6.0 | （6.02） | 2 | 25.0 + TT | 9.0 - TT | （7.5- TT2） |
| 67 | 23 | 0 | 6.5 | 1 | 0 | （1.52） | 15.5 | （142） | 6.0 | （6.02） | 2 | 25.0 + TT | 9.5 - TT | （8.0 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n2, n3, n7, n8, n12, n20, n25, n26, n41, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4.  NOTE 4: Applicable for CBW/SCS combinations other than CBW=40MHz when SCS=60kHz.  NOTE 5: Only applicable for CBW 40MHz when SCS is 60kHz.  NOTE 6: Applicable for CBW/SCS combinations other than CBW=30MHz when SCS=15kHz and CBW=30MHz, 60MHz, 90MHz when SCS=30kHz and CBW=25MHz, 60MHz, 90MHz when SCS=60kHz.  NOTE 7: Only applicable for CBW=30MHz when SCS=15kHz and CBW=30MHz, 60MHz, 90MHz when SCS=30kHz and CBW=25MHz, 60MHz, 90MHz when SCS=60kHz. | | | | | | | | | | | | | | |

Table 6.2G.2.5-10: UE Power Class test requirements (for Bands n28 with channel bandwidth other than 30MHz, n71) for Power Class 3 (almost contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | MPR increase (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 13 | 23 | 0 | 1.5 | 1.5 | 0 | 20 | 6.0 | 2.5 | 25.0 + TT | 14.0-TT |
| 14 | 23 | 0 | 1.5 | 1 | 0 | 20.5 | 6.0 | 2.5 | 25.0 + TT | 14.5-TT |
| 25 | 23 | 0 | 3 | 1.5 | 0 | 18.5 | 5.0 | 2.5 | 25.0 + TT | 13.5-TT |
| 26 | 23 | 0 | 3 | 1 | 0 | 19 | 5.0 | 2.5 | 25.0 + TT | 14.0-TT |
| 33 | 23 | 0 | 2 | 1.5 | 0 | 19.5 | 5.0 | 2.5 | 25.0 + TT | 14.5-TT |
| 34 | 23 | 0 | 2 | 1 | 0 | 20 | 6.0 | 2.5 | 25.0 + TT | 14.0-TT |
| 45 | 23 | 0 | 3 | 1.5 | 0 | 18.5 | 5.0 | 2.5 | 25.0 + TT | 13.5-TT |
| 46 | 23 | 0 | 3 | 1 | 0 | 19 | 5.0 | 2.5 | 25.0 + TT | 14.0-TT |
| 55 | 23 | 0 | 3.5 | 1.5 | 0 | 18 | 5.0 | 2.5 | 25.0 + TT | 13.0-TT |
| 56 | 23 | 0 | 3.5 | 1 | 0 | 18.5 | 5.0 | 2.5 | 25.0 + TT | 13.5-TT |
| 65 | 23 | 0 | 6.5 | 1.5 | 0 | 15 | 6.0 | 2.5 | 25.0 + TT | 9.0-TT |
| 66 | 23 | 0 | 6.5 | 1 | 0 | 15.5 | 6.0 | 2.5 | 25.0 + TT | 9.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4.  NOTE 3: Applicable for CBW/SCS combinations other than CBW=40MHz when SCS=60kHz.  NOTE 4: Only applicable for CBW 40MHz when SCS is 60kHz.  NOTE 5: Applicable for CBW/SCS combinations other than CBW=30MHz when SCS=15kHz and CBW=30MHz, 60MHz, 90MHz when SCS=30kHz and CBW=25MHz, 60MHz, 90MHz when SCS=60kHz.  NOTE 6: Only applicable for CBW=30MHz when SCS=15kHz and CBW=30MHz, 60MHz, 90MHz when SCS=30kHz and CBW=25MHz, 60MHz, 90MHz when SCS=60kHz. | | | | | | | | | | |

Table 6.2G.2.5-11: UE Power Class test requirements (for Band n28 with 30MHz channel bandwidth) for Power Class 3 (almost contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | MPR increase (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 23 | 23 | 0 | 3.5 | 1.5 | 0 | 18 | 5 | 2.5 | 25.0 + TT | 13.0-TT |
| 24 | 23 | 0 | 3.5 | 1 | 0 | 18.5 | 5 | 2.5 | 25.0 + TT | 13.5-TT |
| 43 | 23 | 0 | 3.5 | 1.5 | 0 | 18 | 5 | 2.5 | 25.0 + TT | 13.0-TT |
| 44 | 23 | 0 | 3.5 | 1 | 0 | 18.5 | 5 | 2.5 | 25.0 + TT | 13.5-TT |
| 53 | 23 | 0 | 4 | 1.5 | 0 | 17.5 | 5 | 2.5 | 25.0 + TT | 12.5-TT |
| 54 | 23 | 0 | 4 | 1 | 0 | 18 | 5 | 2.5 | 25.0 + TT | 13.0-TT |
| 63 | 23 | 0 | 7 | 1.5 | 0 | 14.5 | 6 | 2.5 | 25.0 + TT | 8.5-TT |
| 64 | 23 | 0 | 7 | 1 | 0 | 15 | 6 | 2.5 | 25.0 + TT | 9.0-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4.  NOTE 3: Applicable for CBW=30MHz when SCS=60kHz.  NOTE 4: Applicable for CBW=30MHz when SCS=15kHz and CBW=30MHz when SCS=30kHz. | | | | | | | | | | |

Table 6.2G.2.5-12: UE Power Class test requirements (for Bands n24, n48, n77, n78, n79) for Power Class 3 (almost contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | ΔPPowerClass  (dB) | MPR (dB) | MPR increase (dB) | ΔTC,c (dB) | | PCMAX\_L,f,c (dBm) | | T(PCMAX\_L,f,c) (dB) | | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) | |
| 14 | 23 | 0 | 1.5 | 1.5 | 0 | （1.52） | 20 | （18.52） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （13.5 - TT2） |
| 15 | 23 | 0 | 1.5 | 1 | 0 | （1.52） | 20.5 | （192） | 6.0 | （5.02） | 3 | 25.0 + TT | 14.5 - TT | （14.0 - TT2） |
| 26 | 23 | 0 | 3 | 1.5 | 0 | （1.52） | 18.5 | （172） | 5.0 | （5.02） | 3 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 27 | 23 | 0 | 3 | 1 | 0 | （1.52） | 19 | （17.52） | 5.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （12.5 - TT2） |
| 34 | 23 | 0 | 2 | 1.5 | 0 | （1.52） | 19.5 | （182） | 5.0 | （5.02） | 3 | 25.0 + TT | 14.5 - TT | （13.0 - TT2） |
| 35 | 23 | 0 | 2 | 1 | 0 | （1.52） | 20 | （18.52） | 6.0 | （6.02） | 3 | 25.0 + TT | 14.0 - TT | （12.5 - TT2） |
| 46 | 23 | 0 | 3 | 1.5 | 0 | （1.52） | 18.5 | （172） | 5.0 | （5.02） | 3 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 47 | 23 | 0 | 3 | 1 | 0 | （1.52） | 19 | （17.52） | 5.0 | （5.02） | 3 | 25.0 + TT | 14.0 - TT | （12.5 - TT2） |
| 56 | 23 | 0 | 3.5 | 1.5 | 0 | （1.52） | 18 | （16.52） | 5.0 | （5.02） | 3 | 25.0 + TT | 13.0 - TT | （11.5 - TT2） |
| 57 | 23 | 0 | 3.5 | 1 | 0 | （1.52） | 18.5 | （172） | 5.0 | （5.02） | 3 | 25.0 + TT | 13.5 - TT | （12.0 - TT2） |
| 66 | 23 | 0 | 6.5 | 1.5 | 0 | （1.52） | 15 | （13.52） | 6.0 | （6.02） | 3 | 25.0 + TT | 9.0 - TT | （7.5- TT2） |
| 67 | 23 | 0 | 6.5 | 1 | 0 | （1.52） | 15.5 | （142） | 6.0 | （6.02） | 3 | 25.0 + TT | 9.5 - TT | （8.0 - TT2） |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: For Band n24, transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high.  NOTE 3: TT for each frequency and channel bandwidth is specified in Table 6.2G.2.5-4.  NOTE 4: Applicable for CBW/SCS combinations other than CBW=40MHz when SCS=60kHz.  NOTE 5: Only applicable for CBW 40MHz when SCS is 60kHz.  NOTE 6: Applicable for CBW/SCS combinations other than CBW=30MHz when SCS=15kHz and CBW=30MHz, 60MHz, 90MHz when SCS=30kHz and CBW=25MHz, 60MHz, 90MHz when SCS=60kHz.  NOTE 7: Only applicable for CBW=30MHz when SCS=15kHz and CBW=30MHz, 60MHz, 90MHz when SCS=30kHz and CBW=25MHz, 60MHz, 90MHz when SCS=60kHz. | | | | | | | | | | | | | | |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2G.3 UE additional maximum output power reduction for Tx Diversity

Editor’s note: The following aspects are either missing or not yet determined:

- Tests for network signalling values NS\_47 for Power Class 2 and Power Class 1.5 with contiguous allocation is complete.

- Tests for network signalling values NS\_50, NS\_55 for Power Class 2 and, NS\_55 for Power Class 1.5 are FFS.

- Tests for Power Class 3 are FFS.

6.2G.3.1 Test purpose

Additional emission requirements can be signalled by the network. Each additional emission requirement is associated with a unique network signalling (NS) value indicated in RRC signalling by an NR frequency band number of the applicable operating band and an associated value in the field *additionalSpectrumEmission.* Throughout this specification, the notion of indication or signalling of an NS value refers to the corresponding indication of an NR frequency band number of the applicable operating band, the IE field *freqBandIndicatorNR* and an associated value of *additionalSpectrumEmission* in the relevant RRC information elements [6]*.*

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2.1.3-1. Unless stated otherwise, the total reduction to UE maximum output power is max(MPR, A-MPR) where MPR is defined in clause 6.2G.2. Outer and inner allocation notation used in clause 6.2G.3 is defined in clause 6.2.2. In absence of modulation and waveform types the A-MPR applies to all modulation and waveform types.

6.2G.3.2 Test applicability

The requirements of this test apply in test case 6.5G.2.2 Additional Spectrum Emission mask for Tx Diversity for network signalling value NS\_04 to all types of NR Power Class 1.5, Power Class 2 reporting Tx diversity UE release 15 and forward.

The requirements of this test apply in test case 6.5G.3.3 Additional Spurious Emissions Tx Diversity for network signalling values NS\_04, NS\_47 and NS\_50 to all types of NR Power Class 2 and Power Class 1.5 reporting Tx diversity UE release 15 and forward.

6.2G.3.3 Minimum conformance requirements

For UE supporting Tx diversity, the A-MPR values specified in clause 6.2.3 shall apply to the maximum output power specified in Table 6.2.1-1, and the maximum output power is defined as the sum of the maximum output power at each UE antenna connector. Unless stated otherwise, an A-MPR of 0 dB shall be used.

Table 6.2G.3.3-1 specifies the additional requirements with their associated network signalling values and the allowed A-MPR and applicable operating band(s) for each NS value. The mapping of NR frequency band numbers and values of the *additionalSpectrumEmission* to network signalling labels is specified in Table 6.2G.3.3-2.

Table 6.2G.3.3-1: Additional maximum power reduction (A-MPR)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Network signalling label | Requirements (subclause) | NR Band | Channel bandwidth (MHz) | Resources blocks (*N*RB) | A-MPR (dB) |
| NS\_01 |  | Table 5.2-1 | 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 | Table 5.3.2-1 | N/A |
| NS\_04 | 6.5G.2.3.3.2, 6.5G.3.3.3.1 | n41 | 10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100 |  | Clause 6.2.3.3.2 |
| NS\_47 | 6.5G.3.3.3.15 | n41 (Note 3) | 30 | Table 6.2.3.3.18-1 | Table 6.2.3.3.18-2 |
| NS\_50 | 6.5G.3.3.3.16 | n39 | 10, 15, 20, 25, 30, 40 |  | Clause 6.2.3.3.19 |
| NS\_55 | NOTE 4 | n77 | 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 |  | N/A |
| NOTE 1: This NS can be signalled for NR bands that have UTRA services deployed.  NOTE 2: No A-MPR is applied for 5 MHz BWchannel where the lower channel edge is ≥1930 MHz, 10 MHz BWchannel where the lower channel edge is ≥1950 MHz and 15 MHz BWchannel where the lower channel edge is ≥1955 MHz.  NOTE 3: Applicable when the NR carrier is within 2545 – 2575 MHz.  NOTE 4: This NS value is applicable for cells in the range 3450 – 3550 MHz for operations in the USA. This NS value does not indicate any additional spurious emission and maximum output power reduction requirements. | | | | | |

Table 6.2G.3.3-2: Mapping of Network Signalling label

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Value of additionalSpectrumEmission | | | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| n34 | NS\_01 |  |  |  |  |  |  |  |
| n39 | NS\_01 | NS\_50 |  |  |  |  |  |  |
| n41 | NS\_01 | NS\_04 | NS\_47 |  |  |  |  |  |
| n77 | NS\_01 | NS\_55 |  |  |  |  |  |  |
| n78 | NS\_01 |  |  |  |  |  |  |  |
| n79 | NS\_01 |  |  |  |  |  |  |  |
| NOTE: additionalSpectrumEmission corresponds to an information element of the same name defined in clause 6.3.2 of TS 38.331 [6]. | | | | | | | | |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2.3.1 and 6.2G.3.

6.2G.3.4 Test description

6.2G.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in Table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in Table 6.2.3.4.1-2 for NS\_04 and Table 6.2.3.4.1-18 for NS\_47 PC2 and PC3, and in Table 6.2G.3.4.1-1 for NS\_47 PC1.5. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2

Table 6.2G.3.4.1-1: Test Configuration table for NS\_47 power class 1.5

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | | | | | | Normal | | |
| Test Frequencies | | | | | | | | As specified in Table 6.2.3.4.1-18a and 6.2.3.4.1-18b | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | | | | | | 30 MHz | | |
| Test SCS as specified in Table 5.3.5-1 | | | | | | | | Lowest, Highest (Note 3) | | |
| A-MPR test parameters for NS\_47 | | | | | | | | | | |
| Test ID | Fc (MHz) | Ch BW (MHz) | SCS (kHz) | Downlink Configuration | Uplink Configuration | | | | | |
| Modulation  (Note 2) | | RB allocation (Note 1) | | | |
| SCS 15 kHz | | SCS 30 kHz | SCS 60 kHz |
| 1 | Default | 30 | Default | N/A for A-MPR testing. |  | PI/2 BPSK | Edge\_1RB\_Left (A1) | | | |
| 2 | Default | 30 | Default | PI/2 BPSK | 1@29 (A2) | | 1@15 (A2) | 1@8 (A2) |
| 3 | Default | 30 | Default | PI/2 BPSK | Edge\_1RB\_Right (A3) | | | |
| 4 | Default | 30 | Default | PI/2 BPSK | Outer\_Full (A2) | | | |
| 5 | Default | 30 | Default | PI/2 BPSK | 108@0 (A4) | | 54@0 (A4) | 27@0 (A4) |
| 6 | Default | 30 | Default | PI/2 BPSK | 80@0 (A4) | | 40@0 (A4) | 20@0 (A4) |
| 7 | Default | 30 | Default | PI/2 BPSK | 54@0 (A2) | | 27@0 (A2) | 12@0 (A2) |
| 8 | Default | 30 | Default | PI/2 BPSK | 80@35 (A5) | | 40@18 (A5) | 20@9 (A5) |
| 9 | Default | 30 | Default | QPSK | Edge\_1RB\_Left (A1) | | | |
| 10 | Default | 30 | Default | QPSK | 1@29 (A2) | | 1@15 (A2) | 1@8 (A2) |
| 11 | Default | 30 | Default | QPSK | Edge\_1RB\_Right (A3) | | | |
| 12 | Default | 30 | Default | QPSK | Outer\_Full (A2) | | | |
| 13 | Default | 30 | Default | QPSK | 108@0 (A4) | | 54@0 (A4) | 27@0 (A4) |
| 14 | Default | 30 | Default | QPSK | 80@0 (A4) | | 40@0 (A4) | 20@0 (A4) |
| 15 | Default | 30 | Default | QPSK | 54@0 (A2) | | 27@0 (A2) | 12@0 (A2) |
| 16 | Default | 30 | Default | QPSK | 80@35 (A5) | | 40@18 (A5) | 20@9 (A5) |
| 17 | Default | 30 | Default | 16 QAM | Edge\_1RB\_Left (A1) | | | |
| 18 | Default | 30 | Default | 16 QAM | 1@29 (A2) | | 1@15 (A2) | 1@8 (A2) |
| 19 | Default | 30 | Default | 16 QAM | Edge\_1RB\_Right (A3) | | | |
| 20 | Default | 30 | Default | 16 QAM | Outer\_Full (A2) | | | |
| 21 | Default | 30 | Default | 16 QAM | 108@0 (A4) | | 54@0 (A4) | 27@0 (A4) |
| 22 | Default | 30 | Default | 16 QAM | 80@0 (A4) | | 40@0 (A4) | 20@0 (A4) |
| 23 | Default | 30 | Default | 16 QAM | 54@0 (A2) | | 27@0 (A2) | 12@0 (A2) |
| 24 | Default | 30 | Default | 16 QAM | 80@35 (A5) | | 40@18 (A5) | 20@9 (A5) |
| 25 | Default | 30 | Default | 64 QAM | Edge\_1RB\_Left (A1) | | | |
| 26 | Default | 30 | Default | 64 QAM | 1@29 (A2) | | 1@15 (A2) | 1@8 (A2) |
| 27 | Default | 30 | Default | 64 QAM | Edge 1RB\_Right (A3) | | | |
| 28 | Default | 30 | Default | 64 QAM | Outer\_Full (A2) | | | |
| 29 | Default | 30 | Default | 64 QAM | 108@0 (A4) | | 54@0 (A4) | 27@0 (A4) |
| 30 | Default | 30 | Default | 64 QAM | 80@0 (A4) | | 40@0 (A4) | 20@0 (A4) |
| 31 | Default | 30 | Default | 64 QAM | 54@0 (A2) | | 27@0 (A2) | 12@0 (A2) |
| 32 | Default | 30 | Default | 64 QAM | 80@35 (A5) | | 40@18 (A5) | 20@9 (A5) |
| 33 | Default | 30 | Default | 256 QAM | Edge\_1RB\_Left (A1) | | | |
| 34 | Default | 30 | Default | 256 QAM | 1@29 (A2) | | 1@15 (A2) | 1@8 (A2) |
| 35 | Default | 30 | Default | 256 QAM | Edge 1RB\_Right (A3) | | | |
| 36 | Default | 30 | Default | 256 QAM | Outer\_Full (A2) | | | |
| 37 | Default | 30 | Default | 256 QAM | 108@0 (A4) | | 54@0 (A4) | 27@0 (A4) |
| 38 | Default | 30 | Default | 256 QAM | 80@0 (A4) | | 40@0 (A4) | 20@0 (A4) |
| 39 | Default | 30 | Default | 256 QAM | 54@0 (A2) | | 27@0 (A2) | 12@0 (A2) |
| 40 | Default | 30 | Default | 256 QAM | 80@35 (A5) | | 40@18 (A5) | 20@9 (A5) |
| 41 | Default | 30 | Default | CP-OFDM | QPSK | Edge\_1RB\_Left (A1) | | | |
| 42 | Default | 30 | Default | QPSK | 1@29 (A2) | | 1@15 (A2) | 1@8 (A2) |
| 43 | Default | 30 | Deafult | QPSK | Edge 1RB\_Right (A3) | | | |
| 44 | Default | 30 | Default | QPSK | Outer\_Full (A2) | | | |
| 45 | Default | 30 | Default | QPSK | 108@0 (A4) | | 54@0 (A4) | 27@0 (A4) |
| 46 | Default | 30 | Default | QPSK | 80@0 (A4) | | 40@0 (A4) | 20@0 (A4) |
| 47 | Default | 30 | Default | QPSK | 54@0 (A2) | | 27@0 (A2) | 12@0 (A2) |
| 48 | Default | 30 | Default | QPSK | 80@35 (A5) | | 40@18 (A5) | 20@9 (A5) |
| 49 | Default | 30 | Default | 16 QAM | Edge\_1RB\_Left (A1) | | | |
| 50 | Default | 30 | Default | 16 QAM | 1@29 (A2) | | 1@15 (A2) | 1@8 (A2) |
| 51 | Default | 30 | Default | 16 QAM | Edge 1RB\_Right (A3) | | | |
| 52 | Default | 30 | Default | 16 QAM | Outer\_Full (A2) | | | |
| 53 | Default | 30 | Default | 16 QAM | 108@0 (A4) | | 54@0 (A4) | 27@0 (A4) |
| 54 | Default | 30 | Default | 16 QAM | 80@0 (A4) | | 40@0 (A4) | 20@0 (A4) |
| 55 | Default | 30 | Default | 16 QAM | 54@0 (A2) | | 27@0 (A2) | 12@0 (A2) |
| 56 | Default | 30 | Default | 16 QAM | 80@35 (A5) | | 40@18 (A5) | 20@9 (A5) |
| 57 | Default | 30 | Default | 64 QAM | Edge\_1RB\_Left (A1) | | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A-MPR test parameters for NS\_47 | | | | | | | | | |
| Test ID | Fc (MHz) | Ch BW (MHz) | SCS (kHz) | Downlink Configuration | Uplink Configuration | | | | |
| Modulation  (Note 2) | | RB allocation (Note 1) | | |
| 58 | Default | 30 | Default |  |  | 64 QAM | 1@29 (A2) | 1@15 (A2) | 1@8 (A2) |
| 59 | Default | 30 | Default | 64 QAM | Edge 1RB\_Right (A3) | | |
| 60 | Default | 30 | Default | 64 QAM | Outer\_Full (A2) | | |
| 61 | Default | 30 | Default | 64 QAM | 108@0 (A4) | 54@0 (A4) | 27@0 (A4) |
| 62 | Default | 30 | Default | 64 QAM | 80@0 (A4) | 40@0 (A4) | 20@0 (A4) |
| 63 | Default | 30 | Default | 64 QAM | 54@0 (A2) | 27@0 (A2) | 12@0 (A2) |
| 64 | Default | 30 | Default | 64 QAM | 80@35 (A5) | 40@18 (A5) | 20@9 (A5) |
| 65 | Default | 30 | Default | 256 QAM | Edge\_1RB\_Left (A1) | | |
| 66 | Default | 30 | Default | 256 QAM | 1@29 (A2) | 1@15 (A2) | 1@8 (A2) |
| 67 | Default | 30 | Default | 256 QAM | Edge 1RB\_Right (A3) | | |
| 68 | Default | 30 | Default | 256 QAM | Outer\_Full (A2) | | |
| 69 | Default | 30 | Default | 256 QAM | 108@0 (A4) | 54@0 (A4) | 27@0 (A4) |
| 70 | Default | 30 | Default | 256 QAM | 80@0 (A4) | 40@0 (A4) | 20@0 (A4) |
| 71 | Default | 30 | Default | 256 QAM | 54@0 (A2) | 27@0 (A2) | 12@0 (A2) |
| 72 | Default | 30 | Default | 256 QAM | 80@35 (A5) | 40@18 (A5) | 20@9 (A5) |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1 unless otherwise stated in this table.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: For FR1 bands where highest supported SCS is 60 kHz the highest tested SCS is limited to 30 kHz as carrier with SCS=60 kHz cannot be used as PCell. | | | | | | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2 and uplink signals according Annex G.0, G.1, G.2 and G.3.0.

4. The UL Reference Measurement channels are set according to the applicable table from Table 6.2G.3.4.1-1 to Table 6.2G.3.4.1-2.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2G.3.4.3.

6.2G.3.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to the applicable table from Table 6.2G.3.4.1-1 to Table 6.2G.3.4.1-3. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE Allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the sum of the mean power of the UE at each antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration one sub-frame (1ms). For TDD, only slots consisting of only UL symbols are under test.

4. For network signalling value “NS\_04” and UEs supporting Power Class 2 and Power Class 1.5, repeat steps 1~3 on the applicable bands with message exception of P-Max defined in Table 6.2G.3.4.3.1-2.

5. For network signalling value “NS\_04” and UEs supporting Power Class 1.5, repeat steps 1~3 on the applicable bands with message exception of P-Max defined in Table 6.2G.3.4.3.1-3.

NOTE 1: When switching to DFT-s-OFDM waveform, as specified in the test configuration Table 6.2G.3.4.1-1, send an NR RRCReconfiguration message according to TS 38.508-1 [5] clause 4.6.3 Table 4.6.3-118 PUSCH-Config with TRANSFORM\_PRECODER\_ENABLED condition.

6.2G.3.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6.1, with the following exceptions for each network signalling value.

6.2G.3.4.3.1 Message contents exceptions for network signalling value "NS\_04"

1. Information element additionalSpectrumEmission is set to NS\_04. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2G.3.4.3.1-1: *AdditionalSpectrumEmission* Additional spurious emissions test requirement for "NS\_04"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 1 (NS\_04) |  |  |

Table 6.2G.3.4.3.1-2: *P-Max* (Step 4)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-89 | | | |
| Information Element | Value/remark | Comment | Condition |
| P-Max | 23 |  | PC2 UE or  PC1.5 UE |

Table 6.2G.3.4.3.1-3: *P-Max* (Step 5)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-89 | | | |
| Information Element | Value/remark | Comment | Condition |
| P-Max | 26 |  | PC1.5 UE |

6.2G.3.4.3.2 Message contents exceptions for network signalling value "NS\_47"

1. Information element additionalSpectrumEmission is set to NS\_47. This can be set in the *SIB1* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.2G.3.4.3.2-1: *AdditionalSpectrumEmission*: Additional spurious emissions test requirement for "NS\_47"

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-1 | | | |
| Information Element | Value/remark | Comment | Condition |
| additionalSpectrumEmission | 2 (NS\_47) |  |  |

6.2G.3.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in the applicable table from Table 6.2G.3.5-1. The allowed A-MPR values specified in table 6.2G.3.3-1 are in addition to the allowed MPR requirements specified in clause 6.2G.2. For the UE maximum output power modified by MPR and/or A-MPR, the power limits specified in table 6.2G.1.3-1 apply.

Table 6.2G.3.5-0: Test Tolerance (UE additional maximum output power reduction)

|  |  |  |  |
| --- | --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 4.2GHz | 4.2GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB | 1.0 dB |
| 40MHz < BW ≤ 100MHz | 1.0 dB | 1.0 dB | 1.0 dB |

Table 6.2G.3.5-1: UE Power Class 2 test requirements (NS\_04) for band n41 (Step 3)

| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR’ (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit(dBm) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | 26 | 3.5 | 5.5 | 1.5 | 19 | 3.5 | 3 | 28+TT | 15.5-TT |
| 8 | 26 | 3.5 | 3.5 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 9 | 26 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 10 | 26 | 0.5 | 3.5 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 11 | 26 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 12 | 26 | 0.5 | 0 | 0 | 25.5 | 2.0 | 3 | 28+TT | 22.5-TT |
| 13 | 26 | 3.5 | 6 | 1.5 | 18.5 | 4.0 | 3 | 28+TT | 14.5-TT |
| 14 | 26 | 3.5 | 4.5 | 0 | 21 | 2.0 | 3 | 28+TT | 18.5-TT |
| 15 | 26 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 16 | 26 | 1 | 4.5 | 0 | 21.5 | 2.0 | 3 | 28+TT | 18.5-TT |
| 17 | 26 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 18 | 26 | 1 | 0 | 0 | 25 | 2.0 | 3 | 28+TT | 22-TT |
| 19 | 26 | 3.5 | 6 | 1.5 | 18.5 | 4.0 | 3 | 28+TT | 14.5-TT |
| 20 | 26 | 3.5 | 5 | 0 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 21 | 26 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 22 | 26 | 2 | 5 | 0 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 23 | 26 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 24 | 26 | 2 | 0 | 0 | 24 | 2.0 | 3 | 28+TT | 21-TT |
| 25 | 26 | 3.5 | 6.5 | 1.5 | 18 | 4.0 | 3 | 28+TT | 14-TT |
| 26 | 26 | 3.5 | 5 | 0 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 27 | 26 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 28 | 26 | 2.5 | 5 | 0 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 29 | 26 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 30 | 26 | 2.5 | 0 | 0 | 23.5 | 2.0 | 3 | 28+TT | 20.5-TT |
| 31 | 26 | 4.5 | 8 | 1.5 | 16.5 | 5.0 | 3 | 28+TT | 11.5-TT |
| 32 | 26 | 4.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 33 | 26 | 4.5 | 0 | 0 | 21.5 | 2.0 | 3 | 28+TT | 18.5-TT |
| 34 | 26 | 4.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 35 | 26 | 4.5 | 0 | 1.5 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 36 | 26 | 4.5 | 0 | 0 | 21.5 | 2.0 | 3 | 28+TT | 18.5-TT |
| 37 | 26 | 3.5 | 7.5 | 1.5 | 17 | 5.0 | 3 | 28+TT | 12-TT |
| 38 | 26 | 3.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 39 | 26 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 40 | 26 | 3 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 41 | 26 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 42 | 26 | 3 | 0 | 0 | 23 | 2.0 | 3 | 28+TT | 20-TT |
| 43 | 26 | 3.5 | 7.5 | 1.5 | 17 | 5.0 | 3 | 28+TT | 12-TT |
| 44 | 26 | 3.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 45 | 26 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 46 | 26 | 3 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 47 | 26 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 48 | 26 | 3 | 0 | 0 | 23 | 2.0 | 3 | 28+TT | 20-TT |
| 49 | 26 | 3.5 | 7.5 | 1.5 | 17 | 5.0 | 3 | 28+TT | 12-TT |
| 50 | 26 | 3.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 51 | 26 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 52 | 26 | 3.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 53 | 26 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 54 | 26 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 55 | 26 | 6.5 | 10 | 1.5 | 14.5 | 5.0 | 3 | 28+TT | 11-TT |
| 56 | 26 | 6.5 | 7.5 | 0 | 18.5 | 4.0 | 3 | 28+TT | 14.5-TT |
| 57 | 26 | 6.5 | 0 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 58 | 26 | 6.5 | 7.5 | 0 | 18.5 | 4.0 | 3 | 28+TT | 14.5-TT |
| 59 | 26 | 6.5 | 0 | 1.5 | 18 | 4.0 | 3 | 28+TT | 14-TT |
| 60 | 26 | 6.5 | 0 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT=0.7 dB for BWchannel ≤ 40 MHz; TT=1.0 dB for 40 MHz < BWchannel ≤ 100 MHz. | | | | | | | | | |

Table 6.2G.3.5-2: UE Power Class 1.5 test requirements (NS\_04) for band n41 (Step 3)

| Test ID | PPowerClass (dBm) | MPR (dB) | A-MPR’ (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit(dBm) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | 29 | 6 | 7 | 1.5 | 20.5 | 2.5 | 3 | 31+TT | 17.5-TT |
| 8 | 29 | 6 | 5 | 0 | 23 | 2.0 | 3 | 31+TT | 20-TT |
| 9 | 29 | 6 | 0 | 0 | 23 | 2.0 | 3 | 31+TT | 20-TT |
| 10 | 29 | 2 | 5 | 0 | 24 | 2.0 | 3 | 31+TT | 21-TT |
| 11 | 29 | 6 | 0 | 1.5 | 21.5 | 2.0 | 3 | 31+TT | 18.5-TT |
| 12 | 29 | 2 | 0 | 0 | 27 | 2.0 | 3 | 31+TT | 24-TT |
| 13 | 29 | 6.5 | 7.5 | 1.5 | 20 | 2.5 | 3 | 31+TT | 17-TT |
| 14 | 29 | 6.5 | 6 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 15 | 29 | 6.5 | 0 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 16 | 29 | 2.5 | 6 | 0 | 23 | 2.0 | 3 | 31+TT | 20-TT |
| 17 | 29 | 6.5 | 0 | 1.5 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 18 | 29 | 2.5 | 0 | 0 | 26.5 | 2.0 | 3 | 31+TT | 23.5-TT |
| 19 | 29 | 6.5 | 7.5 | 1.5 | 20 | 2.0 | 3 | 31+TT | 17-TT |
| 20 | 29 | 6.5 | 6.5 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 21 | 29 | 6.5 | 0 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 22 | 29 | 3.5 | 6.5 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 23 | 29 | 6.5 | 0 | 1.5 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 24 | 29 | 3.5 | 0 | 0 | 25.5 | 2.0 | 3 | 31+TT | 22.5-TT |
| 25 | 29 | 6.5 | 8 | 1.5 | 19.5 | 3.5 | 3 | 31+TT | 16-TT |
| 26 | 29 | 6.5 | 6.5 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 27 | 29 | 6.5 | 0 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 28 | 29 | 4 | 6.5 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 29 | 29 | 6.5 | 0 | 1.5 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 30 | 29 | 4 | 0 | 0 | 25 | 2.0 | 3 | 31+TT | 22-TT |
| 31 | 29 | 6.5 | 9.5 | 1.5 | 18 | 4.0 | 3 | 31+TT | 14-TT |
| 32 | 29 | 6.5 | 8 | 0 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 33 | 29 | 6.5 | 0 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 34 | 29 | 6.5 | 8 | 0 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 35 | 29 | 6.5 | 0 | 1.5 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 36 | 29 | 6.5 | 0 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 37 | 29 | 6.5 | 9 | 1.5 | 18.5 | 4.0 | 3 | 31+TT | 14.5-TT |
| 38 | 29 | 6.5 | 8 | 0 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 39 | 29 | 6.5 | 0 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 40 | 29 | 4.5 | 8 | 0 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 41 | 29 | 6.5 | 0 | 1.5 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 42 | 29 | 4.5 | 0 | 0 | 24.5 | 2.0 | 3 | 31+TT | 21.5-TT |
| 43 | 29 | 6.5 | 9 | 1.5 | 18.5 | 4.0 | 3 | 31+TT | 14.5-TT |
| 44 | 29 | 6.5 | 8 | 0 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 45 | 29 | 6.5 | 0 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 46 | 29 | 4.5 | 8 | 0 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 47 | 29 | 6.5 | 0 | 1.5 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 48 | 29 | 4.5 | 0 | 0 | 24.5 | 2.0 | 3 | 31+TT | 21.5-TT |
| 49 | 29 | 6.5 | 9 | 1.5 | 18.5 | 4.0 | 3 | 31+TT | 14.5-TT |
| 50 | 29 | 6.5 | 8 | 0 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 51 | 29 | 6.5 | 0 | 0 | 22.5 | 2.0 | 3 | 31+TT | 19.5-TT |
| 52 | 29 | 5 | 8 | 0 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 53 | 29 | 6.5 | 0 | 1.5 | 21 | 2.0 | 3 | 31+TT | 18-TT |
| 54 | 29 | 5 | 0 | 0 | 24 | 2.0 | 3 | 31+TT | 21-TT |
| 55 | 29 | 8.5 | 11.5 | 1.5 | 16 | 5.0 | 3 | 31+TT | 11-TT |
| 56 | 29 | 8.5 | 9 | 0 | 20 | 2.5 | 3 | 31+TT | 17-TT |
| 57 | 29 | 8.5 | 0 | 0 | 20.5 | 2.5 | 3 | 31+TT | 17.5-TT |
| 58 | 29 | 8.5 | 9 | 0 | 20 | 2.5 | 3 | 31+TT | 17-TT |
| 59 | 29 | 8.5 | 0 | 1.5 | 19 | 3.5 | 3 | 31+TT | 15.5-TT |
| 60 | 29 | 8.5 | 0 | 0 | 20.5 | 2.5 | 3 | 31+TT | 17.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT=0.7 dB for BWchannel ≤ 40 MHz; TT=1.0 dB for 40 MHz < BWchannel ≤ 100 MHz. | | | | | | | | | |

Table 6.2G.3.5-3: UE Power Class 1.5 and Power Class 2 test requirements (NS\_04) for band n41 (Step 4)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | ΔPPowerClass  (dB) | MPR (dB) | A-MPR’ (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 7 | 293 (264) | 63 (34) | 0.5 | 3.5 | 1.5 | 18 | 4.0 | 3 | 25+TT | 14-TT |
| 8 | 293 (264) | 63 (34) | 0.5 | 3.5 | 0 | 19.5 | 3.5 | 3 | 25+TT | 16-TT |
| 9 | 293 (264) | 63 (34) | 0.5 | 0 | 0 | 22.5 | 2.0 | 3 | 25+TT | 19.5-TT |
| 10 | 293 (264) | 63 (34) | 0.5 | 3.5 | 0 | 19.5 | 3.5 | 3 | 25+TT | 16-TT |
| 11 | 293 (264) | 63 (34) | 0.5 | 0 | 1.5 | 21 | 2.0 | 3 | 25+TT | 18-TT |
| 12 | 293 (264) | 63 (34) | 0.5 | 0 | 0 | 22.5 | 2.0 | 3 | 25+TT | 19.5-TT |
| 13 | 293 (264) | 63 (34) | 1 | 4 | 1.5 | 17.5 | 5.0 | 3 | 25+TT | 12.5-TT |
| 14 | 293 (264) | 63 (34) | 1 | 4 | 0 | 19 | 3.5 | 3 | 25+TT | 15.5-TT |
| 15 | 293 (264) | 63 (34) | 1 | 0 | 0 | 22 | 2.0 | 3 | 25+TT | 19-TT |
| 16 | 293 (264) | 63 (34) | 1 | 4 | 0 | 19 | 3.5 | 3 | 25+TT | 15.5-TT |
| 17 | 293 (264) | 63 (34) | 1 | 0 | 1.5 | 20.5 | 2.5 | 3 | 25+TT | 17.5-TT |
| 18 | 293 (264) | 63 (34) | 1 | 0 | 0 | 22 | 2.0 | 3 | 25+TT | 19-TT |
| 19 | 293 (264) | 63 (34) | 2 | 4 | 1.5 | 17.5 | 5.0 | 3 | 25+TT | 12.5-TT |
| 20 | 293 (264) | 63 (34) | 2 | 4 | 0 | 19 | 3.5 | 3 | 25+TT | 15.5-TT |
| 21 | 293 (264) | 63 (34) | 2 | 0 | 0 | 21 | 2.0 | 3 | 25+TT | 18-TT |
| 22 | 293 (264) | 63 (34) | 2 | 4 | 0 | 19 | 3.5 | 3 | 25+TT | 15.5-TT |
| 23 | 293 (264) | 63 (34) | 2 | 0 | 1.5 | 19.5 | 3.5 | 3 | 25+TT | 16-TT |
| 24 | 293 (264) | 63 (34) | 2 | 0 | 0 | 21 | 2.0 | 3 | 25+TT | 18-TT |
| 25 | 293 (264) | 63 (34) | 2.5 | 4.5 | 1.5 | 17 | 5.0 | 3 | 25+TT | 12-TT |
| 26 | 293 (264) | 63 (34) | 2.5 | 4 | 0 | 19 | 3.5 | 3 | 25+TT | 15.5-TT |
| 27 | 293 (264) | 63 (34) | 2.5 | 0 | 0 | 20.5 | 2.5 | 3 | 25+TT | 17.5-TT |
| 28 | 293 (264) | 63 (34) | 2.5 | 4 | 0 | 19 | 3.5 | 3 | 25+TT | 15.5-TT |
| 29 | 293 (264) | 63 (34) | 2.5 | 0 | 1.5 | 19 | 3.5 | 3 | 25+TT | 15.5-TT |
| 30 | 293 (264) | 63 (34) | 2.5 | 0 | 0 | 20.5 | 2.5 | 3 | 25+TT | 17.5-TT |
| 31 | 293 (264) | 63 (34) | 4.5 | 6 | 1.5 | 15.5 | 5.0 | 3 | 25+TT | 10.5-TT |
| 32 | 293 (264) | 63 (34) | 4.5 | 4.5 | 0 | 18.5 | 4.0 | 3 | 25+TT | 14.5-TT |
| 33 | 293 (264) | 63 (34) | 4.5 | 0 | 0 | 18.5 | 4.0 | 3 | 25+TT | 14.5-TT |
| 34 | 293 (264) | 63 (34) | 4.5 | 4.5 | 0 | 18.5 | 4.0 | 3 | 25+TT | 14.5-TT |
| 35 | 293 (264) | 63 (34) | 4.5 | 0 | 1.5 | 17 | 5.0 | 3 | 25+TT | 12-TT |
| 36 | 293 (264) | 63 (34) | 4.5 | 0 | 0 | 18.5 | 4.0 | 3 | 25+TT | 14.5-TT |
| 37 | 293 (264) | 63 (34) | 3 | 5.5 | 1.5 | 16 | 5.0 | 3 | 25+TT | 11-TT |
| 38 | 293 (264) | 63 (34) | 3 | 5.5 | 0 | 17.5 | 5.0 | 3 | 25+TT | 12.5-TT |
| 39 | 293 (264) | 63 (34) | 3 | 0 | 0 | 20 | 2.5 | 3 | 25+TT | 17-TT |
| 40 | 293 (264) | 63 (34) | 3 | 5.5 | 0 | 17.5 | 5.0 | 3 | 25+TT | 12.5-TT |
| 41 | 293 (264) | 63 (34) | 3 | 0 | 1.5 | 18.5 | 4.0 | 3 | 25+TT | 14.5-TT |
| 42 | 293 (264) | 63 (34) | 3 | 0 | 0 | 20 | 2.5 | 3 | 25+TT | 17-TT |
| 43 | 293 (264) | 63 (34) | 3 | 5.5 | 1.5 | 16 | 5.0 | 3 | 25+TT | 11-TT |
| 44 | 293 (264) | 63 (34) | 3 | 5.5 | 0 | 17.5 | 5.0 | 3 | 25+TT | 12.5-TT |
| 45 | 293 (264) | 63 (34) | 3 | 0 | 0 | 20 | 2.5 | 3 | 25+TT | 17-TT |
| 46 | 293 (264) | 63 (34) | 3 | 5.5 | 0 | 17.5 | 5.0 | 3 | 25+TT | 12.5-TT |
| 47 | 293 (264) | 63 (34) | 3 | 0 | 1.5 | 18.5 | 4.0 | 3 | 25+TT | 14.5-TT |
| 48 | 293 (264) | 63 (34) | 3 | 0 | 0 | 20 | 2.5 | 3 | 25+TT | 17-TT |
| 49 | 293 (264) | 63 (34) | 3.5 | 5.5 | 1.5 | 16 | 5.0 | 3 | 25+TT | 11-TT |
| 50 | 293 (264) | 63 (34) | 3.5 | 5.5 | 0 | 17.5 | 5.0 | 3 | 25+TT | 12.5-TT |
| 51 | 293 (264) | 63 (34) | 3.5 | 0 | 0 | 19.5 | 3.5 | 3 | 25+TT | 16-TT |
| 52 | 293 (264) | 63 (34) | 3.5 | 5.5 | 0 | 17.5 | 5.0 | 3 | 25+TT | 12.5-TT |
| 53 | 293 (264) | 63 (34) | 3.5 | 0 | 1.5 | 18 | 4.0 | 3 | 25+TT | 14-TT |
| 54 | 293 (264) | 63 (34) | 3.5 | 0 | 0 | 19.5 | 3.5 | 3 | 25+TT | 16-TT |
| 55 | 293 (264) | 63 (34) | 6.5 | 8 | 1.5 | 13.5 | 5.0 | 3 | 25+TT | 8.5-TT |
| 56 | 293 (264) | 63 (34) | 6.5 | 6.5 | 0 | 16.5 | 5.0 | 3 | 25+TT | 11.5-TT |
| 57 | 293 (264) | 63 (34) | 6.5 | 0 | 0 | 16.5 | 5.0 | 3 | 25+TT | 11.5-TT |
| 58 | 293 (264) | 63 (34) | 6.5 | 6.5 | 0 | 16.5 | 5.0 | 3 | 25+TT | 11.5-TT |
| 59 | 293 (264) | 63 (34) | 6.5 | 0 | 1.5 | 15 | 5.0 | 3 | 25+TT | 10-TT |
| 60 | 293 (264) | 63 (34) | 6.5 | 0 | 0 | 16.5 | 5.0 | 3 | 25+TT | 11.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT=0.7 dB for BWchannel ≤ 40 MHz; TT=1.0 dB for 40 MHz < BWchannel ≤ 100 MHz.  NOTE 3: Power Class 1.5 UE  NOTE 4: Power Class 2 UE | | | | | | | | | | |

Table 6.2G.3.5-4: UE Power Class 1.5 test requirements (NS\_04) for band n41 (Step 5)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | ΔPPowerClass  (dB) | MPR (dB) | A-MPR’ (dB) | ΔTC,c (dB) | PCMAX,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 7 | 29 | 3 | 3.5 | 5.5 | 1.5 | 19 | 3.5 | 3 | 28+TT | 15.5-TT |
| 8 | 29 | 3 | 3.5 | 3.5 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 9 | 29 | 3 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 10 | 29 | 3 | 0.5 | 3.5 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 11 | 29 | 3 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 12 | 29 | 3 | 0.5 | 0 | 0 | 25.5 | 2.0 | 3 | 28+TT | 22.5-TT |
| 13 | 29 | 3 | 3.5 | 6 | 1.5 | 18.5 | 4.0 | 3 | 28+TT | 14.5-TT |
| 14 | 29 | 3 | 3.5 | 4.5 | 0 | 21 | 2.0 | 3 | 28+TT | 18.5-TT |
| 15 | 29 | 3 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 16 | 29 | 3 | 1 | 4.5 | 0 | 21.5 | 2.0 | 3 | 28+TT | 18.5-TT |
| 17 | 29 | 3 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 18 | 29 | 3 | 1 | 0 | 0 | 25 | 2.0 | 3 | 28+TT | 22-TT |
| 19 | 29 | 3 | 3.5 | 6 | 1.5 | 18.5 | 4.0 | 3 | 28+TT | 14.5-TT |
| 20 | 29 | 3 | 3.5 | 5 | 0 | 19.5 | 2.0 | 3 | 28+TT | 18-TT |
| 21 | 29 | 3 | 3.5 | 0 | 0 | 21 | 2.0 | 3 | 28+TT | 19.5-TT |
| 22 | 29 | 3 | 2 | 5 | 0 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 23 | 29 | 3 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 24 | 29 | 3 | 2 | 0 | 0 | 24 | 2.0 | 3 | 28+TT | 21-TT |
| 25 | 29 | 3 | 3.5 | 6.5 | 1.5 | 18 | 4.0 | 3 | 28+TT | 14-TT |
| 26 | 29 | 3 | 3.5 | 5 | 0 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 27 | 29 | 3 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 28 | 29 | 3 | 2.5 | 5 | 0 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 29 | 29 | 3 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 30 | 29 | 3 | 2.5 | 0 | 0 | 23.5 | 2.0 | 3 | 28+TT | 20.5-TT |
| 31 | 29 | 3 | 4.5 | 8 | 1.5 | 16.5 | 5.0 | 3 | 28+TT | 11.5-TT |
| 32 | 29 | 3 | 4.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 33 | 29 | 3 | 4.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 34 | 29 | 3 | 4.5 | 0 | 0 | 21.5 | 2.0 | 3 | 28+TT | 18.5-TT |
| 35 | 29 | 3 | 4.5 | 0 | 1.5 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 36 | 29 | 3 | 4.5 | 0 | 0 | 21.5 | 2.0 | 3 | 28+TT | 18.5-TT |
| 37 | 29 | 3 | 3.5 | 7.5 | 1.5 | 17 | 5.0 | 3 | 28+TT | 12-TT |
| 38 | 29 | 3 | 3.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 39 | 29 | 3 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 40 | 29 | 3 | 3 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 41 | 29 | 3 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 42 | 29 | 3 | 3 | 0 | 0 | 23 | 2.0 | 3 | 28+TT | 20-TT |
| 43 | 29 | 3 | 3.5 | 7.5 | 1.5 | 17 | 5.0 | 3 | 28+TT | 12-TT |
| 44 | 29 | 3 | 3.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 45 | 29 | 3 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 46 | 29 | 3 | 3 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 47 | 29 | 3 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 48 | 29 | 3 | 3 | 0 | 0 | 23 | 2.0 | 3 | 28+TT | 20-TT |
| 49 | 29 | 3 | 3.5 | 7.5 | 1.5 | 17 | 5.0 | 3 | 28+TT | 12-TT |
| 50 | 29 | 3 | 3.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 51 | 29 | 3 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 52 | 29 | 3 | 3.5 | 6.5 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 53 | 29 | 3 | 3.5 | 0 | 1.5 | 21 | 2.0 | 3 | 28+TT | 18-TT |
| 54 | 29 | 3 | 3.5 | 0 | 0 | 22.5 | 2.0 | 3 | 28+TT | 19.5-TT |
| 55 | 29 | 3 | 6.5 | 10 | 1.5 | 14.5 | 5.0 | 3 | 28+TT | 9.5-TT |
| 56 | 29 | 3 | 6.5 | 7.5 | 0 | 18.5 | 4.0 | 3 | 28+TT | 14.5-TT |
| 57 | 29 | 3 | 6.5 | 0 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| 58 | 29 | 3 | 6.5 | 7.5 | 0 | 18.5 | 4.0 | 3 | 28+TT | 14.5-TT |
| 59 | 29 | 3 | 6.5 | 0 | 1.5 | 18 | 4.0 | 3 | 28+TT | 14-TT |
| 60 | 29 | 3 | 6.5 | 0 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT=0.7 dB for BWchannel ≤ 40 MHz; TT=1.0 dB for 40 MHz < BWchannel ≤ 100 MHz. | | | | | | | | | | |

Table 6.2G.3.5-5: UE Power Class 2 test requirements for NS\_47 (contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 26 | 0 | 3.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 2 | 26 | 0 | 0.0 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 3 | 26 | 0 | 3.5 | 5 | 0 | 21 | 2 | 3 | 28+TT | 18-TT |
| 4 | 26 | 0 | 0.5 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 5 | 26 | 0 | 0.5 | 6 | 0 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 6 | 26 | 0 | 0.5 | 6 | 0 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 7 | 26 | 0 | 0.5 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 8 | 26 | 0 | 3.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 9 | 26 | 0 | 0.0 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 10 | 26 | 0 | 3.5 | 5 | 0 | 21 | 2 | 3 | 28+TT | 18-TT |
| 11 | 26 | 0 | 1.0 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 12 | 26 | 0 | 1.0 | 6 | 0 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 13 | 26 | 0 | 1.0 | 6 | 0 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 14 | 26 | 0 | 1.0 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 15 | 26 | 0 | 3.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 16 | 26 | 0 | 1.0 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 17 | 26 | 0 | 3.5 | 5 | 0 | 21 | 2 | 3 | 28+TT | 18-TT |
| 18 | 26 | 0 | 2.0 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 19 | 26 | 0 | 2.0 | 6 | 0 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 20 | 26 | 0 | 2.0 | 6 | 0 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 21 | 26 | 0 | 2.0 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 22 | 26 | 0 | 3.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 23 | 26 | 0 | 2.5 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 24 | 26 | 0 | 3.5 | 5 | 0 | 21 | 2 | 3 | 28+TT | 18-TT |
| 25 | 26 | 0 | 2.5 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 26 | 26 | 0 | 2.5 | 6 | 0 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 27 | 26 | 0 | 2.5 | 6 | 0 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 28 | 26 | 0 | 2.5 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 29 | 26 | 0 | 4.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 30 | 26 | 0 | 4.5 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 31 | 26 | 0 | 4.5 | 5 | 0 | 21 | 2 | 3 | 28+TT | 18-TT |
| 32 | 26 | 0 | 4.5 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 33 | 26 | 0 | 4.5 | 6 | 0 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 34 | 26 | 0 | 4.5 | 6 | 0 | 20 | 2.5 | 3 | 28+TT | 17-TT |
| 35 | 26 | 0 | 4.5 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 36 | 26 | 0 | 3.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 37 | 26 | 0 | 1.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 38 | 26 | 0 | 3.5 | 5 | 0 | 21 | 2 | 3 | 28+TT | 18-TT |
| 39 | 26 | 0 | 3 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 40 | 26 | 0 | 3 | 7 | 0 | 19 | 3.5 | 3 | 28+TT | 15.5-TT |
| 41 | 26 | 0 | 3 | 7 | 0 | 19 | 3.5 | 3 | 28+TT | 15.5-TT |
| 42 | 26 | 0 | 3 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 43 | 26 | 0 | 3.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 44 | 26 | 0 | 2.0 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 45 | 26 | 0 | 3.5 | 5 | 0 | 21 | 2 | 3 | 28+TT | 18-TT |
| 46 | 26 | 0 | 3 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 47 | 26 | 0 | 3 | 7 | 0 | 19 | 3.5 | 3 | 28+TT | 15.5-TT |
| 48 | 26 | 0 | 3 | 7 | 0 | 19 | 3.5 | 3 | 28+TT | 15.5-TT |
| 49 | 26 | 0 | 3 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 50 | 26 | 0 | 3.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 51 | 26 | 0 | 3.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 52 | 26 | 0 | 3.5 | 5 | 0 | 21 | 2 | 3 | 28+TT | 18-TT |
| 53 | 26 | 0 | 3.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 54 | 26 | 0 | 3.5 | 7 | 0 | 19 | 3.5 | 3 | 28+TT | 15.5-TT |
| 55 | 26 | 0 | 3.5 | 7 | 0 | 19 | 3.5 | 3 | 28+TT | 15.5-TT |
| 56 | 26 | 0 | 3.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 57 | 26 | 0 | 6.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 58 | 26 | 0 | 6.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 59 | 26 | 0 | 6.5 | 0 | 0 | 19.5 | 3.5 | 3 | 28+TT | 16-TT |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 60 | 26 | 0 | 6.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| 61 | 26 | 0 | 6.5 | 7 | 0 | 19 | 3.5 | 3 | 28+TT | 15.5-TT |
| 62 | 26 | 0 | 6.5 | 7 | 0 | 19 | 3.5 | 3 | 28+TT | 15.5-TT |
| 63 | 26 | 0 | 6.5 | 10 | 0 | 16 | 5 | 3 | 28+TT | 11-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2G.3.5-0. | | | | | | | | | | |

Table 6.2G.3.5-6: UE Power Class 1.5 test requirements for NS\_47 (contiguous allocation)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 29 | 0 | 6 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 2 | 29 | 0 | 0.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 3 | 29 | 0 | 6 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 4 | 29 | 0 | 2 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 5 | 29 | 0 | 2 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 6 | 29 | 0 | 2 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 7 | 29 | 0 | 2 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 8 | 29 | 0 | 2 | 3 | 0 | 26 | 3 | 3 | 31+TT | 23.0-TT |
| 9 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 10 | 29 | 0 | 0.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 11 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 12 | 29 | 0 | 2.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 13 | 29 | 0 | 2.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 14 | 29 | 0 | 2.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 15 | 29 | 0 | 2.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 16 | 29 | 0 | 2.5 | 3 | 0 | 26 | 3 | 3 | 31+TT | 23.0-TT |
| 17 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 18 | 29 | 0 | 1.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 19 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 20 | 29 | 0 | 3.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 21 | 29 | 0 | 3.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 22 | 29 | 0 | 3.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 23 | 29 | 0 | 3.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 24 | 29 | 0 | 3.5 | 3 | 0 | 25.5 | 3 | 3 | 31+TT | 22.5-TT |
| 25 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 26 | 29 | 0 | 3.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 27 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 28 | 29 | 0 | 4 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 29 | 29 | 0 | 4 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 30 | 29 | 0 | 4 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 31 | 29 | 0 | 4 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 32 | 29 | 0 | 4 | 0 | 0 | 25 | 3 | 3 | 31+TT | 22.0-TT |
| 33 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 34 | 29 | 0 | 6.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 35 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 36 | 29 | 0 | 6.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 37 | 29 | 0 | 6.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 38 | 29 | 0 | 6.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 39 | 29 | 0 | 6.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 40 | 29 | 0 | 6.5 | 0 | 0 | 22.5 | 5 | 3 | 31+TT | 17.5-TT |
| 41 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 42 | 29 | 0 | 2 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 43 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 44 | 29 | 0 | 4.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 45 | 29 | 0 | 4.5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 46 | 29 | 0 | 4.5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 47 | 29 | 0 | 4.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 48 | 29 | 0 | 4.5 | 4 | 0 | 24.5 | 3 | 3 | 31+TT | 21.5-TT |
| 49 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 50 | 29 | 0 | 2.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 51 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 52 | 29 | 0 | 4.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 53 | 29 | 0 | 4.5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 54 | 29 | 0 | 4.5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 55 | 29 | 0 | 4.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 56 | 29 | 0 | 4.5 | 4 | 0 | 24.5 | 3 | 3 | 31+TT | 21.5-TT |
| 57 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 58 | 29 | 0 | 4.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 59 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 60 | 29 | 0 | 5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 61 | 29 | 0 | 5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 62 | 29 | 0 | 5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 63 | 29 | 0 | 5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 64 | 29 | 0 | 5 | 0 | 0 | 24 | 3 | 3 | 31+TT | 21.0-TT |
| 65 | 29 | 0 | 8.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 66 | 29 | 0 | 8.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 67 | 29 | 0 | 8.5 | 8 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 68 | 29 | 0 | 8.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 69 | 29 | 0 | 8.5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 70 | 29 | 0 | 8.5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 71 | 29 | 0 | 8.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 72 | 29 | 0 | 8.5 | 0 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2G.3.5-0. | | | | | | | | | | |

Table 6.2G.3.5-7: UE Power Class 1.5 test requirements for NS\_47 (contiguous allocation, large FWA form factor with 20 dB or above antenna isolation)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 29 | 0 | 6 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 2 | 29 | 0 | 0 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 3 | 29 | 0 | 6 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 4 | 29 | 0 | 1.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 5 | 29 | 0 | 1.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 6 | 29 | 0 | 1.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 7 | 29 | 0 | 1.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 8 | 29 | 0 | 1.5 | 3 | 0 | 26 | 3 | 3 | 31+TT | 23.0-TT |
| 9 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 10 | 29 | 0 | 0 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 11 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 12 | 29 | 0 | 2 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 13 | 29 | 0 | 2 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 14 | 29 | 0 | 2 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 15 | 29 | 0 | 2 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 16 | 29 | 0 | 2 | 3 | 0 | 26 | 3 | 3 | 31+TT | 23.0-TT |
| 17 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 18 | 29 | 0 | 1 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 19 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 20 | 29 | 0 | 3 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 21 | 29 | 0 | 3 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 22 | 29 | 0 | 3 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 23 | 29 | 0 | 3 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 24 | 29 | 0 | 3 | 3 | 0 | 26 | 3 | 3 | 31+TT | 23.0-TT |
| 25 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 26 | 29 | 0 | 3 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 27 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 28 | 29 | 0 | 3.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 29 | 29 | 0 | 3.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 30 | 29 | 0 | 3.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 31 | 29 | 0 | 3.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 32 | 29 | 0 | 3.5 | 0 | 0 | 25.5 | 3 | 3 | 31+TT | 22.5-TT |
| 33 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 34 | 29 | 0 | 5.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 35 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 36 | 29 | 0 | 5.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 37 | 29 | 0 | 5.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 38 | 29 | 0 | 5.5 | 8.5 | 0 | 20.5 | 6 | 3 | 31+TT | 14.5-TT |
| 39 | 29 | 0 | 5.5 | 11 | 0 | 18 | 5 | 3 | 31+TT | 13.0-TT |
| 40 | 29 | 0 | 5.5 | 0 | 0 | 23.5 | 3 | 3 | 31+TT | 20.5-TT |
| 41 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 42 | 29 | 0 | 1.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 43 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 44 | 29 | 0 | 4 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 45 | 29 | 0 | 4 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 46 | 29 | 0 | 4 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 47 | 29 | 0 | 4 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 48 | 29 | 0 | 4 | 4 | 0 | 25 | 3 | 3 | 31+TT | 22.0-TT |
| 49 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 50 | 29 | 0 | 2 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 51 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 52 | 29 | 0 | 4 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 53 | 29 | 0 | 4 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 54 | 29 | 0 | 4 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 55 | 29 | 0 | 4 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 56 | 29 | 0 | 4 | 4 | 0 | 25 | 3 | 3 | 31+TT | 22.0-TT |
| 57 | 29 | 0 | 6.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 58 | 29 | 0 | 4 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 59 | 29 | 0 | 6.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass (dBm) | PPowerClass (dB) | MPR (dB) | A-MPR (dB) | ΔTC,c (dB) | PCMAX\_L,c (dBm) | T(PCMAX\_L,c) (dB) | TL,c (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 60 | 29 | 0 | 4.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 61 | 29 | 0 | 4.5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 62 | 29 | 0 | 4.5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 63 | 29 | 0 | 4.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 64 | 29 | 0 | 4.5 | 0 | 0 | 24.5 | 3 | 3 | 31+TT | 21.5-TT |
| 65 | 29 | 0 | 7.5 | 13 | 0 | 16 | 5 | 3 | 31+TT | 11.0-TT |
| 66 | 29 | 0 | 7.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 67 | 29 | 0 | 7.5 | 8 | 0 | 21 | 5 | 3 | 31+TT | 16.0-TT |
| 68 | 29 | 0 | 7.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 69 | 29 | 0 | 7.5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 70 | 29 | 0 | 7.5 | 9.5 | 0 | 19.5 | 5 | 3 | 31+TT | 14.5-TT |
| 71 | 29 | 0 | 7.5 | 12.5 | 0 | 16.5 | 5 | 3 | 31+TT | 11.5-TT |
| 72 | 29 | 0 | 7.5 | 0 | 0 | 21.5 | 5 | 3 | 31+TT | 16.5-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance.  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2G.3.5-0. | | | | | | | | | | |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2G.4 Configured transmitted power for Tx Diversity

6.2G.4.1 Test purpose

To verify the measured UE configured maximum output power PUMAX,f,c for Tx diversity is within the specified bounds.

6.2G.4.2 Test applicability

This test case applies to all types of NR Power Class 1.5, Power Class 2, and Power Class 3 UE release 15 and forward that support Tx diversity.

6.2G.4.3 Minimum conformance requirements

For UE supporting Tx diversity, the transmitted power is configured per each UE.

The definitions of configured maximum output power PCMAX,*c*, the lower bound PCMAX\_L,*c*, and the higher bound PCMAX\_H,*c* specified in subclause 6.2.4.3 shall apply to UE supporting Tx diversity, where

- PPowerClass,ΔPPowerClass and TC,*c* are specified in subclause 6.2.4.3 unless otherwise stated;

- MPR*c* is specified in subclause 6.2G.2.3;

The measured configured maximum output power PUMAX,*c* for serving cell *c* shall be within the following bounds:

PCMAX\_L,*c*– MAX{TL, T LOW(PCMAX\_L,*c*)} ≤ PUMAX,*c* ≤ PCMAX\_H,*c*+ T HIGH(PCMAX\_H,*c*)

where TLOW(PCMAX\_L,*c*) and THIGH(PCMAX\_H,*c*) are defined as the tolerance and applies to PCMAX\_L,*c* and PCMAX\_H,*c* separately, while TL is the absolute value of the lower tolerance in Table 6.2.1.3-1 for the applicable operating band.

For UE supporting Tx diversity, the tolerance is specified in Table 6.2G.4.3-1.

Table 6.2G.4.3-1: PCMAX,*c* tolerance for Tx Diversity

|  |  |  |
| --- | --- | --- |
| PCMAX,*c*(dBm) | Tolerance TLOW(PCMAX\_L,*c*) (dB) | Tolerance THIGH(PCMAX\_H,*c*) (dB) |
| 23 ≤ PCMAX,*c* ≤ 29 | 3.0 | 2.0 |
| 22 ≤ PCMAX,*c* < 23 | 5.0 | 2.0 |
| 21 ≤ PCMAX,*c* < 22 | 5.0 | 3.0 |
| 20 ≤ PCMAX,*c* < 21 | 6.0 | 4.0 |
| 16 ≤ PCMAX,*c* < 20 | 5.0 | |
| 11 ≤ PCMAX,*c* < 16 | 6.0 | |
| -40 ≤ PCMAX,*c* < 11 | 7.0 | |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2G.4.

6.2G.4.4 Test description

6.2G.4.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2G.4.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2G.4.4.1-1: Test Configuration Table for Tx Diversity

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Mid range (NOTE 4) | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest | |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 |  | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 2 |  | DFT-s-OFDM QPSK | Inner Full |
| 33 |  | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: UE operating in TDD mode with PI/2 PBSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and the IE *powerBoostPi2BPSK* is set to 1 for bands n34, n40, n41, n77, n78 and n79.  NOTE 4: For NR band n28, 30MHz test channel bandwidth is tested with Low range test frequencies. | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.2 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2G.4.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR,* Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2G.4.4.3.

6.2G.4.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2G.4.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level of the test point.

3. Measure the sum of the mean power of the UE at each transmit antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms over all active uplink slots and in the uplink symbols. For TDD slots only slots consisting of only UL symbols are under test.

6.2G.4.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 with the following exceptions:

Table 6.2G.4.4.3-1: *PUSCH-Config*

|  |
| --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED |

Table 6.2G.4.4.3-2: FrequencyInfoUL-SIB: Test point 1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 0 |  |  |

Table 6.2G.4.4.3-3: FrequencyInfoUL-SIB: Test point 2

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 14 |  |  |

Table 6.2G.4.4.3-4: FrequencyInfoUL-SIB: Test point 3

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 18 |  |  |

Table 6.2G.4.4.3-5: FrequencyInfoUL-SIB: Test point 4

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 20 |  |  |

Table 6.2G.4.4.3-6: ServingCellConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| uplinkConfig SEQUENCE { |  |  |  |
| powerBoostPi2BPSK | 0 |  | Test ID 1, 2 |
|  | 1 |  | Test ID 3 |
| } |  |  |  |
| } |  |  |  |

6.2G.4.5 Test requirement

The maximum output power measured shall not exceed the values specified in Table 6.2G.4.5-1.

Table 6.2G.4.5-1: PCMAX configured UE output power

|  |  |  |
| --- | --- | --- |
|  | Maximum output power | |
|  | Test ID 1,2 | Test ID 3 |
| Measured UE output power test point 1 | 0 dBm ± (7+TT) | 0 dBm ± (7+TT) |
| Measured UE output power test point 2 | 14 dBm ± (6+TT) | 14 dBm ± (6+TT) |
| Measured UE output power test point 3 | 18 dBm ± (5+TT) | 18 dBm ± (5+TT) |
| Measured UE output power test point 4 | Note 3 | Note 4 |
| Note 1: TT for each frequency and channel bandwidth is specified in Table 6.2G.4.5-4.  Note 2: Power class 3 is default power class unless otherwise stated.  Note 3: The maximum output power shall be within the range in Table 6.2G.4.5-2.  Note 4: The maximum output power shall be within the range in Table 6.2G.4.5-3. | | |

Table 6.2G.4.5-2: Measured UE output power test point 4 for Test ID 1,2

|  |  |
| --- | --- |
| NR  band | Tolerance (dB) |
| n1 | 20 dBm + 4+TT/-6-TT |
| n2 | 20 dBm + 4+TT/-6-TT |
| n3 | 20 dBm + 4+TT/-6-TT |
| n5 | 20 dBm + 4+TT/-6-TT |
| n7 | 20 dBm + 4+TT/-6-TT |
| n8 | 20 dBm + 4+TT/-6-TT |
| n12 | 20 dBm + 4+TT/-6-TT |
| n14 | 20 dBm + 4+TT/-6-TT |
| n20 | 20 dBm + 4+TT/-6-TT |
| n24 | 20 dBm + 4+TT/-6-TT |
| n25 | 20 dBm + 4+TT/-6-TT |
| n26 | 20 dBm + 4+TT/-6-TT |
| n28 | 20 dBm + 4+TT/-6-TT |
| n30 | 20 dBm + 4+TT/-6-TT |
| n34 | 20 dBm + 4+TT/-6-TT |
| n38 | 20 dBm + 4+TT/-6-TT |
| n39 | 20 dBm + 4+TT/-6-TT |
| n40 | 20 dBm + 4+TT/-6-TT |
| n41 | 20 dBm + 4+TT/-6-TT |
| n50 | 20 dBm + 4+TT/-6-TT |
| n51 | 20 dBm + 4+TT/-6-TT |
| n65 | 20 dBm + 4+TT/-6-TT |
| n66 | 20 dBm + 4+TT/-6-TT |
| n70 | 20 dBm + 4+TT/-6-TT |
| n71 | 20 dBm + 4+TT/-6-TT |
| n74 | 20 dBm + 4+TT/-6-TT |
| n77 | 20 dBm + 4+TT/-6-TT |
| n78 | 20 dBm + 4+TT/-6-TT |
| n79 | 20 dBm + 4+TT/-6-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2D.4.5-4. | |

Table 6.2G.4.5-3: Measured UE output power test point 4 for Test ID 3

|  |  |
| --- | --- |
| NR  band | Tolerance (dB) |
| n34 | 23 dBm + 2+TT/-3-TT |
| n39 | 23 dBm + 2+TT/-3-TT |
| n40 | 23 dBm + 2+TT/-3-TT |
| n41 | 23 dBm + 2+TT/-3-TT |
| n77 | 23 dBm + 2+TT/-3-TT |
| n78 | 23 dBm + 2+TT/-3-TT |
| n79 | 23 dBm + 2+TT/-3-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2G.4.5-4. | |

Table 6.2G.4.5-4: Test Tolerance (configured transmitted power for Tx Diversity)

|  |  |  |
| --- | --- | --- |
|  | **f ≤ 3.0GHz** | **3.0GHz < f ≤ 6.0GHz** |
| BW ≤ 40MHz | 0.7 | 1.0 |
| 40MHz < BW ≤ 100MHz | 1.0 | 1.0 |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

## 6.2H Transmitter power for CA with UL MIMO

### 6.2H.1 Transmitter power for intra-band UL contiguous CA with UL MIMO

#### 6.2H.1.1 UE maximum output power for intra-band UL contiguous CA with UL MIMO

6.2H.1.1.1 Test purpose

To verify that the error of the UE maximum output power for intra-band UL contiguous carrier aggregation with UL MIMO does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2H.1.1.2 Test applicability

This test case applies to all types of NR UE release 15 and forward that support intra-band UL contiguous CA with UL MIMO.

NOTE: Testing can’t be performed due to lack of appropriate test points.

6.2H.1.1.3 Minimum conformance requirements

For intra-band UL contiguous CA and UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the maximum output power is defined as the sum of the maximum output power from both UE antenna connectors and all UL CCs. The period of measurement shall be at least one sub frame (1 ms), as specified in Table 6.2H.1.1.3-1. The requirements shall be met with the UL MIMO configurations specified in Table 6.2D.1.3-2 and 6.2D.1.3-3 for 2 layer configuration and ULFPTx configuration respectively.

Table 6.2H.1.1.3-1: UE Power Class for intra-band UL contiguous CA with UL MIMO in closed loop spatial multiplexing scheme

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA Configuration | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| CA\_n41C |  |  | 26 | +2/-31 | 23 | +2/-31 |  |  |
| NOTE 1: If all transmitted resource blocks over all component carriers are confined within FUL\_low and FUL\_low + 4 MHz or/and FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 2: PPowerClass is the maximum UE power specified without taking into account the tolerance | | | | | | | | |

If UE is scheduled for single antenna-port PUSCH transmission by DCI format 0\_0 or by DCI format 0\_1 for codebook based transmission with precoding matrix *W*=1 [6.3.1.5 TS 38.211], the requirements in clause 6.2A apply for at least one antenna connector for the power class as indicated by the *ue-PowerClass* field in capability signalling.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2H.1.1.

6.2H.1.1.4 Test procedure

No test case details are specified.

#### 6.2H.1.2 UE maximum output power reduction for intra-band UL contiguous CA with UL MIMO

Editor’s Note:

- Test tolerance for BW>100M is FFS.

6.2H.1.2.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified maximum output power with MPR and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2H.1.2.2 Test applicability

This test case applies to all types of NR UE release 15 and forward that support intra-band UL contiguous CA with UL MIMO.

NOTE: Test execution is not necessary if TC 6.5H.1.2.3 is executed

6.2H.1.2.3 Minimum conformance requirements

For intra-band UL contiguous CA and UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2H.1.1.3-1 is specified in Table 6.2A.2.0.4-1, Table 6.2A.2.0.4-2 for power class 3 CA; Table 6.2A.2.0.4-1b, Table 6.2A.2.0.4-4 for power class 2 CA.

The requirements shall be met with UL MIMO configurations defined in Table 6.2D.1.3-2 and 6.2D.1.3-3 for 2 layer configuration and ULFPTx configuration respectively. For the UE maximum output power modified by MPR, the power limits specified in clause 6.2H.1.4 apply.

If UE is scheduled for single antenna-port PUSCH transmission by DCI format 0\_0 or by DCI format 0\_1 for single antenna port codebook based transmission with precoding matrix *W*=1 [6.3.1.5 TS 38.211], the requirements in clause 6.2A.2 apply for the power class as indicated by the *ue-PowerClass* field in capability signaling.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2H.1.2.

6.2H.1.2.4 Test description

6.2H.1.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR CA configuration specified in clause 5.5A. All of these configurations shall be tested with applicable test parameters for each CA configuration of test channel bandwidth and sub-carrier spacing, and are shown in Table 6.2H.1.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2H.1.2.4.1-1: Test Configuration Table (contiguous RB allocation)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Initial Conditions | | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range  High range | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest NRB\_agg, Highest NRB\_agg  (NOTE 1) | | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | | |
| Test Parameters for CA bandwidth class B and C | | | | | |
| Test ID | DL configuration | UL configuration | | | |
|  | for PCC & SCC | Modulations for all CCs | | | RB allocation (NOTE 2) |
| 1 |  |  | | QPSK | Inner Full |
| 2 |  |  | | QPSK | Outer Full |
| 3 |  |  | | 16QAM | Inner Full |
| 4 |  | CP-OFDM | | 16QAM | Outer Full |
| 5 |  |  | | 64QAM | Inner Full |
| 6 |  |  | | 64QAM | Outer Full |
| 7 |  |  | | 256QAM | Inner Full |
| 8 |  |  | | 256QAM | Outer Full |
| NOTE 1: The Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.5A.1-1.  NOTE 2: The specific configuration of each RB allocation is defined in Table 6.1A-1a.  NOTE 3: If the UE supports multiple CC Combinations in the CA Configuration with the same NRB\_agg, only the combination with the highest NRB\_PCC is tested. | | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.6 for TE diagram and section A.3.2.3.11 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals for PCC are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2H.1.2.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2H.1.2.4.3.

6.2H.1.2.4.2 Test procedure

1. Configure SCC according to Annex C.0, C.1, and C.2 for all downlink physical channels.

2. The SS shall configure SCC as per TS 38.508-1 [5] clause 5.5.1. Message contents are defined in clause 6.2H.1.2.4.3.

3. SS activates SCC by sending the activation MAC CE (Refer TS 38.321 [18], clauses 5.9, 6.1.3.10). Wait for at least 2 seconds (Refer TS 38.133[19], clause 9.3).

4. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Tables 6.2H.1.2.4.1-1 on both PCC and SCC as appropriate. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

5. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

6. Measure the sum of mean transmitted power from both antenna connectors and all component carriers in the CA configuration of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms uplink. For TDD only slots consisting of only UL symbols are under test.

6.2H.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 ensuring Table 4.6.3-182 with the condition 2TX\_UL\_MIMO with the following exceptions:

Table 6.2H.1.2.4.3-1: FrequencyInfoUL-SIB for Power Class 3 (contiguous RB allocation) for CA\_n41C

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 16 |  | Test IDs 1, 3 |
|  | 14 |  | Test ID 5 |
|  | 11 |  | Test ID 7 |
|  | 10 |  | Test IDs 2, 4, 6, 8 |

Table 6.2H.1.2.4.3-2: FrequencyInfoUL-SIB for Power Class 2 (contiguous RB allocation) for CA\_n41C

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 19 |  | Test IDs 1, 3 |
|  | 17 |  | Test ID 5 |
|  | 14 |  | Test ID 7 |
|  | 12 |  | Test IDs 2, 4, 6, 8 |

6.2H.1.2.5 Test requirement

The maximum output power, derived in step 6 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2H.1.2.5-1 – Table 6.2H.1.2.5-2.

Table 6.2H.1.2.5-1: UE Output Power for Power Class 3 (contiguous RB allocation) test requirements (for CA\_n41C)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | MPR (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 23 | 3.5 | 0 | 19.5 | 3.5 | 3 | 25+TT | 16-TT |
| 2 | 23 | 8.0 | 0 | 15 | 5 | 3 | 25+TT | 10-TT |
| 3 | 23 | 3.5 | 0 | 19.5 | 3.5 | 3 | 25+TT | 16-TT |
| 4 | 23 | 8.0 | 0 | 15 | 5 | 3 | 25+TT | 10-TT |
| 5 | 23 | 5.0 | 0 | 18 | 4 | 3 | 25+TT | 14-TT |
| 6 | 23 | 8.0 | 0 | 15 | 5 | 3 | 25+TT | 10-TT |
| 7 | 23 | 7.0 | 0 | 16 | 5 | 3 | 25+TT | 11-TT |
| 8 | 23 | 8.0 | 0 | 15 | 5 | 3 | 25+TT | 10-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2H.1.2.5-3. | | | | | | | | |

Table 6.2H.1.2.5-2: UE Output Power for Power Class 2 (contiguous RB allocation) test requirements (for CA\_n41C)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerClass  (dBm) | MPR (dB) | ΔTC,c (dB) | PCMAX\_L,f,c (dBm) | T(PCMAX\_L,f,c) (dB) | TL,c  (dB) | Upper limit (dBm) | Lower limit (dBm) |
| 1 | 26 | 4.0 | 0 | 22 | 2 | 3 | 28+TT | 19-TT |
| 2 | 26 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 3 | 26 | 4.0 | 0 | 22 | 2 | 3 | 28+TT | 19-TT |
| 4 | 26 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 5 | 26 | 5.5 | 0 | 20.5 | 2.5 | 3 | 28+TT | 17.5-TT |
| 6 | 26 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| 7 | 26 | 7.5 | 0 | 18.5 | 4 | 3 | 28+TT | 14.5-TT |
| 8 | 26 | 8.5 | 0 | 17.5 | 5 | 3 | 28+TT | 12.5-TT |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.2H.1.2.5-3. | | | | | | | | |

Table 6.2H.1.2.5-3: Test Tolerance

|  |  |  |
| --- | --- | --- |
| TT for overall output power (dB) | | |
| Aggregation BW | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 | 1.0 |
| 40MHz < BW ≤ 100MHz | 1.0 | 1.0 |
| 100MHz < BW ≤ 200MHz | FFS | FFS |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

#### 6.2H.1.3 UE additional maximum output power reduction for intra-band UL contiguous CA with UL MIMO

Editor’s Note:

- Test tolerance for BW>100M is FFS.

6.2H.1.3.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified maximum output power with AMPR and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2H.1.3.2 Test applicability

This test case applies to all types of NR UE release 15 and forward that support intra-band UL contiguous CA with UL MIMO.

NOTE: Test execution is not necessary if TC 6.5H.1.2.3 is executed

6.2H.1.3.3 Minimum conformance requirements

For intra-band UL contiguous CA and UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the A-MPR values specified in clause 6.2A.3.0 shall apply to the maximum output power specified in Table 6.2H.1.1.3-1. The requirements shall be met with UL MIMO configurations defined in Table 6.2D.1.3-2 and 6.2D.1.3-3 for 2 layer configuration and ULFPTx configuration respectively.

For the UE maximum output power modified by A-MPR, the power limits specified in clause 6.2H.1.4.3 apply.

If UE is scheduled for single antenna-port PUSCH transmission by DCI format 0\_0 or by DCI format 0\_1 for single antenna port codebook based transmission with precoding matrix *W*=1 [6.3.1.5 TS 38.211], the requirements in clause 6.2A.3.0.1 apply for the power class as indicated by the *ue-PowerClass* field in capability signalling.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2H.1.3.

6.2H.1.3.4 Test description

6.2H.1.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR CA configuration specified in clause 5.5A. All of these configurations shall be tested with applicable test parameters for each CA configuration of test channel bandwidth and sub-carrier spacing, and are shown in Table 6.2H.1.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2H.1.3.4.1-1: Test Configuration Table for intra-band contiguous CA for CA\_NS\_04 (contiguous allocation)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause4.3.1.1.3 for inter band CA in FR1 | | | Referring to Test Frequency Column | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest NRB\_agg  Highest NRB\_agg | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters | | | | |
| Test ID | Test Frequency | Downlink Configuration | Uplink Configuration | |
| Modulation | RB allocation for PCC&SCC (NOTE 1) |
| 1 | High range |  | CP-OFDM QPSK | Outer\_Full |
| 2 | High range | CP-OFDM QPSK | Edge\_1RB\_Right |
| 3 | Low range | CP-OFDM QPSK | Outer\_Full |
| 4 | Low range | CP-OFDM QPSK | Edge\_1RB\_Left |
| 5 | Low range | CP-OFDM QPSK | Inner\_Full |
| 6 | Low range | CP-OFDM 16QAM | Inner\_Full |
| 7 | Low range | CP-OFDM 64QAM | Inner\_Full |
| 8 | Low range | CP-OFDM 256QAM | Inner\_Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1A-1a.  NOTE 2: Test Channel Bandwidths and Test SCS are checked separately for each NR CA band combination, which applicable channel bandwidths and SCS are specified in Table 5.5A3-1. | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.6 for TE diagram and section A.3.2.3.11 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals for PCC are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2H.1.3.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2H.1.3.4.3.

6.2H.1.3.4.2 Test procedure

1. Configure SCC according to Annex C.0, C.1, and C.2 for all downlink physical channels.

2. The SS shall configure SCC as per TS 38.508-1 [5] clause 5.5.1. Message contents are defined in clause 6.2H.1.3.4.3.

3. SS activates SCC by sending the activation MAC CE (Refer TS 38.321 [18], clauses 5.9, 6.1.3.10). Wait for at least 2 seconds (Refer TS 38.133[19], clause 9.3).

4. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Tables 6.2H.1.3.4.1-1 on both PCC and SCC as appropriate. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

5. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

6. Measure the sum of mean transmitted power from both antenna connectors and all component carriers in the CA configuration of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms uplink. For TDD only slots consisting of only UL symbols are under test.

6.2H.1.3.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 ensuring Table 4.6.3-182 with the condition 2TX\_UL\_MIMO with the following exceptions:

6.2H.1.3.4.3.1 Message contents exceptions (network signalling value "CA\_NS\_04" on PCC and SCC)

Table 6.2H.1.3.4.3.1-1: AdditionalSpectrumEmission: Additional spurious emissions test requirement for "CA\_NS\_04" on PCC and SCC

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] clause 4.6.3, Table 4.6.3-1 *AdditionalSpectrumEmission* | | | |
| Information Element | Value/remark | Comment | Condition |
| AdditionalSpectrumEmission | 1 (CA\_NS\_04) |  |  |

Table 6.2H.1.3.4.3.1-2: FrequencyInfoUL-SIB for Power Class 3 (contiguous RB allocation) for CA\_n41C

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 12 |  | Test IDs 5, 6, 7 |
|  | 10 |  | Test IDs 1, 2, 3, 4, 8 |

Table 6.2H.1.3.4.3.1-3: FrequencyInfoUL-SIB for Power Class 2 (contiguous RB allocation) for CA\_n41C

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 14 |  | Test IDs 5, 6, 7 |
|  | 12 |  | Test IDs 1, 2, 3, 4 |
|  | 11 |  | Test ID 8 |

6.2H.1.3.5 Test requirement

The maximum output power, derived in step 6 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2H.1.3.5-1 – Table 6.2H.1.3.5-2.

Table 6.2H.1.3.5-0: Test Tolerance

|  |  |  |
| --- | --- | --- |
| TT for overall output power (dB) | | |
| Aggregation BW | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 | 1.0 |
| 40MHz < BW ≤ 100MHz | 1.0 | 1.0 |
| 100MHz < BW ≤ 200MHz | FFS | FFS |

Table 6.2H.1.3.5-1: UE Power Class 3 test requirement (network signalling value CA\_NS\_04) for CA\_n41C

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerclass | MPR (dB) | AMPRcc (dB) | AMPR(dB) | ΔTC,c (dB) | TL (dB) | PCMAX\_L (dBm) | TLOW(PCMAX\_L) | Upper limit | Lower limit |
|  | (dBm) |  |  | (dB) | (dBm) | (dBm) |
| 1 | 23 | 8 | - | 8 | 0 | 2 | 15 | 5 | 25+TT | 10-TT |
| 2 | 23 | 8 | - | 8 | 1.5 | 2 | 15 | 5 | 25+TT | 10-TT |
| 3 | 23 | 8 | - | 8 | 0 | 2 | 15 | 5 | 25+TT | 10-TT |
| 4 | 23 | 8 | - | 8 | 1.5 | 2 | 15 | 5 | 25+TT | 10-TT |
| 5 | 23 | 3.5 | 5.5 | 5.5 | 0 | 2 | 17.5 | 5 | 25+TT | 12.5-TT |
| 6 | 23 | 3.5 | 5.5 | 5.5 | 0 | 2 | 17.5 | 5 | 25+TT | 12.5-TT |
| 7 | 23 | 5 | 5.5 | 5.5 | 0 | 2 | 17.5 | 5 | 25+TT | 12.5-TT |
| 8 | 23 | 7 | 8 | 8 | 0 | 2 | 15 | 5 | 25+TT | 10-TT |

Table 6.2H.1.3.5-2: UE Power Class 2 test requirement (network signalling value CA\_NS\_04) for CA\_n41C

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | PPowerclass | MPR (dB) | AMPRcc (dB) | AMPR(dB) | ΔTC,c (dB) | TL (dB) | PCMAX\_L (dBm) | TLOW(PCMAX\_L) | Upper limit | Lower limit |
|  | (dBm) |  |  | (dB) | (dBm) | (dBm) |
| 1 | 26 | 8.5 | - | 8.5 | 0 | 3 | 17.5 | 5 | 28+TT | 12.5-TT |
| 2 | 26 | 8.5 | - | 8.5 | 1.5 | 3 | 17.5 | 5 | 28+TT | 12.5-TT |
| 3 | 26 | 8.5 | - | 8.5 | 0 | 3 | 17.5 | 5 | 28+TT | 12.5-TT |
| 4 | 26 | 8.5 | - | 8.5 | 1.5 | 3 | 17.5 | 5 | 28+TT | 12.5-TT |
| 5 | 26 | 4.0 | 7.5 | 7.5 | 0 | 3 | 18.5 | 4 | 28+TT | 14.5-TT |
| 6 | 26 | 4.0 | 7.5 | 7.5 | 0 | 3 | 18.5 | 4 | 28+TT | 14.5-TT |
| 7 | 26 | 5.5 | 7.5 | 7.5 | 0 | 3 | 18.5 | 4 | 28+TT | 14.5-TT |
| 8 | 26 | 7.5 | 10 | 10 | 0 | 3 | 16 | 5 | 28+TT | 11-TT |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

#### 6.2H.1.4 Configured transmitted power for intra-band UL contiguous CA with UL MIMO

Editor’s Note:

- Test tolerance for BW>100M is FFS.

6.2H.1.4.1 Test purpose

To verify that the total measured UE configured maximum output power for intra-band UL contiguous CA with UL MIMO is within the specified bounds.

6.2H.1.4.2 Test applicability

This test case applies to all types of NR UE release 15 and forward that support intra-band UL contiguous CA with UL MIMO.

6.2H.1.4.3 Minimum conformance requirements

For UE supporting intra-band UL contiguous CA with UL MIMO, the transmitted power is configured per each UE.

The definitions of configured maximum output power PCMAX,*c*, the lower bound PCMAX\_L,*c*, and the higher bound PCMAX\_H,*c* specified in clause 6.2A.4 shall apply to UE supporting intra-band UL contiguous CA with UL MIMO, where

- ΔPPowerClass and ∆TC,c are specified in clause 6.2A.4 unless otherwise stated;

- PPowerClass,CA is the maximum UE power specified in Table 6.2H.1.1.3-1 without taking into account the tolerance;

- MPR, AMPR is specified in clause 6.2H.1.2 and 6.2H.1.3;

The measured configured maximum output power PUMAX over all serving cells shall be within the following bounds:

PCMAX\_L – MAX{TL, T LOW(PCMAX\_L)} ≤ PUMAX  ≤ PCMAX\_H + T HIGH(PCMAX\_H)

where TLOW(PCMAX\_L) and THIGH(PCMAX\_H) are defined as the tolerance and applies to PCMAX\_L and PCMAX\_H separately, while TL is the absolute value of the lower tolerance in Table 6.2 H.1.1.3-1 for the applicable operating band.

For UE supporting intra-band UL contiguous CA with UL MIMO, the tolerance is specified in Table 6.2H.1.4.3-1.

Table 6.2H.1.4.3-1: PCMAX tolerance for intra-band UL contiguous CA with UL MIMO

|  |  |  |
| --- | --- | --- |
| PCMAX (dBm) | Tolerance TLOW(PCMAX) (dB) | Tolerance THIGH(PCMAX) (dB) |
| 23 < PCMAX ≤ 26 | 3.0 | 2.0 |
| 21 ≤ PCMAX ≤ 23 | 2.0 | |
| 20 ≤ PCMAX < 21 | 2.5 | |
| 19 ≤ PCMAX < 20 | 3.5 | |
| 18 ≤ PCMAX < 19 | 4.0 | |
| 13 ≤ PCMAX < 18 | 5.0 | |
| 8 ≤ PCMAX < 13 | 6.0 | |
| -40 ≤ PCMAX < 8 | 7.0 | |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2H.1.4.

6.2H.1.4.4 Test description

6.2H.1.4.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR CA configuration specified in clause 5.5A. All of these configurations shall be tested with applicable test parameters for each CA configuration of test channel bandwidth and sub-carrier spacing, and are shown in Table 6.2H.1.4.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2H.1.4.4.1-1: Test Configuration Table (contiguous RB allocation)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Mid range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest NRB\_agg, Highest NRB\_agg  (NOTE 1) | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest | |
| Test Parameters for Channel Bandwidths | | | | |
| Test Parameters for CA bandwidth class B and C | | | | |
| Test ID | DL configuration for PCC & SCC | UL configuration | | |
| Modulations for all CCs | | RB allocation (NOTE 2) |
| 1 | N/A | CP-OFDM QPSK | | Inner Full |
| NOTE 1: The Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.5A.1-1.  NOTE 2: The specific configuration of each RB allocation is defined in Table 6.1A-1a.  NOTE 3: If the UE supports multiple CC Combinations in the CA Configuration with the same NRB\_agg, only the combination with the highest NRB\_PCC is tested. | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.6 for TE diagram and section A.3.2.3.11 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals for PCC are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2H.1.4.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2H.1.4.4.3.

6.2H.1.4.4.2 Test procedure

1. Configure SCC according to Annex C.0, C.1, and C.2 for all downlink physical channels.

2. The SS shall configure SCC as per TS 38.508-1 [5] clause 5.5.1. Message contents are defined in clause 6.2H.1.4.4.3.

3. SS activates SCC by sending the activation MAC CE (Refer TS 38.321 [18], clauses 5.9, 6.1.3.10). Wait for at least 2 seconds (Refer TS 38.133[19], clause 9.3).

4. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Tables 6.2H.1.4.4.1-1 on both PCC and SCC as appropriate. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The PDCCH DCI format 0\_1 is specified with the condition 2TX\_UL\_MIMO in 38.508-1 [5] subclause 4.3.6.1.1.2.

5. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

6. Measure the sum of mean transmitted power from both antenna connectors and all component carriers in the CA configuration of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms uplink. For TDD only slots consisting of only UL symbols are under test.

6.2H.1.4.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 ensuring Table 4.6.3-182 with the condition 2TX\_UL\_MIMO.

Table 6.2H.1.4.4.3-1: FrequencyInfoUL: Test point 1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-61 FrequencyInfoUL | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | -10 |  |  |

Table 6.2H.1.4.4.3-1a: FrequencyInfoUL-SIB: Test point 1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | -10 |  |  |

Table 6.2H.1.4.4.3-2: FrequencyInfoUL: Test point 2

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-61 FrequencyInfoUL | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 7 |  |  |

Table 6.2H.1.4.4.3-2a: FrequencyInfoUL-SIB: Test point 2

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 7 |  |  |

Table 6.2H.1.4.4.3-3: FrequencyInfoUL: Test point 3

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-61 FrequencyInfoUL | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 17 |  | Power Class 3 |

Table 6.2H.1.4.4.3-3a: FrequencyInfoUL-SIB: Test point 3

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 17 |  | Power Class 3 |

Table 6.2H.1.4.4.3-4: FrequencyInfoUL: Test point 4

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-61 FrequencyInfoUL | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 16 |  | Power Class 2 |

Table 6.2H.1.4.4.3-4a: FrequencyInfoUL-SIB: Test point 4

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] Table 4.6.3-62 FrequencyInfoUL-SIB | | | |
| Information Element | Value/remark | Comment | Condition |
| p-Max | 16 |  | Power Class 2 |

6.2H.1.4.5 Test requirement

The maximum output power, derived in step 6 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2H.1.4.5-1.

Table 6.2H.1.4.5-1: Configured UE Output Power for Intra-band contiguous CA of PC2 and PC3 (contiguous RB allocation))

|  |  |  |
| --- | --- | --- |
|  | Maximum output power | |
| Lower limit | Upper limit |
| Measured UE output power test point 1 | -14 dBm - TT | 0 dBm + TT |
| Measured UE output power test point 2 | 4 dBm - TT | 16 dBm + TT |
| Measured UE output power test point 3 (Note 2) | 17 dBm - TT | 22.5 dBm + TT |
| Measured UE output power test point 4 (Note 3) | 15.5 dBm - TT | 22.5 dBm + TT |
| Note 1: TT for each intra-band UL CA configuration is in table 6.2H.4.1.5-2.  Note 2: Only applicable to Power Class 3.  Note 3: Only applicable to Power Class 2. | | |

Table 6.2H.1.4.5-2: Test Tolerance for intra-band CA (Configured transmitted power for CA)

|  |  |  |
| --- | --- | --- |
| TT for overall output power (dB) | | |
| Aggregation BW | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 | 1.0 |
| 40MHz < BW ≤ 100MHz | 1.0 | 1.0 |
| 100MHz < BW ≤ 200MHz | FFS | FFS |

For the UE which supports inter-band NR CA configuration, inter-band NR-DC configuration, SUL configuration or inter-band EN-DC configuration, ΔTIB,c as specified in 6.2A.4.0.2 for NR CA, 6.2B.4.0.2 for NR-DC, clause 6.2C.2 for SUL, or TS 38.521-3 [14] clause 6.2B.4.2 for EN-DC applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations for CA, NR-DC, SUL or EN-DC, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied.

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in clause 6.2A.4.0.2, 6.2B.4.0.2, 6.2C.2 in this specification and 6.2B.4.2 in TS 38.521-3 [14] for the applicable operating bands.

### 6.2H.2

### 6.2H.3 Transmitter power for inter-band UL CA with UL MIMO

#### 6.2H.3.1 UE maximum output power for inter-band UL CA with UL MIMO

FFS

#### 6.2H.3.2 UE maximum output power reduction for inter-band UL CA with UL MIMO

6.2H.3.2.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified maximum output power with MPR and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2H.3.2.2 Test applicability

This test case applies to all types of NR UE release 17 and forward that support inter-band UL CA with UL MIMO.

6.2H.3.2.3 Minimum conformance requirements

For inter-band UL CA with UL MIMO in one of the two frequency bands, the requirements in clause 6.2D.2 apply for the component carrier configured with UL MIMO and the requirements in clause 6.2.2 apply for the other component carrier.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2H.3.2.

6.2H.3.2.4 Test procedure

This test is covered by clauses 6.2.2 UE maximum output power reduction and 6.2D.2 UE maximum output power reduction for UL MIMO.

## 6.2I Transmitter power for RedCap

### 6.2I.1 UE maximum output power for RedCap

6.2I.1.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2I.1.2 Test applicability

This test case applies to all types of NR RedCap UE release 17 and forward.

6.2I.1.3 Minimum conformance requirements

For Redcap UE, the requirements for power class 3 specified in clause 6.2.1 apply.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2I.1.

6.2I.1.4 Test description

6.2I.1.4.1 Initial conditions

Same initial conditions as in 6.2.1 with following exception:

- The test channel bandwidth are specified in TS 38.508-1 [5] subclause 4.3.1 for RedCap.

6.2I.1.4.2 Test procedure

Same test procedure as steps 1~3 of clause 6.2.1.4.2.

6.2I.1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 and 5.4 with the following exceptions.

Table 6.2I.1.4.3-1: *PUSCH-Config*

|  |
| --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED |

6.2I.1.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2I.1.5-1 for Power Class 3.

Table 6.2I.1.5-1: Maximum Output Power test requirement for Power Class 3

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| NR  band | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) |
| n1 |  |  |  |  | 23 | ±(2+TT) |
| n2 |  |  |  |  | 23 | ±(23+TT) |
| n3 |  |  |  |  | 23 | ±(23+TT) |
| n5 |  |  |  |  | 23 | ±(2+TT) |
| n7 |  |  |  |  | 23 | ±(23+TT) |
| n8 |  |  |  |  | 23 | ±(23+TT) |
| n12 |  |  |  |  | 23 | ±(23+TT) |
| n14 |  |  |  |  | 23 | ±(2+TT) |
| n20 |  |  |  |  | 23 | ±(23+TT) |
| n24 |  |  |  |  | 23 | +2+TT/-3.03-TT |
| n25 |  |  |  |  | 23 | ±(23+TT) |
| n26 |  |  |  |  | 23 | ±(23+TT) |
| n28 |  |  |  |  | 23 | +2+TT/-2.5-TT |
| n30 |  |  |  |  | 23 | ±(2+TT) |
| n34 |  |  |  |  | 23 | ±(2+TT) |
| n38 |  |  |  |  | 23 | ±(2+TT) |
| n39 |  |  |  |  | 23 | ±(2+TT) |
| n40 |  |  |  |  | 23 | ±(2+TT) |
| n41 |  |  |  |  | 23 | ±(23+TT) |
| n48 |  |  |  |  | 23 | +2+TT/-3-TT |
| n50 |  |  |  |  | 23 | ±(2+TT) |
| n51 |  |  |  |  | 23 | ±(2+TT) |
| n53 |  |  |  |  | 23 | ±(2+TT) |
| n65 |  |  |  |  | 23 | ±(2+TT) |
| n66 |  |  |  |  | 23 | ±(2+TT) |
| n70 |  |  |  |  | 23 | ±(2+TT) |
| n71 |  |  |  |  | 23 | +2+TT/-2.5-TT |
| n74 |  |  |  |  | 23 | ±(2+TT) |
| n77 |  |  |  |  | 23 | +2+TT/-3-TT |
| n78 |  |  |  |  | 23 | +2+TT/-3-TT |
| n79 |  |  |  |  | 23 | +2+TT/-3-TT |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 2: Power class 3 is default power class unless otherwise stated  NOTE 3: Refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 4: TT for each frequency and channel bandwidth is specified in Table 6.2I.1.5-2. | | | | | | |

Table 6.2I.1.5-2: Test Tolerance (UE maximum output power)

|  |  |  |  |
| --- | --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 4.2GHz | 4.2GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 0.7 dB | 1.0 dB | 1.0 dB |

For the UE which supports [SUL] configuration, ΔTIB,c as specified in clause [6.2C.2 for SUL] applies. Unless otherwise stated, ΔTIB,c is set to zero. In case the UE supports more than one of band combinations, and an operating band belongs to more than one band combinations then

a) When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔTIB,c shall be the average value for all band combinations defined in [clause 6.2C.2] in this specification, truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔTIB,c among the different supported band combinations involving such band shall be applied

b) When the operating band frequency range is > 1 GHz, the applicable additional ΔTIB,c shall be the maximum value for all band combinations defined in [clause 6.2C.2] in this specification for the applicable operating bands.

### 6.2I.2 Void

### 6.2I.3 Void

### 6.2I.4 Void

## 6.2J Transmitter power for ATG

### 6.2J.1 UE maximum output power for ATG

Editor’s Note: This test is incomplete. The following aspects are not yet determined:

- Addition to applicability spec is incomplete.

- [*RatedMOPATG*] is pending.

- Annex F MU/TT is FFS.

- Test requirement is incomplete.

- Message contents are TBC pending on Rel-18 ASN.1 freeze.

6.2J.1.1 Test purpose

To verify that the error of the NR ATG UE maximum output power for the ATG UE does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2J.1.2 Test applicability

This test case applies to all types of NR ATG UE release 18 and forward.

6.2J.1.3 Minimum conformance requirements

For the ATG UE, the rated maximum output power is declared via UE capability [*RatedMOPATG*] at maximum modulation order reported by ATG UE and full PRB configurations within the channel bandwidth of NR carrier unless otherwise stated. The period of measurement shall be at least one sub frame (1ms). UE capability [*RatedMOPATG*] is an integer value in the range 23 to 40 dBm.

The measured maximum output powershall remain within +2 dB and -2 dB of the *rated maximum output power* declared by the ATG UE.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2J.1.

6.2J.1.4 Test description

6.2J.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1 that are restricted to the ATG UE. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2J.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2J.1.4.1-1: Test Configuration Table

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Low range, Mid range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest, Highest | |
| Test Parameters | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A for maximum output | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 | power test case | DFT-s-OFDM PI/2 BPSK | Inner Full |
| 2 |  | DFT-s-OFDM PI/2 BPSK | Inner 1RB Left |
| 3 |  | DFT-s-OFDM PI/2 BPSK | Inner 1RB Right |
| 4 |  | DFT-s-OFDM QPSK | Inner Full |
| 5 |  | DFT-s-OFDM QPSK | Inner 1RB Left |
| 6 |  | DFT-s-OFDM QPSK | Inner 1RB Right |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1. | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2J.1.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2J.1.4.3.

6.2J.1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. Measure the sum of the mean transmitted power of the UE at each transmit antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of 1ms over all active uplink slots and in the uplink symbols. For TDD symbols with transient periods are not under test.

6.2J.1.4.3 Message contents

FFS

6.2J.1.5 Test requirement

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2J.1.5-1.

Table 6.2J.1.5-1: Rated Maximum Output Power test requirement

|  |  |  |
| --- | --- | --- |
| NR  band | Rated Maximum Output Power (dBm) | Tolerance (dB) |
| n1 | 23 to 40 | ±(2+TT) |
| n3 | 23 to 40 | ±(21+TT) |
| n34 | 23 to 40 | ±(2+TT) |
| n39 | 23 to 40 | ±(2+TT) |
| n41 | 23 to 40 | ±(21+TT) |
| n78 | 23 to 40 | ±(2+TT) |
| n79 | 23 to 40 | ±(2+TT) |
| NOTE 1: Refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB.  NOTE 2: UE capability [*RatedMOPATG*] is an integer value in the range 23 to 40 dBm. | | |

Table 6.2J.1.5-2: Test Tolerance (UE maximum output power)

FFS

### 6.2J.2 Configured transmitted power

Editor’s Note: This test is incomplete. The following aspects are not yet determined:

- Addition to applicability spec is incomplete.

- [*RatedMOPATG*] is pending.

- Annex F MU/TT is FFS.

- Test requirement is incomplete.

- Message contents are TBC pending on Rel-18 ASN.1 freeze.

6.2J.2.1 Test purpose

To verify the measured NR ATG UE configured maximum output power PUMAX,f,c for the ATG UE is within the specified bounds.

6.2J.2.2 Test applicability

This test case applies to all types of NR ATG UE release 18 and forward.

6.2J.2.3 Minimum conformance requirements

The UE is allowed to set its configured maximum output power PCMAX,f,c for carrier f of serving cell c in each slot. The configured maximum output power PCMAX,f,c is set within the following bounds:

PCMAX\_L,f,c ≤ PCMAX,f,c ≤ PCMAX\_H,f,c with

PCMAX\_L,f,c = MIN {PEMAX,c, *PMaxOutputPower*}

PCMAX\_H,f,c = PEMAX,c

where

PEMAX,c is the value given by [either the *p-Max* IE or the field *additionalPmax* of the *NR-NS-PmaxList IE]*, whichever is applicable according to TS 38.331[7];

*PMaxOutputPower* is the maximum ATG UE output power at maximum modulation order and full PRB configurations which is indicated by ATG UE capability [*RatedMOPATG*];

The normative reference for this requirement is TS 38.101-1 [2] clause 6.2J.2.

6.2J.2.4 Test description

6.2J.2.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1 that are restricted to the ATG UE. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.2J.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.2J.2.4.1-1: Test Configuration Table for ATG UE

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Mid range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest | |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A | Modulation (NOTE 2) | RB allocation (NOTE 1) |
| 1 |  | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| 2 |  | DFT-s-OFDM QPSK | Inner Full |
| 33 |  | DFT-s-OFDM Pi/2 BPSK | Inner Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.  NOTE 3: UE operating in TDD mode with PI/2 PBSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and the IE *powerBoostPi2BPSK* is set to 1 for bands n41, n78 and n79. | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.2J.2.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in State RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.2J.2.4.3.

6.2J.2.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.2J.2.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step to ensure that the UE reaches the PUMAX level of the test point.

3. Measure the sum of the mean transmitted power of the UE at each transmit antenna connector in table 6.2J.2.5-1 according to the test configuration from table 6.2J.2.4.1-1. The period of measurement shall be at least the continuous duration of 1ms over all active uplink slots and in the uplink symbols. For TDD slots with transient periods are not under test.

6.2J.2.4.3 Message contents

FFS

6.2J.2.5 Test requirement

The maximum output power measured shall not exceed the values specified in Table 6.2J.2.5-1.

Table 6.2J.2.5-1: PCMAX configured UE output power for ATG UE

|  |  |  |
| --- | --- | --- |
|  | Maximum output power | |
|  | Test ID 1,2 | Test ID 3 |
| Measured UE output power test point 1 | -10 dBm ± (2+TT) | -10 dBm ± (2+TT) |
| Measured UE output power test point 2 | 10 dBm ± (2+TT) | 10 dBm ± (2+TT) |
| Measured UE output power test point 3 | 15 dBm ± (2+TT) | 15 dBm ± (2+TT) |
| Measured UE output power test point 4 | 20 dBm ± (2+TT) | 20 dBm ± (2+TT) |
| Measured UE output power test point 5 | 25 dBm ± (2+TT) | 25 dBm ± (2+TT) |
| Measured UE output power test point 6 | 30 dBm ± (2+TT) | 30 dBm ± (2+TT) |
| Measured UE output power test point 7 | Note 3 | Note 4 |
| Note 1: TT for each frequency and channel bandwidth is specified in Table 6.2J.2.5-2.  Note 2: UE capability [*RatedMOPATG*] is an integer value in the range 23 to 40 dBm.  Note 3: The maximum output power shall be within the range in Table 6.2J.2.5-1a.  Note 4: The maximum output power shall be within the range in Table 6.2J.2.5-1b. | | |

Table 6.2J.2.5-1a: Measured UE output power test point 7 for Test ID 1,2 for ATG UE

|  |  |
| --- | --- |
| NR  band | Tolerance (dB) |
| n1 | 35 dBm ±(2+TT) |
| n3 | 35 dBm ±(2+TT) |
| n34 | 35 dBm ±(2+TT) |
| n39 | 35 dBm ±(2+TT) |
| n41 | 35 dBm ±(2+TT) |
| n78 | 35 dBm ±(2+TT) |
| n79 | 35 dBm ±(2+TT) |
| NOTE 1: Void  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2J.2.5-2. | |

Table 6.2J.2.5-1b: Measured UE output power test point 7 for Test ID 3 for ATG UE

|  |  |
| --- | --- |
| NR  band | Tolerance (dB) |
| n41 | 38 dBm ±(2+TT) |
| n78 | 38 dBm ±(2+TT) |
| n79 | 38 dBm ±(2+TT) |
| NOTE 1: Void  NOTE 2: TT for each frequency and channel bandwidth is specified in Table 6.2J.2.5-2. | |

Table 6.2J.2.5-2: Test Tolerance (Configured transmitted power) for ATG UE

FFS

## 6.3 Output power dynamics

### 6.3.1 Minimum output power

6.3.1.1 Test purpose

To verify the UE's ability to transmit with a broadband output power below the value specified in the test requirement when the power is set to a minimum value.

6.3.1.2 Test applicability

This test case applies to all types of NR Power Class 1 release 15 and forward.

This test case applies to all types of NR Power Class 2 and Power Class 3 UE release 15 and forward that don’t support Tx diversity.

6.3.1.3 Minimum conformance requirements

The minimum controlled output power of the UE is defined as the power in the channel bandwidth for all transmit bandwidth configurations (resource blocks), when the power is set to a minimum value.

The minimum output power is defined as the mean power in at least one sub-frame 1 ms. The minimum output power shall not exceed the values specified in Table 6.3.1.3-1.

Table 6.3.1.3-1: Minimum output power

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth | (MHz) | 5,10,15,20 | 25,30,35,40,45,50 | 60,70,80,90,100 |
| REF\_SCS | (kHz) | 15 | | 30 |
| Minimum output power | (dBm) | -40 | -40+10log10 (BWChannel /20) | -40+10log10 (BWChannel /20) |
| Measurement bandwidth | (MHz) | MBW=REF\_SCS\*(12\*NRB+1)/1000 | | |
| NOTE: The minimum output power value is rounded to the nearest number down to one decimal point. | | | | |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.3.1.

6.3.1.4 Test description

6.3.1.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.3.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.1.4.1-1: Test Configuration Table

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Low range, Mid range, High range (NOTE 2) | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Highest | |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A for minimum output power | Modulation | RB allocation (NOTE 1) |
| 1 | test case | DFT-s-OFDM QPSK | Outer Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: For NR band n28, 30MHz test channel bandwidth is tested with Low range and High range test frequencies. | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.3.1.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in State RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.3.1.4.3.

6.3.1.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.3.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Send continuously uplink power control "down" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step to ensure that the UE transmits at its minimum output power.

3. Measure the mean power of the UE in the associated measurement channel bandwidth specified in Table 6.3.1.5-1 for the specific channel bandwidth under test. The period of measurement shall be at least the continuous duration of one active sub-frame (1ms) and in the uplink symbols. For TDD symbols with transient periods are not under test.

6.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 with following exception.

Table 6.3.1.4.3-1: *PUSCH-Config*

|  |
| --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED |

6.3.1.5 Test requirement

The minimum output power, derived in step 3 shall not exceed the values specified in Table 6.3.1.5-1.

Table 6.3.1.5-1: Minimum output power

|  |  |  |
| --- | --- | --- |
| Channel bandwidth  (MHz) | Minimum output power  (dBm) | Measurement bandwidth  (MHz) |
| 5 | -40+TT | 4.515 |
| 10 | -40+TT | 9.375 |
| 15 | -40+TT | 14.235 |
| 20 | -40+TT | 19.095 |
| 25 | -39+TT | 23.955 |
| 30 | -38.2+TT | 28.815 |
| 35 | -37.6+TT | 33.855 |
| 40 | -37+TT | 38.895 |
| 45 | -36.5+TT | 43.575 |
| 50 | -36+TT | 48.615 |
| 60 | -35.2+TT | 58.35 |
| 70 | -34.6+TT | 68.07 |
| 80 | -34+TT | 78.15 |
| 90 | -33.5+TT | 88.23 |
| 100 | -33+TT | 98.31 |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.3.1.5-2 | | |

Table 6.3.1.5-2: Test Tolerance (Minimum output power)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 1.0 dB | 1.3 dB |
| 40MHz < BW ≤ 100MHz | 1.3 dB | 1.3 dB |

### 6.3.2 Transmit OFF power

6.3.2.1 Test purpose

To verify that the UE transmit OFF power is lower than the value specified in the test requirement.

An excess Transmit OFF power potentially increases the Rise Over Thermal (RoT) and therefore reduces the cell coverage area for other UEs.

6.3.2.2 Test applicability

The requirements of this test apply in test cases 6.3.3 Transmit ON/OFF time mask to all types of NR Power Class 1 UE release 15 and forward.

The requirements of this test apply in test cases 6.3.3 Transmit ON/OFF time mask to all types of NR Power Class 2 and Power Class 3 UE release 15 and forward that don't support Tx diversity.

6.3.2.3 Minimum conformance requirements

Transmit OFF power is defined as the mean power in the channel bandwidth when the transmitter is OFF. The transmitter is considered OFF when the UE is not allowed to transmit on any of its ports.

The Transmit OFF power is defined as the mean power in a duration of at least one sub-frame (1ms) excluding any transient periods. The Transmit OFF power shall not exceed the values specified in Table 6.3.2.3-1.

Table 6.3.2.3-1: Transmit OFF power

|  |  |  |  |
| --- | --- | --- | --- |
| **Channel bandwidth** | (MHz) | 5,10,15,20,25,30,35,40,45,50 | 60,70,80,90,100 |
| **REF\_SCS** | (kHz) | 15 | 30 |
| **Transmit OFF power** | (dBm) | -50 | |
| **Measurement bandwidth** | (MHz) | MBW=REF\_SCS\*(12\*NRB+1)/1000 | |
| NOTE: "NRB" in the formula is the maximum transmission bandwidth configuration as defined in Table 5.3.2-1. | | | |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.3.2.

6.3.2.4 Test description

This test is covered by clause 6.3.3 Transmit ON/OFF time mask.

6.3.2.5 Test requirement

The requirement for the Transmit OFF power shall not exceed the values specified in Table 6.3.2.5-1.

Table 6.3.2.5-1: Transmit OFF power

|  |  |  |
| --- | --- | --- |
| Channel bandwidth  (MHz) | Transmit OFF power  (dBm) | Measurement bandwidth  (MHz) |
| 5 | -50+TT | 4.515 |
| 10 | -50+TT | 9.375 |
| 15 | -50+TT | 14.235 |
| 20 | -50+TT | 19.095 |
| 25 | -50+TT | 23.955 |
| 30 | -50+TT | 28.815 |
| 35 | -50+TT | 33.855 |
| 40 | -50+TT | 38.895 |
| 45 | -50+TT | 43.575 |
| 50 | -50+TT | 48.615 |
| 60 | -50+TT | 58.35 |
| 70 | -50+TT | 68.07 |
| 80 | -50+TT | 78.15 |
| 90 | -50+TT | 88.23 |
| 100 | -50+TT | 98.31 |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.3.2.5-2 | | |

Table 6.3.2.5-2: Test Tolerance (Transmit OFF power)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 1.5 dB | 1.8 dB |
| 40MHz < BW ≤ 100MHz | 1.7 dB | 1.8 dB |

### 6.3.3 Transmit ON/OFF time mask

#### 6.3.3.1 General

The transmit power time mask defines the transient period(s) allowed

- between transmit OFF power as defined in sub-clause 6.3.2 and transmit ON power symbols (transmit ON/OFF)

- between continuous ON-power transmissions with power change or RB hopping is applied.

When a UE signals the transient period capability, the transient period value (*tp)* can be 2, 4, or 7 μs. If no capability is signalled, the default transient period value of 10 μs applies.

In case of RB hopping, and in following figures where *tpstart* is specified, the transient period is shared symmetrically when the transient period is 10 μs. If the UE signals a transient period (*tp*) of 2, 4 or 7 μs, the transient period start position is given by *tpstart* in Table 6.3.3.1-1.

Table 6.3.3.1-1: tpstart  values

| tp (μs) | tpstart (μs) |
| --- | --- |
| 2 | -0.5 |
| 4 | -1 |
| 7 | -2.7 |
| NOTE 1: Negative values mean that the transient period starts before the symbol boundary | |

Unless otherwise stated the minimum requirements in clause 6.5 apply also in transient periods.

In the following sub-clauses, following definitions apply:

- A slot or long subslot transmission is a transmission with more than 2 symbols.

- A short subslot transmission is a transmission with 1 or 2 symbols.

#### 6.3.3.2 General ON/OFF time mask

6.3.3.2.1 Test purpose

To verify that the general ON/OFF time mask meets the requirements given in 6.3.3.2.5.

The transmit power time mask for transmit ON/OFF defines the transient period(s) allowed between transmit OFF power as defined in sub-clause 6.3.2 and transmit ON power symbols (transmit ON/OFF)

Transmission of the wrong power increases interference to other channels, or increases transmission errors in the uplink channel.

6.3.3.2.2 Test applicability

This test case applies to all types of NR Power Class 1 release 15 and forward.

This test case applies to all types of NR Power Class 2 and Power Class 3 UE release 15 and forward that don’t support Tx diversity.

6.3.3.2.3 Minimum conformance requirements

The general ON/OFF time mask defines the observation period between transmit OFF and ON power and between transmit ON and OFF power for each SCS. ON/OFF scenarios include: the beginning or end of DTX, measurement gap, contiguous, and non-contiguous transmission, etc.

The OFF power measurement period is defined in a duration of at least one slot excluding any transient periods. The ON power is defined as the mean power over one slot excluding any transient period.



Figure 6.3.3.2.3-1: General ON/OFF time mask for NR UL transmission in FR1

The normative reference for this requirement is TS 38.101-1 [2] clause 6.3.3.2.

6.3.3.2.4 Test description

6.3.3.2.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of channel bandwidth and sub-carrier spacing, and are shown in table 6.3.3.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.3.2.4.1-1: Test Configuration Table

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Low range, Mid range, High range (NOTE 2) | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A for minimum output power | Modulation | RB allocation (NOTE 1) |
| 1 | test case | DFT-s-OFDM QPSK | Inner Full |
| NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.  NOTE 2: For NR band n28, 30MHz test channel bandwidth is tested with Low range and High range test frequencies. | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.3.3.2.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in State RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.3.3.2.4.3.

6.3.3.2.4.2 Test procedure

1. SS sends uplink scheduling information via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.3.3.2.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The UL assignment is such that the UE transmits on slots 8 for15kHz SCS, on slots 8 and 18 for 30kHz SCS and on slots 17 and 37 for 60kHz SCS.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. ON power sub test:

3.1. Measure the output power of the UE PUSCH transmission during one slot.

4. OFF power sub test:

4.1. Measure the UE transmission OFF power during the slot prior to the PUSCH transmission, excluding a transient period of 10 µs in the end of the slot.

4.2. Measure the UE transmission OFF power during the slot following the PUSCH transmission, excluding a transient period of 10 µs at the beginning of the slot.

6.3.3.2.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 with following exceptions.

Table 6.3.3.2.4.3-1: Void

Table 6.3.3.2.4.3-2: *Void*

Table 6.3.3.2.4.3-3: TDD-UL-DL-Config

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1[5], Table 4.6.3-192 | | | |
| Information Element | Value/remark | Comment | Condition |
| TDD-UL-DL-ConfigCommon ::= SEQUENCE { |  |  |  |
| referenceSubcarrierSpacing | SubcarrierSpacing |  |  |
| pattern1 SEQUENCE { |  |  |  |
| dl-UL-TransmissionPeriodicity | ms5 |  | FR1 |
|  | ms10 |  | FR1\_15kHz |
| nrofDownlinkSlots | 6 |  | FR1\_15kHz |
|  | 6 |  | FR1\_30kHz |
|  | 14 |  | FR1\_60kHz |
| nrofDownlinkSymbols | 10 |  | FR1\_15kHz |
|  | 6 |  | FR1\_30kHz |
|  | 12 |  | FR1\_60kHz |
| nrofUplinkSlots | 3 |  | FR1\_15kHz,FR1\_30kHz |
|  | 4 |  | FR1\_60kHz |
| nrofUplinkSymbols | 4 |  | FR1\_30kHz |
|  | 2 |  | FR1\_15kHz, |
|  | 8 |  | FR1\_60kHz |
|  |  |  |  |
| } |  |  |  |
| pattern2 | Not present |  |  |
| } |  |  |  |

Table 6.3.3.2.4.3-4: PUSCH-TimeDomainResourceAllocationList

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1[5], Table 4.6.3-122 | | | |
| Information Element | Value/remark | Comment | Condition |
| PUSCH-TimeDomainResourceAllocationList ::= SEQUENCE (SIZE(1..maxNrofUL-Allocations)) OF { | 2 entries |  |  |
| PUSCH-TimeDomainResourceAllocation[1] SEQUENCE { |  |  |  |
| k2 | 4 |  | FR1\_15kHz,FR1\_30kHz |
| 6 |  | FR1\_60kHz |
| mappingType | typeA |  |  |
| startSymbolAndLength | 27 | Start symbol(S)=0, Length(L)=14 |  |
| } |  |  |  |
| PUSCH-TimeDomainResourceAllocation[2] SEQUENCE { |  | addressed by Msg3 PUSCH time resource allocation field of the Random Access Response acc. to TS 38.213 [22] Table 8.2-1. |  |
| k2 | 2 | K2+ Δ=4 acc. to TS 38.214 [21] Table 6.1.2.1.1-5  (NOTE 1) | FR1\_15kHz |
| 6 | K2+ Δ=9 acc. to TS 38.214 [21] Table 6.1.2.1.1-5  (NOTE 1) | FR1\_30kHz |
| mappingType | typeA |  |  |
| startSymbolAndLength | 27 | Start symbol(S)=0, Length(L)=14 |  |
| } |  |  |  |
| } |  |  |  |
| NOTE 1: Values are chosen so that first slot of a TDD-UL-DL slot configuration period can be used for the Random Access Response and the last slot (of the same or another period) for the corresponding Msg3. | | | |

|  |  |
| --- | --- |
| Condition | Explanation |
| FR1\_15kHz | FR1 is used under the test. SCS is set to 15kHz. |
| FR1\_30kHz | FR1 is used under the test. SCS is set to 30kHz. |
| FR1\_60kHz | FR1 is used under the test. SCS is set to 60kHz. |

Table 6.3.3.2.4.3-5: Void

Table 6.3.3.2.4.3-6: *PUSCH-Config*

|  |
| --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED |

Table 6.3.3.2.4.3-7: *P-Max*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-89 | | | |
| Information Element | Value/remark | Comment | Condition |
| P-Max | 23 |  |  |

6.3.3.2.5 Test requirement

The requirement for the power measured in steps 2, 3 and 4 of the test procedure shall not exceed the values specified in Table 6.3.3.2.5-1.

Table 6.3.3.2.5-1: General ON/OFF time mask

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Channel bandwidth / minimum output power / measurement bandwidth | | | | | | | | | | | | | | |
| 5  MHz | 10  MHz | 15  MHz | 20  MHz | 25  MHz | 30  MHz | 35  MHz | 40  MHz | 45  MHz | 50  MHz | 60  MHz | 70  MHz | 80  MHz | 90  MHz | 100  MHz |
| Transmit OFF power | ≤ -50+TT dBm | | | | | | | | | | | | | | |
| Transmission OFF Measurement bandwidth | 4.515 | 9.375 | 14.235 | 19.095 | 23.955 | 28.815 | 33.855 | 38.895 | 43.575 | 48.615 | 58.35 | 68.07 | 78.15 | 88.23 | 98.31 |
| Transmit ON power | Same as Table 6.2.1.5-1 | | | | | | | | | | | | | | |
| NOTE 1: TT for each frequency and channel bandwidth of OFF power is specified in Table 6.3.3.2.5-2  NOTE 2: TT for each frequency and channel bandwidth of ON power is specified in Table 6.2.1.5-3 | | | | | | | | | | | | | | | |

Table 6.3.3.2.5-2: Test Tolerance for OFF power

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6GHz |
| BW ≤ 40MHz | 1.5 dB | 1.8 dB |
| 40MHz < BW ≤ 100MHz | 1.7 dB | 1.8 dB |

Table 6.3.3.2.5-3: Void

#### 6.3.3.3 Transmit power time mask for slot and short or subslot boundaries

No test case details are specified. Current test procedures for time masks are based on power measurement in relatively long period compared with transient period. For time masks between 2 active time slots with different power level, the test procedure can’t provide enough resolution to identify non-conformant UEs. Therefore, the minimum requirement is not testable.

#### 6.3.3.4 PRACH time mask

6.3.3.4.1 Test purpose

To verify that the PRACH time mask meets the requirements given in 6.3.3.4.5.

The time mask for PRACH time mask defines the transient period(s)allowed between transmit OFF power and transmit ON power when transmitting the PRACH.

Transmission of the wrong power increases interference to other channels, or increases transmission errors in the uplink channel.

6.3.3.4.2 Test applicability

This test case applies to all types of NR Power Class 1 release 15 and forward.

This test case applies to all types of NR Power Class 2 and Power Class 3 UE release 15 and forward that don’t support Tx diversity.

6.3.3.4.3 Minimum conformance requirements

The PRACH ON power is specified as the mean power over the PRACH measurement period excluding any transient periods as shown in Figure 6.3.3.4.3-1. The measurement period for different PRACH preamble format is specified in Table 6.3.3.4.3-1.

Table 6.3.3.4.3-1: PRACH ON power measurement period

|  |  |  |
| --- | --- | --- |
| PRACH preamble format | SCS (kHz) | Measurement period (ms) |
| 0 | 1.25 | 0.903125 |
| 1 | 1.25 | 2.284375 |
| 2 | 1.25 | 3.352604 |
| 3 | 5 | 0.903125 |
| A1 | 15 | 0.142708 |
| 30 | 0.071354 |
| A2 | 15 | 0.285417 |
| 30 | 0.142708 |
| A3 | 15 | 0.428125 |
| 30 | 0.2140625 |
| B1 | 15 | 0.140365 |
| 30 | 0.070182 |
| B4 | 15 | 0.83046875 |
| 30 | 0.415234375 |
| A1/B1 | 15 | 0.142708 ms for first six occasion 0.140365 ms for the last occasion |
| 30 | 0.071354 ms for first six occasion 0.070182 ms for the last occasion |
| A2/B2 | 15 | 0.285417 ms for first two occasion 0.278385 ms for the third occasion |
| 30 | 0.142708 ms for first two occasion 0.1391925 ms for the third occasion |
| A3/B3 | 15 | 0.428125 ms for the first occasion 0.41640625 ms for the second occasion |
| 30 | 0.2140625 ms for the first occasion 0.208203125 ms for the second occasion |
| C0 | 15 | 0.10703125 |
| 30 | 0.053515625 |
| C2 | 15 | 0.333333 |
| 30 | 0.166667 |
| NOTE: For PRACH on PRACH occasion start from the beginning of 0.5ms or span the boundary of 0.5ms of the subframe, the measurement period will plus 0.032552μs | | |



Figure 6.3.3.4.3-1: PRACH ON/OFF time mask

The normative reference for this requirement is TS 38.101-1 [2] clause 6.3.3.4.

6.3.3.4.4 Test description

6.3.3.4.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.2-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.3.3.4.4.1-1. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.3.4.4.1-1: Test Configuration Table

|  |  |  |
| --- | --- | --- |
| Initial Conditions | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | Mid range (NOTE 1) | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | SCS defined in TS 38.211 [8] subclause 6.3.3.2 determined by PRACH Configuration Index for long sequence  Lowest, Highest for short sequence | |
| PRACH preamble format | | |
|  | Paired Spectrum | Unpaired Spectrum |
| PRACH Configuration Index for test point 1 | 4 (long sequence) | 7 (long sequence) |
| PRACH Configuration Index for test point 2 | 160 (short sequence) | 123 (short sequence) |
| NOTE 1: For NR band n28, 30MHz test channel bandwidth is tested with Low range test frequencies. | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. Propagation conditions are set according to Annex B.0.

5. Ensure the UE is in State RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.3.3.4.4.3.

6.3.3.4.4.2 Test procedure

1. The SS shall signal a Random Access Preamble ID via a PDCCH order to the UE and initiate a Non-contention based Random Access procedure.

2. The UE shall send the signalled preamble to the SS.

3. The SS measure the UE transmission OFF power during the slot preceding the PRACH preamble excluding a transient period of 10 µs according to Figure 6.3.3.4.3-1.

4. Measure the output power of the transmitted PRACH preamble according to Figure 6.3.3.4.3-1.

5. Measure the UE transmission OFF power, starting 10 µs after the PRACH preamble ends for a measurement period.

6.3.3.4.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6.3 with the following exceptions:

Table 6.3.3.4.4.3-1: *RACH-ConfigCommon:* PRACH measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1[5], Table 4.6.3-128 | | | |
| Information Element | Value/remark | Comment | Condition |
| RACH-ConfigCommon::= SEQUENCE { |  |  |  |
| prach-RootSequenceIndex CHOICE { |  |  |  |
| l139 | Set according to table 4.4.2-2 for the NR Cell. |  | PRACH Format A3 |
| l839 | 0 | NR Cell 1 | PRACH Format 0 |
|  | TBD | Other than NR Cell 1 | PRACH Format 0 |
| } |  |  |  |
| } |  |  |  |

Table 6.3.3.4.4.3-2: *RACH-ConfigGeneric:* PRACH measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1[5], Table 4.6.3-130 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| RACH-ConfigGeneric ::= SEQUENCE { |  |  |  |
| prach-ConfigurationIndex | 4 | Paired Spectrum | PRACH Format 0 |
|  | 160 | Paired Spectrum | PRACH Format A3 |
|  | 7 | Unpaired Spectrum | PRACH Format 0 |
|  | 123 | Unpaired Spectrum | PRACH Format A3 |
| msg1-FDM | four |  | FR1 |
| one |  | FR1 5MHz PRACH Format A3 for SCS 15 kHz OR  FR1 10MHz PRACH Format A3 for SCS 30 kHz OR  FR1 10MHz PRACH Format A3 for SCS 60 kHz |
| preambleReceivedTargetPower | -118 |  | PRACH Format 0 |
|  | -122 |  | PRACH Format A3 for SCS 15 kHz |
|  | -124 |  | PRACH Format A3 for SCS 30 kHz |
|  | -128 |  | PRACH Format A3 for SCS 60kHz |
| powerRampingStep | dB0 |  |  |
| ra-ResponseWindow | sl20 |  |  |
| } |  |  |  |

Table 6.3.3.4.4.3-3: *ServingCellConfigCommonSIB: PRACH measurement*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1[5], Table 4.6.3-169 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| ServingCellConfigCommonSIB ::= SEQUENCE { |  |  |  |
| ss-PBCH-BlockPower | 32 |  | SCS\_15kHz |
| 35 |  | SCS\_30kHz |
| } |  |  |  |

Table 6.3.3.4.4.3-4: *PUSCH-TimeDomainResourceAllocationList: PRACH measurement*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1[5], Table 4.6.3-122 | | | |
| Information Element | Value/remark | Comment | Condition |
| PUSCH-TimeDomainResourceAllocationList ::= SEQUENCE (SIZE(1..maxNrofUL-Allocations)) OF PUSCH-TimeDomainResourceAllocation { | 2 entries |  |  |
| PUSCH-TimeDomainResourceAllocation[2] SEQUENCE { |  | entry 2  addressed by Msg3 PUSCH time resource allocation field of the Random Access Response acc. to TS 38.213 [22] Table 8.2-1. |  |
| k2 | 6 | K2+ Δ=8 acc. to TS 38.214 [21] Table 6.1.2.1.1-5 | Unpaired Spectrum  for SCS15kHz and PRACH Format 0 |
| } |  |  |  |
| } |  |  |  |

6.3.3.4.5 Test requirement

The requirement for the power measured in steps (3), (4) and (5) of the test procedure shall not exceed the values specified in Table 6.3.3.4.5-1.

Table 6.3.3.4.5-1: PRACH time mask

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Channel bandwidth / minimum output power / measurement bandwidth | | | | | | | | | | | | |
|  | 5  MHz | 10  MHz | 15  MHz | 20  MHz | 25  MHz | 30  MHz | 40  MHz | 50  MHz | 60  MHz | 70  MHz | 80  MHz | 90  MHz | 100  MHz |
| Transmit OFF power | ≤ -50+TT dBm | | | | | | | | | | | | |
| Transmission OFF Measurement bandwidth | 4.515 | 9.375 | 14.235 | 19.095 | 23.955 | 28.815 | 38.895 | 48.615 | 58.35 | 68.07 | 78.15 | 88.23 | 98.31 |
| Expected PRACH Transmission ON Measured Power for PRACH Format 0 and PRACH Format A3 for SCS 30kHz | -1 dBm | -1 dBm | -1 dBm | -1 dBm | -1 dBm | -1 dBm | -1 dBm | -1 dBm | -1 dBm | -1 dBm | -1 dBm | -1 dBm | -1 dBm |
| Expected PRACH Transmission ON Measured Power for PRACH Format A3 for SCS 15kHz and SCS 60kHz | -2 dBm | -2 dBm | -2 dBm | -2 dBm | -2 dBm | -2 dBm | -2 dBm | -2 dBm | -2 dBm | -2 dBm | -2 dBm | -2 dBm | -2 dBm |
| ON Power Tolerance | ± (9+TT)dB | | | | | | | | | | | | |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.3.3.4.5-2 | | | | | | | | | | | | | |

Table 6.3.3.4.5-2: Test Tolerance (Transmit OFF power and PRACH time mask)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 1.5 dB | 1.8 dB |
| 40MHz < BW ≤ 100MHz | 1.7 dB | 1.8 dB |

#### 6.3.3.5 Void

#### 6.3.3.6 SRS time mask

6.3.3.6.1 Test purpose

To verify that the SRS time mask meets the requirements given in 6.3.3.6.5.

The time mask for SRS time mask defines the transient period(s) allowed between transmit OFF power and transmit ON power when transmitting the SRS.

Transmission of the wrong power increases interference to other channels, or increases transmission errors in the uplink channel.

6.3.3.6.2 Test applicability

This test case applies to all types of NR Power Class 1 release 15 and forward.

This test case applies to all types of NR Power Class 2 and Power Class 3 UE release 15 and forward that don’t support Tx diversity.

6.3.3.6.3 Minimum conformance requirements

For SRS transmission mapped to one OFDM symbol, the ON power is defined as the mean power over the symbol duration excluding any transient period; See Figure 6.3.3.6.3-1



Figure 6.3.3.6.3-1: Single SRS time mask for NR UL transmission

For SRS transmission mapped to two or more OFDM symbols the ON power is defined as the mean power for each symbol duration excluding any transient period. For consecutive SRS transmissions without power change, Figure 6.3.3.6.3-2 applies.



Figure 6.3.3.6.3-2: Consecutive SRS time mask for the case when no power change is required with SRS usage other than antenna switching

When power change between consecutive SRS transmissions is required, then Figure 6.3.3.6.3-3 and Figure 6.3.3.6.3-4 apply.



Figure 6.3.3.6.3-3: Consecutive SRS time mask for the case when power change is required and when 15kHz and 30kHz SCS is used in FR1 with SRS usage other than antenna switching

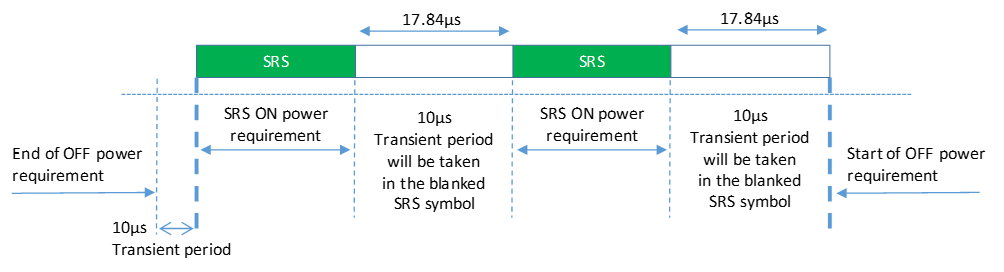


Figure 6.3.3.6.3-4: Consecutive SRS time mask for the case when power change is required and when 60kHz SCS is used in FR1

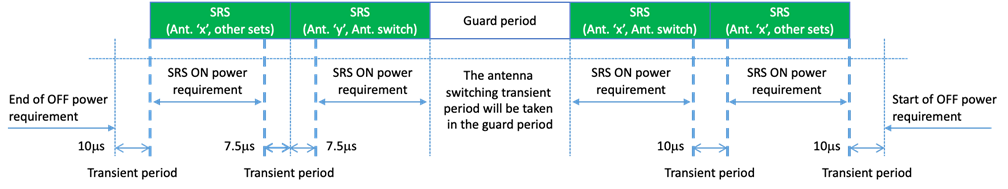


Figure 6.3.3.6.3-5: FR1 Time mask for 15 kHz and 30 kHz SCS for the case when consecutive SRS switching usage is between antenna switching & other sets

where “other sets” belongs to a “usage set” other than the set for antenna switching. The usage sets for SRS switching are defined in section 6.2.1 of TS 38.214 [12].

NOTE: Guard period of one symbol is defined between two SRS resources of an SRS resource set for antenna switching for 15kHz, 30kHz and 60kHz SCS in Table 6.2.1.2-1 of TS 38.214 [10].

The above transient period applies to all the transmit CCs in CA with the CC sounding SRS. UE RF requirements do not apply during this transient period.

The normative reference for this requirement is TS 38.101-1 [2] clause 6.3.3.6.

6.3.3.6.4 Test description

6.3.3.6.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of channel bandwidth and sub-carrier spacing, and are shown in table 6.3.3.6.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2, with the exception for SCS 15 KHz as specified in table 6.3.3.6.4.1-2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.3.6.4.1-1: Test Configuration Table

|  |  |  |
| --- | --- | --- |
| Initial Conditions | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | Mid range (NOTE 1) | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | Lowest, Highest | |
| SRS configuration | Paired Spectrum | Unpaired Spectrum |
| c-SRS (SRS bandwidth configuration) | 7 (24 RB for BW 5 MHz)  14 (52 RB for BW 10 MHz)  20 (76 RB for BW 15 MHz)  25 (104 RB for BW 20 MHz)  33 (132 RB for BW 25 MHz)  42 (160 RB for BW 30 MHz)  45 (184 RB for BW 35 MHz)  51 (216 RB for BW 40MHz)  58 (242 RB for BW 45MHz)  60 (264 RB for BW 50MHz)  for SCS 15 KHz | 7 (for BW 5 MHz)  13 (for BW 10 MHz)  19 (for BW 15 MHz)  25 (for BW 20 MHz)  30 (for BW 25 MHz)  40 (for BW 30 MHz)  51 (for BW 40MHz)  60 (for BW 50MHz)  for SCS 15 KHz |
| 1 (8 RB for BW 5 MHz)  7 (24 RB for BW 10 MHz)  10 (36 RB for BW 15 MHz)  13 (48 RB for BW 20 MHz)  17 (64 RB for BW 25 MHz)  20 (76 RB for BW 30 MHz)  22 (88 RB for BW 35 MHz)  25 (104 RB for BW 40MHz)  30 (117 RB for BW 45MHz)  33 (132 RB for BW 50MHz)  42 (160 RB for BW 60MHz)  45 (184 RB for BW 70MHz)  51 (216 RB for BW 80MHz)  56 (240 RB for BW 90MHz)  63 (272 RB for BW 100MHz)  for SCS 30 KHz | 1 (for BW 5 MHz)  6 (for BW 10 MHz)  10 (for BW 15 MHz)  12 (for BW 20 MHz)  17 (for BW 25 MHz)  20 (for BW 30 MHz)  25 (for BW 40MHz)  30 (for BW 50MHz)  40 (for BW 60MHz)  45 (for BW 70MHz)  51 (for BW 80MHz)  53 (for BW 90MHz)  61 (for BW 100MHz)  for SCS 30 KHz |
| 1 (8 RB for BW 10 MHz)  4 (16 RB for BW 15 MHz)  7 (24 RB for BW 20 MHz)  8 (28 RB for BW 25 MHz)  10 (36 RBfor BW 30 MHz)  11 (40 RBfor BW 35 MHz)  13 (48 RB for BW 40MHz)  15 (56 RB for BW 45MHz)  17 (64 RB for BW 50MHz)  20 (76 RB for BW 60MHz)  22 (88 RB for BW 70MHz)  25 (104 RB for BW 80MHz)  29 (120 RB for BW 90MHz)  33 (132 RB for BW 100MHz)  for SCS 60 KHz | 1 (for BW 10 MHz)  4 (for BW 15 MHz)  7 (for BW 20, 25 MHz)  9 (for BW 30 MHz)  13 (for BW 40MHz)  17 (for BW 50MHz)  19 (for BW 60MHz)  22 (for BW 70MHz)  25 (for BW 80MHz)  27 (for BW 90MHz)  30 (for BW 100MHz)  for SCS 60 KHz |
| b-SRS | 0 | 0 |
| b-hop | 3 | 0 |
| freqDomainPosition | 0 | 0 |
| SRS-PeriodicityAndOffset | sl10  for SCS 15 KHz | sl10  for SCS 15 KHz |
| sl20  for SCS 30 KHz | sl20  for SCS 30 KHz |
| sl40  for SCS 60 KHz | sl40  for SCS 60 KHz |
| transmissionComb | n2 | n2 |
| CombOffset | 0 | 0 |
| cyclicShift | 0 | 0 |
| startPosition | 0 | 0 |
| nrofSymbols | n1 | n1 |
| NOTE 1: For NR band n28, 30MHz test channel bandwidth is tested with Low range test frequencies. | | |

Table 6.3.3.6.4.1-2: Additional reference channels parameters for TDD for SCS= 15 kHz

|  |  |
| --- | --- |
| Parameter | SCS 15 KHz (µ=0) |
| TDD Slot Configuration Pattern | DDSUU |
| nrofDownlinkSlots | 2 |
| nrofUplinkSlots | 2 |
| The number of slots between PDSCH and corresponding HARQ-ACK information (i is the slot index per frame; i = {0, …,9} | K1= 3 if mod(i,5) = 0  K1= 2 if mod(i,5) = 1 |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. Propagation conditions are set according to Annex B.0.

5. Ensure the UE is in State RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.3.3.6.4.3.

6.3.3.6.4.2 Test procedure

1. SS sends uplink scheduling information via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.3.3.2.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The UL assignment is such that the UE transmits on slot 3 for15kHz SCS, on slot 8 for 30kHz SCS and on slot 16 for 60kHz SCS. PUSCH is transmitted in the first half of the frame.

2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms starting from the first TPC command in this step for the UE to reach PUMAX level.

3. ON power sub test:

3.1. Measure the output power of the transmitted SRS transmission during 1 OFDM symbol. The SRS transmission in the second half of the frame is used for measurement since there is no PUSCH transmission before and after.

4. OFF power sub test:

4.1. The SS measure the UE transmission OFF power during the 13 OFDM symbols, preceding the SRS symbol excluding a transient period of 10 μs.

4.2. Measure the UE transmission OFF power during the slot following the SRS under test, excluding a transient period of 10 µs

6.3.3.6.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6.3 with the following exceptions:

*Table 6.3.3.6.4.3-0: BWP-UplinkDedicated*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1[5], Table 4.6.3-15 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| BWP-UplinkDedicated ::= SEQUENCE { |  |  |  |
| srs-Config | *SRS-Config* in Table 6.3.3.6.4.3-1 |  |  |
| } |  |  |  |
| Note: This message exception is only valid for the initial BWP and not for an additional BWP inside BWP-Uplink. | | | |

*Table 6.3.3.6.4.3-1: SRS-Config: SRS time mask measurement*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1[5], Table 4.6.3-182 | | | |
| **Information Element** | **Value/remark** | **Comment** | **Condition** |
| SRS-Config ::= SEQUENCE { |  |  |  |
| srs-ResourceSetToAddModList SEQUENCE (SIZE(0..maxNrofSRS-ResourceSets)) OF SEQUENCE { | 1 entry |  |  |
| resourceType CHOICE { |  |  |  |
| periodic SEQUENCE { |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| srs-ResourceToAddModList SEQUENCE (SIZE(1..maxNrofSRS-Resources)) OF SEQUENCE { | 1 entry |  |  |
| resourceMapping SEQUENCE { |  |  |  |
| startPosition | 0 |  |  |
| nrofSymbols | n1 |  |  |
| repetitionFactor | n1 |  |  |
| } |  |  |  |
| freqHopping SEQUENCE { |  |  |  |
| c-SRS |  |  |  |
|  | 7 (for BW 5 MHz)  14 (for BW 10 MHz)  20 (for BW 15 MHz)  25 (for BW 20 MHz)  33 (for BW 25 MHz)  42 (for BW 30 MHz)  45 (for BW 35 MHz)  51 (for BW 40MHz)  58 (for BW 45MHz)  60 (for BW 50MHz) |  | Paired Spectrum for SCS 15 KHz |
|  | 1 (for BW 5 MHz)  7 (for BW 10 MHz)  10 (for BW 15 MHz)  13 (for BW 20 MHz)  17 (for BW 25 MHz)  20 (for BW 30 MHz)  22 (for BW 35 MHz)  25 (for BW 40MHz)  30 (for BW 45MHz)  33 (for BW 50MHz)  42 (for BW 60MHz)  45 (for BW 70MHz)  51 (for BW 80MHz)  56 (for BW 90MHz) |  | Paired Spectrum for SCS 30 KHz |
|  | 1 (for BW 10 MHz)  4 (for BW 15 MHz)  7 (for BW 20 MHz)  8 (for BW 25 MHz)  10 (for BW 30 MHz)  11 (for BW 35 MHz)  13 (for BW 40MHz)  15 (for BW 45MHz)  17 (for BW 50MHz)  20 (for BW 60MHz)  22 (for BW 70MHz)  25 (for BW 80MHz)  29 (for BW 90MHz)  33 (for BW 100MHz) |  | Paired Spectrum for SCS 60 KHz |
|  | 7 (for BW 5 MHz)  13 (for BW 10 MHz)  19 (for BW 15 MHz)  25 (for BW 20 MHz)  30 (for BW 25 MHz)  40 (for BW 30 MHz)  51 (for BW 40MHz)  60 (for BW 50MHz) |  | Unpaired Spectrum  for SCS 15 KHz |
|  | 1 (for BW 5 MHz)  6 (for BW 10 MHz)  10 (for BW 15 MHz)  12 (for BW 20 MHz)  17 (for BW 25 MHz)  20 (for BW 30 MHz)  25 (for BW 40MHz)  30 (for BW 50MHz)  40 (for BW 60MHz)  45 (for BW 70MHz)  51 (for BW 80MHz)  53 (for BW 90MHz)  61 (for BW 100MHz) |  | Unpaired Spectrum  for SCS 30 KHz |
|  | 1 (for BW 10 MHz)  4 (for BW 15 MHz)  7 (for BW 20, 25 MHz)  9 (for BW 30 MHz)  13 (for BW 40MHz)  17 (for BW 50MHz)  19 (for BW 60MHz)  22 (for BW 70MHz)  25 (for BW 80MHz)  27 (for BW 90MHz)  30 (for BW 100MHz) |  | Unpaired Spectrum  for SCS 60 KHz |
| b-SRS | 0 |  |  |
| b-hop | 3 |  | Paired Spectrum |
|  | 0 |  | Unpaired Spectrum |
| } |  |  |  |
| resourceType CHOICE { |  |  |  |
| periodic SEQUENCE { |  |  |  |
| periodicityAndOffset-p CHOICE{ |  |  |  |
| sl10 | 8 |  | SCS 15 KHz |
| sl20 | 18 |  | SCS 30KHz |
| sl40 | 36 |  | SCS 60 KHz |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| SCS\_15kHz | SCS=15kHz for SS/PBCH block |
| SCS\_30kHz | SCS=30kHz for SS/PBCH block |

Table 6.3.3.6.4.3-2: void

Table 6.3.3.6.4.3-3: *P-Max*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-89 | | | |
| Information Element | Value/remark | Comment | Condition |
| P-Max | 23 |  |  |

6.3.3.6.5 Test requirement

The requirement for the power measured in steps (1), (2) and (3) of the test procedure shall not exceed the values specified in Table 6.3.3.6.5-1.

Table 6.3.3.6.5-1: SRS time mask

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Channel bandwidth / minimum output power / measurement bandwidth | | | | | | | | | | | | | | |
|  | | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 60 | 70 | 80 | 90 | 100 |
| MHz | MHz | MHz | MHz | MHz | MHz | MHz | MHz | MHz | MHz | MHz | MHz | MHz | MHz | MHz |
| Transmit OFF power | | ≤ -50+TT dBm | | | | | | | | | | | | | | |
| Transmission OFF Measurement bandwidth | | 4.515 | 9.375 | 14.235 | 19.095 | 23.955 | 28.815 | 33.855 | 38.895 | 43.575 | 48.615 | 58.35 | 68.07 | 78.15 | 88.23 | 98.31 |
| Transmit ON power | | Same as Table 6.2.1.5-1 | | | | | | | | | | | | | | |
| NOTE 1: TT for each frequency and channel bandwidth is specified in Table 6.3.3.6.5-2 | | | | | | | | | | | | | | | | |

Table 6.3.3.6.5-2: Test Tolerance (Transmit OFF power and SRS time mask)

|  |  |  |
| --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 6GHz |
| BW ≤ 40MHz | 1.5 dB | 1.8 dB |
| 40MHz < BW ≤ 100MHz | 1.7 dB | 1.8 dB |

#### 6.3.3.7 PUSCH-PUCCH and PUSCH-SRS time masks

No test case details are specified. Current test procedures for time masks are based on power measurement in relatively long period compared with transient period. For time masks between 2 active time slots with different power level, the test procedure can’t provide enough resolution to identify non-conformant UEs. Therefore the minimum requirement is not testable.

#### 6.3.3.8 Transmit power time mask for consecutive slot or long subslot transmission and short subslot transmission boundaries

No test case details are specified. Current test procedures for time masks are based on power measurement in relatively long period compared with transient period. For time masks between 2 active time slots with different power level, the test procedure can’t provide enough resolution to identify non-conformant UEs. Therefore the minimum requirement is not testable.

#### 6.3.3.9 Transmit power time mask for consecutive short subslot transmissions boundaries

No test case details are specified. Current test procedures for time masks are based on power measurement in relatively long period compared with transient period. For time masks between 2 active time slots with different power level, the test procedure can’t provide enough resolution to identify non-conformant UEs. Therefore the minimum requirement is not testable.

### 6.3.4 Power control

#### 6.3.4.1 General

The requirements on power control accuracy apply under normal conditions.

#### 6.3.4.2 Absolute power tolerance

6.3.4.2.1 Test purpose

To verify the ability of the UE transmitter to set its initial output power to a specific value at the start of a contiguous transmission or non-contiguous transmission with a long transmission gap, i.e. transmission gap is larger than 20ms.

6.3.4.2.2 Test applicability

This test case applies to all types of NR Power Class 1 release 15 and forward.

This test case applies to all types of NR Power Class 2 and Power Class 3 UE release 15 and forward that don’t support Tx diversity.

6.3.4.2.3 Minimum conformance requirements

The absolute power tolerance is the ability of the UE transmitter to set its initial output power to a specific value for the first sub-frame(1ms) at the start of a contiguous transmission or non-contiguous transmission with a transmission gap larger than 20ms. The tolerance includes the channel estimation error.

The minimum requirement specified in Table 6.3.4.2.3-1 apply in the power range bounded by the minimum output power as specified in sub-clause 6.3.1 and the maximum output power as specified in sub-clause 6.2.1.

Table 6.3.4.2.3-1: Absolute power tolerance

|  |  |
| --- | --- |
| Conditions | Tolerance |
| Normal | ± 9.0 dB |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.3.4.2

6.3.4.2.4 Test description

6.3.4.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in clause 6.2D.3.4.1 for NS\_03, NS\_03U, NS\_04 and NS\_35. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.4.2.4.1-1: Test Configuration Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Mid range (NOTE 2) | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest | |
| Test Parameters | | | | |
| Test ID | Downlink Configuration | | Uplink Configuration | |
|  | Modulation | RB allocation | Modulation | RB allocation (NOTE 1) |
| 1 | N/A for Absolute power tolerance test case | | CP-OFDM QPSK | Outer\_Full |
| NOTE 1: The specific configuration of each RF allocation is defined in Table 6.1-1.  NOTE 2: For NR band n28, 30MHz test channel bandwidth is tested with Low range test frequencies. | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.3.4.2.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.3.4.2.4.3. Note that PDCCH DCI format 0\_1 sent after resetting uplink power with RRC Connection Reconfiguration, should have TPC command 0dB.

6.3.4.2.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 with TPC command 0dB for C\_RNTI to schedule the UL RMC according to Table 6.3.4.2.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Measure the initial output power of the first sub-frame (1ms) of UE PUSCH first transmission.

3. Repeat for the two test points as indicated in section 6.3.4.2.4.3. The timing of the execution between the two test points shall be larger than 20ms.

6.3.4.2.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 with the following exceptions:

Table 6.3.4.2.4.3-1: UplinkPowerControlCommon: Test point 1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] subclause 4.6.3 Table 4.6.3-119 PUSCH-ConfigCommon | | | |
| Information Element | Value/remark | Comment | Condition |
| PUSCH-ConfigCommon::= SEQUENCE { |  |  |  |
| p0-NominalWithGrant | -114 | Test point 1 to verify a UE relative low initial power transmission |  |
| } |  |  |  |

Table 6.3.4.2.4.3-2: UplinkPowerControlCommon: Test point 2

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [5] subclause 4.6.3 Table 4.6.3-119 PUSCH-ConfigCommon | | | |
| Information Element | Value/remark | Comment | Condition |
| PUSCH-ConfigCommon::= SEQUENCE { |  |  |  |
| p0-NominalWithGrant | -100 | Test point 2 to verify a UE relative high initial power transmission |  |
| } |  |  |  |

Table 6.3.4.2.4.3-3: *Void*

Table 6.3.4.2.4.3-4: ServingCellConfigCommon

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1[5], Table 4.6.3-168 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfigCommon ::= SEQUENCE { |  |  |  |
| ss-PBCH-BlockPower | 18 |  | SCS\_15kHz |
|  | 21 |  | SCS\_30kHz |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| SCS\_15kHz | SCS=15kHz for SS/PBCH block |
| SCS\_30kHz | SCS=30kHz for SS/PBCH block |

6.3.4.2.5 Test requirement

The requirement for the power measured in step (2) of the test procedure is not to exceed the values specified in Table 6.3.4.2.5-1 and 6.3.4.2.5-2.

Table 6.3.4.2.5-1: Absolute power tolerance: test point 1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Channel bandwidth / expected output power (dBm) | | | | | | | | | | | | | | |
| 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz | 35  MHz | 40 MHz | 45 MHz | 50 MHz | 60 MHz | 70 MHz | 80 MHz | 90 MHz | 100 MHz |
| Expected Measured power | SCS15 | -17.6 | -14.4 | -12.6 | -11.3 | -10.4 | -9.6 | -8.9 | -8.3 | -7.8 | -7.3 | N/A | N/A | N/A | N/A | N/A |
| SCS30 | -18.2 | -14.8 | -12.8 | -11.5 | -10.5 | -9.7 | -9 | -8.3 | -7.9 | -7.4 | -6.5 | -5.8 | -5.2 | -4.7 | -4.2 |
| SCS60 | N/A | -15.2 | -13 | -11.8 | -10.7 | -9.8 | -9.1 | -8.5 | -8 | -7.5 | -6.6 | -5.9 | -5.3 | -4.8 | -4.3 |
| Power tolerance | |  | ± (9+TT)dB | | | | | | | | | | | | | |
| Note 1: The lower power limit shall not exceed the minimum output power requirements defined in sub-clause 6.3.2.3  Note 2: TT for each duplex, Sub-Carrier Spacing, frequency and channel bandwidth is specified in Table 6.3.4.2.5-3. | | | | | | | | | | | | | | | | |

Table 6.3.4.2.5-2: Absolute power tolerance: test point 2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Channel bandwidth / expected output power (dBm) | | | | | | | | | | | | | | |
| 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz | 35  MHz | 40 MHz | 45 MHz | 50 MHz | 60 MHz | 70 MHz | 80 MHz | 90 MHz | 100 MHz |
| Expected Measured power | SCS15 | -3.6 | -0.4 | 1.4 | 2.7 | 3.6 | 4.4 | 5.1 | 5.7 | 6.2 | 6.7 | N/A | N/A | N/A | N/A | N/A |
| SCS30 | -4.2 | -0.8 | 1.2 | 2.5 | 3.5 | 4.3 | 5 | 5.7 | 6.2 | 6.6 | 7.5 | 8.2 | 8.8 | 9.3 | 9.8 |
| SCS60 | N/A | -1.2 | 1 | 2.2 | 3.3 | 4.2 | 4.9 | 5.5 | 6 | 6.5 | 7.4 | 8.1 | 8.7 | 9.2 | 9.7 |
| Power tolerance | | ± (9+TT)dB | | | | | | | | | | | | | | |
| Note 1: The higher power limit shall not exceed the maximum output power requirements defined in sub-clause 6.2.1.3  Note 2: TT for each duplex, Sub-Carrier Spacing, frequency and channel bandwidth is specified in Table 6.3.4.2.5-3. | | | | | | | | | | | | | | | | |

Table 6.3.4.2.5-3: Test Tolerance

|  |  |  |  |
| --- | --- | --- | --- |
|  | f ≤ 3.0GHz | 3.0GHz < f ≤ 4.2GHz | 4.2GHz < f ≤ 6.0GHz |
| BW ≤ 40MHz | 1.0 dB | 1.4 dB | 1.4 dB |
| 40MHz < BW ≤ 100MHz | 1.4 dB | 1.4 dB | 1.4 dB |

#### 6.3.4.3 Relative power tolerance

6.3.4.3.1 Test purpose

To verify the ability of the UE transmitter to set its output power in a target sub-frame(1ms) relatively to the power of the most recently transmitted reference sub-frame if the transmission gap between these sub-frames is less than or equal to 20ms.

6.3.4.3.2 Test applicability

This test case applies to all types of NR Power Class 1 release 15 and forward.

This test case applies to all types of NR Power Class 2 and Power Class 3 UE release 15 and forward that don’t support Tx diversity.

6.3.4.3.3 Minimum conformance requirement

The UE shall meet the requirements specified in Table 6.3.4.3.3-1.

The minimum requirements specified in Table 6.3.4.3.3-1 apply when the power of the target and reference sub-frames are within the power range bounded by the minimum output power as defined in sub-clause 6.3.1 and the measured PUMAX as defined in sub-clause 6.2.1.

To account for RF Power amplifier mode changes, 2 exceptions are allowed for each of two test patterns. The test patterns are a monotonically increasing power sweep and a monotonically decreasing power sweep over a range bounded by the requirements of minimum power and maximum power specified in subclauses 6.3.1 and 6.2.1, respectively. For those exceptions, the power tolerance limit is a maximum of ± 6.0 dB in Table 6.3.4.3.3-1.

Table 6.3.4.3.3-1: Relative Power Tolerance

|  |  |  |  |
| --- | --- | --- | --- |
| Power step P (Up or down)  (dB) | All combinations of PUSCH and PUCCH transitions (dB) | All combinations of PUSCH/PUCCH and SRS transitions between sub-frames (dB) | PRACH (dB) |
| ΔP < 2 | ± 2.0 (NOTE) | ± 2.5 | ± 2.0 |
| 2 ≤ ΔP < 3 | ± 2.5 | ± 3.5 | ± 2.5 |
| 3 ≤ ΔP < 4 | ± 3.0 | ± 4.5 | ± 3.0 |
| 4 ≤ ΔP ≤ 10 | ± 3.5 | ± 5.5 | ± 3.5 |
| 10 ≤ ΔP < 15 | ± 4.0 | ± 7.0 | ± 4.0 |
| 15 ≤ ΔP | ± 5.0 | ± 8.0 | ± 5.0 |
| NOTE: For PUSCH to PUSCH transitions with the allocated resource blocks fixed in frequency and no transmission gaps other than those generated by downlink subframes, DwPTS fields or Guard Periods: for a power step ΔP ≤ 1 dB, the relative power tolerance for transmission is ± 0.7 dB. | | | |

The normative reference for this requirement is TS 38.101-1 [2] clause 6.3.4.3.

6.3.4.3.4 Test description

6.3.4.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.3.4.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.4.3.4.1-1: Test Configuration Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Initial Conditions | | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Mid, Highest | |
| Test SCS as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Highest | |
| Test Parameters | | | | |
| Ch BW | Downlink Configuration | | Uplink Configuration | |
|  | Modulation | RB Allocation | Modulation | RB allocation (NOTE 1) |
| 5MHz | N/A for Relative power tolerance test case | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-1  See Table 6.3.4.3.5-2  See Table 6.3.4.3.5-7 |
| 10MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-3  See Table 6.3.4.3.5-4  See Table 6.3.4.3.5-7 |
| 15MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-3  See Table 6.3.4.3.5-4  See Table 6.3.4.3.5-7 |
| 20MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-3  See Table 6.3.4.3.5-4  See Table 6.3.4.3.5-7 |
| 25MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-3  See Table 6.3.4.3.5-4  See Table 6.3.4.3.5-7 |
| 30MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-3  See Table 6.3.4.3.5-4  See Table 6.3.4.3.5-7 |
| 35MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-3  See Table 6.3.4.3.5-4  See Table 6.3.4.3.5-7 |
| 40MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-3  See Table 6.3.4.3.5-4  See Table 6.3.4.3.5-7 |
| 45MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-3  See Table 6.3.4.3.5-4  See Table 6.3.4.3.5-7 |
| 50MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-3  See Table 6.3.4.3.5-4  See Table 6.3.4.3.5-7 |
| 60MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-5  See Table 6.3.4.3.5-6  See Table 6.3.4.3.5-7 |
| 70MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-5  See Table 6.3.4.3.5-6  See Table 6.3.4.3.5-7 |
| 80MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-5  See Table 6.3.4.3.5-6  See Table 6.3.4.3.5-7 |
| 90MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-5  See Table 6.3.4.3.5-6  See Table 6.3.4.3.5-7 |
| 100MHz |  | | DFT-s-OFDM QPSK | See Table 6.3.4.3.5-5  See Table 6.3.4.3.5-6  See Table 6.3.4.3.5-7 |
| Note 1: The starting resource block shall be RB# 0 | | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to Annex G.0, G.1, G.2, G.3.0.

4. The UL Reference Measurement Channel is set according to Table 6.3.4.3.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5 Message contents are defined in clause 6.3.4.3.4.3.

6.3.4.3.4.2 Test procedure

The procedure is separated in various subtests to verify different aspects of relative power control. The power patterns of the subtests are described in figure 6.3.4.3.4.2-1 thru figure 6.3.4.3.4.2-5.



Figure 6.3.4.3.4.2-1: FDD ramping up test power patterns



Figure 6.3.4.3.4.2-2: FDD ramping down test power patterns



Figure 6.3.4.3.4.2-3: TDD ramping up test power patterns



Figure 6.3.4.3.4.2-4: TDD ramping down test power patterns

Figure 6.3.4.3.4.2-5: Alternating Test Power patterns

1. Sub test: ramping up pattern

1.1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.3.4.3.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. Send uplink power control commands to the UE using 1dB power step size to ensure that the UE output power measured by the test system is within the Uplink power control window, defined as +MU to +(MU + Uplink power control window size) dB of the target power level -33 dBm, where:

- MU is the test system uplink power measurement uncertainty and is specified in Table F.1.2-1 for the carrier frequency f and the channel bandwidth BW.

- Uplink power control window size = 1dB (UE power step size) + 0.7dB (UE power step tolerance) + (Test system relative power measurement uncertainty), where, the UE power step tolerance is specified in TS 38.101-1 [2], Table 6.3.4.3-1 and is 0.7dB for 1dB power step size, and the Test system relative power measurement uncertainty is specified in Table F.1.2-1.

1.2. Schedule the UE's PUSCH data transmission as described in Figure 6.3.4.3.4.2-1 (FDD pattern A: sub-test is divided in 4 arbitrary radio frames with 10 active uplink sub-frames per radio frame) and Figure 6.3.4.3.4.2-3 (TDD pattern A: sub-test is divided in 20 arbitrary radio frames with 2 active uplink sub-frames per radio frame). Uplink RB allocation as defined in table 6.3.4.3.5-1/6.3.4.3.5-3/ 6.3.4.3.5-5 depending on channel bandwidth. On the PDCCH format 0\_1 for the scheduling of the PUSCH the SS will transmit a +1dB TPC command for every first slot in a sub-frame. Note that the measurement need not be done continuously, provided that interruptions are whole numbers of frames, and TPC commands of 0dB are sent during the interruption.

1.3. Measure the power of PUSCH transmissions to verify the UE relative power control meet test requirements 6.3.4.3.5. For power transients between sub-frames, transient periods of 20us between sub-frames are excluded.

1.4. Repeat the subtest different pattern B, C to move the RB allocation change at different points in the pattern as described in Table 6.3.4.3.5-1/6.3.4.3.5-3/ 6.3.4.3.5-5 to force bigger UE power steps at various points in the power range.

NOTE: The purpose of the Uplink power control window is to ensure that the actual UE output power is no less than the target power level, and as close as possible to the target power level. The relationship between the Uplink power control window, the target power level and the corresponding possible actual UE Uplink power window is illustrated in Annex F, clause F.4.2.

2. Sub test: ramping down pattern

2.1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.3.4.3.4.1-1. Send uplink power control commands to the UE using 1dB power step size to ensure that the UE output power measured by the test system is within the Uplink power control window, defined as -(MU + Uplink power control window size) to -MU dB of the target power level 20.7 dBm, where:

- MU is the test system uplink power measurement uncertainty and is specified in Table F.1.2-1 for the carrier frequency f and the channel bandwidth BW.

- Uplink power control window size is same as defined in step 1.1.

2.2. Schedule the UE's PUSCH data transmission as described in Figure 6.3.4.3.4.2-2 (FDD pattern A: sub-test is divided in 4 arbitrary radio frames with 10 active uplink slots per radio frame) and Figure 6.3.4.3.4.2-4 (TDD pattern A: sub-test is divided in 20 arbitrary radio frames with 2 active uplink sub-frames per radio frame). Uplink RB allocation as defined in table 6.3.4.3.5-2/6.3.4.3.5-4/ 6.3.4.3.5-6 depending on channel bandwidth. On the PDCCH format 0\_1 for the scheduling of the PUSCH the SS will transmit a -1dB TPC command for every first slot in a sub-frame. Note that the measurement need not be done continuously, provided that interruptions are whole numbers of frames, and TPC commands of 0dB are sent during the interruption.

2.3. Measure the power of PUSCH transmissions to verify the UE relative power control meet test requirements 6.3.4.4.5. For power transients between sub-frames, transient periods of 20us between sub-frames are excluded.

2.4. Repeat the subtest different pattern B, C to move the RB allocation change at different points in the pattern as described in Table 6.3.4.3.5-2/6.3.4.3.5-4/ 6.3.4.3.5-6 to force bigger UE power steps at various points in the power range.

NOTE: The purpose of the Uplink power control window is to ensure that the actual UE output power is no greater than the target power level, and as close as possible to the target power level. The relationship between the Uplink power control window, the target power level and the corresponding possible actual UE Uplink power window is illustrated in Annex F, clause F.4.3.

3. Sub test: alternating pattern

3.1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0\_1 for C\_RNTI to schedule the UL RMC according to Table 6.3.4.3.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. Send uplink power control commands for PUSCH to the UE using 1dB power step size to ensure that the UE output power measured by the test system is within the Uplink power control window, defined as – (Uplink power control window size / 2) dB to + (Uplink power control window size / 2) dB of the target power level -10 dBm, where:

- Uplink power control window size is same as defined in step 1.1.

3.2. Schedule the UE's PUSCH data transmission as described in Figure 6.3.5.2.4.2-5 for 10 sub-frames an uplink RB allocation alternating pattern as defined in table 6.3.4.3.5-7 while transmitting 0dB TPC command for PUSCH via the PDCCH.

3.3. Measure the power of PUSCH transmissions to verify the UE relative power control meet test requirements specified in clause 6.3.4.3.5. For power transients between sub-frames, transient periods of 20us between sub-frames are excluded.

NOTE: The purpose of the Uplink power control window is to ensure that the actual UE output power is as close as possible to the target power level. The relationship between the Uplink power control window, the target power level and the corresponding possible actual UE Uplink power window is illustrated in Annex F.4.4.

6.3.4.3.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6 with the following exceptions:

Table 6.3.4.3.4.3-1: *PUSCH-Config*

|  |
| --- |
| Derivation Path: TS 38.508-1 [5], Table 4.6.3-118 with condition TRANSFORM\_PRECODER\_ENABLED |

6.3.4.3.5 Test requirement

Each UE power step measured in the test procedure 6.3.4.3.4.2 should satisfy the test requirements specified in Table 6.3.4.3.5-1 thru 6.3.4.3.5-7.

To account for RF Power amplifier mode changes 2 exceptions are allowed for each of ramping up and ramping down test patterns. For these exceptions the power tolerance limit is a maximum of ± (6.0 + TT) dB. If there is an exception in the power step caused by the RB change for all test patterns (A, B, C) then fail the UE.

Table 6.3.4.3.5-1: Test Requirements Relative Power Tolerance for Transmission, channel BW 5MHz, ramp up sub-test

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Test SCS [kHz] | Sub-test ID | Applicable sub-frames | Uplink RB allocation | TPC command | Expected power step size (Up) | Power step size range (Up) | PUSCH |
|  |  |  |  |  | ΔP [dB] | ΔP [dB] | [dB] |
|  |  | Sub-frames before RB change | Fixed = 1 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 15 | 1 | RB change | 1RB to 5 RBs | TPC=+1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Sub-frames after RB change | Fixed = 5 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Sub-frames before RB change | Fixed = 1 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 2 | RB change | 1RB to 15 RBs | TPC=+1dB | 12.76 | 10dB ≤ ΔP < 15dB | 12.76 +/- (4 + TT) |
|  |  | Sub-frames after RB change | Fixed = 15 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Sub-frames before RB change | Fixed = 1 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 1 | RB change | 1RB to 5 RBs | TPC=+1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Sub-frames after RB change | Fixed = 5 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 30 |  | Sub-frames before RB change | Fixed = 1 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 2 | RB change | 1RB to 10 RBs | TPC=+1dB | 11.00 | 10dB ≤ ΔP < 15dB | 11.00 +/- (4 + TT) |
|  |  | Sub-frames after RB change | Fixed = 10 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| Note 1: Position of RB change: Pattern A the position of RB uplink allocation change is after 10 active uplink Sub-frames Pattern B the position of RB uplink allocation change is after 20 active uplink Sub-frames Pattern C the position of RB uplink allocation change is after 30 active uplink Sub-frames  Note 2: The starting resource block shall be RB# 0.  Note 3: TT=0.7dB  Note 4: Applicable if PUMAX ≥ P ≥ Pmin. Pmin as defined in sub-clause 6.3.1. | | | | | | | |

Table 6.3.4.3.5-2: Test Requirements Relative Power Tolerance for Transmission, channel BW 5MHz, ramp down sub-test

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Test SCS [kHz] | Sub-test ID | Applicable sub-frames | Uplink RB allocation | TPC command | Expected power step size (Down) | Power step size range (Down) | PUSCH |
|  |  |  |  |  | ΔP [dB] | ΔP [dB] | [dB] |
|  |  | Sub-frames before RB change | Fixed = 5 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 1 | RB change | 5 RBs to 1 RB | TPC=-1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Sub-frames after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 15 |  | Sub-frames before RB change | Fixed = 15 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 2 | RB change | 15 RBs to 1 RB | TPC=-1dB | 12.76 | 10dB ≤ ΔP < 15dB | 12.76 +/- (3.5 + TT) |
|  |  | Sub-frames after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Sub-frames before RB change | Fixed = 5 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 1 | RB change | 5 RBs to 1 RB | TPC=-1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Sub-frames after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 30 |  | Sub-frames before RB change | Fixed = 10 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 2 | RB change | 10 RBs to 1 RB | TPC=-1dB | 11.00 | 10dB ≤ ΔP < 15dB | 11.00 +/- (4 + TT) |
|  |  | Sub-frames after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| Note 1: Position of RB change: Pattern A the position of RB uplink allocation change is after 10 active uplink Sub-frames Pattern B the position of RB uplink allocation change is after 20 active uplink Sub-frames Pattern C the position of RB uplink allocation change is after 30 active uplink Sub-frames  Note 2: The starting resource block shall be RB# 0.  Note 3: TT=0.7dB  Note 4: Applicable if PUMAX ≥ P ≥ Pmin. Pmin as defined in sub-clause 6.3.1. | | | | | | | |

Table 6.3.4.3.5-3: Test Requirements Relative Power Tolerance for Transmission, channel BW 10MHz, 15MHz, 20MHz, 25MHz, 30MHz, 35MHz, 40MHz, 45MHz, 50MHz ramp up sub-test

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Test SCS [kHz] | Sub-test ID | Applicable sub-frames | Uplink RB allocation | TPC command | Expected power step size (Up) | Power step size range (Up) | PUSCH |
|  |  |  |  |  | ΔP [dB] | ΔP [dB] | [dB] |
|  |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 1 | RB change | 1RB to 5 RBs | TPC=+1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Subframes after RB change | Fixed = 5 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 15 | 2 | RB change | 1RB to 20 RBs | TPC=+1dB | 14.01 | 10dB ≤ ΔP < 15dB | 14.01 +/- (4 + TT) |
|  |  | Subframes after RB change | Fixed = 20 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/-0.7 + TT |
|  |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 3 | RB change | 1RB to 50 RBs | TPC=+1dB | 17.99 | 15dB ≤ ΔP | 17.99 +/- (5 + TT) |
|  |  | Subframes after RB change | Fixed = 50 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 1 | RB change | 1RB to 5 RBs | TPC=+1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Subframes after RB change | Fixed = 5 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 30 |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/-0.7 + TT |
|  | 2 | RB change | 1RB to 24 RBs | TPC=+1dB | 14.80 | 10dB ≤ ΔP < 15dB | 14.80+/- (4 + TT) |
|  |  | Subframes after RB change | Fixed = 24 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/-0.7 + TT |
|  | 1 | RB change | 1RB to 5 RBs | TPC=+1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Subframes after RB change | Fixed = 5 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 60 |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 2 | RB change | 1RB to 10 RBs | TPC=+1dB | 11.00 | 10dB ≤ ΔP < 15dB | 11.00 +/- (4 + TT) |
|  |  | Subframes after RB change | Fixed = 10 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| Note 1: Position of RB change: Pattern A the position of RB uplink allocation change is after 10 active uplink Subframes. Pattern B the position of RB uplink allocation change is after 20 active uplink Subframes Pattern C the position of RB uplink allocation change is after 30 active uplink Subframes.  Note 2: The starting resource block shall be RB# 0.  Note 3: TT=0.7dB  Note 4: Applicable if PUMAX ≥ P ≥ Pmin. Pmin as defined in sub-clause 6.3.1. | | | | | | | |

Table 6.3.4.3.5-4: Test Requirements Relative Power Tolerance for Transmission, channel BW 10MHz, 15MHz, 20MHz, 25MHz, 30MHz, 35MHz, 40MHz, 45MHz, 50MHz ramp down sub-test

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Test SCS [kHz] | Sub-test ID | Applicable sub-frames | Uplink RB allocation | TPC command | Expected power step size (Down) | Power step size range (Down) | PUSCH |
|  |  |  |  |  | ΔP [dB] | ΔP [dB] | [dB] |
|  |  | Subframes before RB change | Fixed = 5 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 1 | RB change | 5 RBs to 1RBs | TPC=-1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | Fixed = 20 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 15 | 2 | RB change | 20 RBs to 1 RB | TPC=-1dB | 14.01 | 10dB ≤ ΔP < 15dB | 14.01 +/- (4 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | Fixed = 50 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 3 | RB change | 50 RBs to 1 RB | TPC=-1dB | 17.99 | 15dB ≤ ΔP | 17.99 +/- (5 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 30 |  | Subframes before RB change | Fixed = 5 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/-0.7 + TT |
|  | 1 | RB change | 5 RBs to 1 RB | TPC=-1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | Fixed = 24 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/-0.7 + TT |
|  | 2 | RB change | 24 RBs to 1 RB | TPC=-1dB | 14.80 | 10dB ≤ ΔP < 15dB | 14.80 +/- (4 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | Fixed = 5 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 1 | RB change | 5 RBs to 1 RB | TPC=-1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 60 |  | Subframes before RB change | Fixed = 10 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/-0.7 + TT |
|  | 2 | RB change | 10 RBs to 1 RB | TPC=-1dB | 11.00 | 10dB ≤ ΔP < 15dB | 11.00 +/- (4 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| Note 1: Position of RB change: Pattern A the position of RB uplink allocation change is after 10 active uplink Subframes. Pattern B the position of RB uplink allocation change is after 20 active uplink Subframes Pattern C the position of RB uplink allocation change is after 30 active uplink Subframes.  Note 2: The starting resource block shall be RB# 0.  Note 3: TT=0.7dB  Note 4: Applicable if PUMAX ≥ P ≥ Pmin. Pmin as defined in sub-clause 6.3.1. | | | | | | | |

Table 6.3.4.3.5-5: Test Requirements Relative Power Tolerance for Transmission, channel BW 60MHz, 70MHz, 80MHz, 90MHz, 100MHz ramp up sub-test

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Test SCS [kHz] | Sub-test ID | Applicable sub-frames | Uplink RB allocation | TPC command | Expected power step size (Up) | Power step size range (Up) | PUSCH |
|  |  |  |  |  | ΔP [dB] | ΔP [dB] | [dB] |
|  |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 1 | RB change | 1RB to 5 RBs | TPC=+1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Subframes after RB change | Fixed = 5 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 30 | 2 | RB change | 1RB to 24 RBs | TPC=+1dB | 14.80 | 10dB ≤ ΔP < 15dB | 14.80 +/- (4 + TT) |
|  |  | Subframes after RB change | Fixed = 24 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 3 | RB change | 1RB to 81 RBs | TPC=+1dB | 20.08 | 15dB < ΔP | 20.08 +/- (5 + TT) |
|  |  | Subframes after RB change | Fixed = 81 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 1 | RB change | 1RB to 5 RBs | TPC=+1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Subframes after RB change | Fixed = 5 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 60 |  | Subframes before RB change | 1RB | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 2 | RB change | 1RB to 75 RBs | TPC=+1dB | 19.75 | 15dB < ΔP | 19.75 +/- (5 + TT) |
|  |  | Subframes after RB change | Fixed = 75 | TPC=+1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| Note 1: Position of RB change: Pattern A the position of RB uplink allocation change is after 10 active uplink Subframes. Pattern B the position of RB uplink allocation change is after 20 active uplink Subframes Pattern C the position of RB uplink allocation change is after 30 active uplink Subframes.  Note 2: The starting resource block shall be RB# 0.  Note 3: TT=0.7dB  Note 4: Applicable if PUMAX ≥ P ≥ Pmin. Pmin as defined in sub-clause 6.3.1. | | | | | | | |

Table 6.3.4.3.5-6: Test Requirements Relative Power Tolerance for Transmission, channel BW 60MHz, 70MHz, 80MHz, 90MHz, 100MHz ramp down sub-test

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Test SCS [kHz] | Sub-test ID | Applicable sub-frames | Uplink RB allocation | TPC command | Expected power step size (Down) | Power step size range (Down) | PUSCH |
|  |  |  |  |  | ΔP [dB] | ΔP [dB] | [dB] |
|  |  | Subframes before RB change | Fixed = 5 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/-0.7 + TT |
|  | 1 | RB change | 5 RBs to 1 RB | TPC=-1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | Fixed = 24 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 30 | 2 | RB change | 24 RBs to 1 RB | TPC=-1dB | 14.80 | 10dB ≤ ΔP < 15dB | 14.80 +/- (4 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | Fixed = 81 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 3 | RB change | 81 RBs to 1 RB | TPC=-1dB | 20.08 | 15dB < ΔP | 20.08 +/- (5 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  |  | Subframes before RB change | Fixed = 5 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 1 | RB change | 5 RBs to 1 RB | TPC=-1dB | 7.99 | 4dB ≤ ΔP < 10dB | 7.99 +/- (3.5 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| 60 |  | Subframes before RB change | Fixed = 75 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
|  | 2 | RB change | 75 RBs to 1 RB | TPC=-1dB | 19.75 | 15dB < ΔP | 19.75 +/- (5 + TT) |
|  |  | Subframes after RB change | Fixed = 1 | TPC=-1dB | 1 | ΔP ≤ 1 dB | 1 +/- (0.7 + TT) |
| Note 1: Position of RB change: Pattern A the position of RB uplink allocation change is after 10 active uplink Subframes. Pattern B the position of RB uplink allocation change is after 20 active uplink Subframes Pattern C the position of RB uplink allocation change is after 30 active uplink Subframes.  Note 2: The starting resource block shall be RB# 0.  Note 3: TT=0.7dB  Note 4: Applicable if PUMAX ≥ P ≥ Pmin. Pmin as defined in sub-clause 6.3.1. | | | | | | | |

Table 6.3.4.3.5-7: Test Requirements Relative Power Tolerance for Transmission, alternating sub-test

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BW | Test SCS [kHz] | Sub-test ID | Uplink RB allocation | TPC command | Expected power step size (Up or Down) | Power step size range (Up or Down) | PUSCH |
|  |  |  |  |  | ΔP [dB] | ΔP [dB] | [dB] |
|  |  | 1 | Alternating 1 and 2 | TPC=0dB | 3.01 | 3dB ≤ ΔP < 4dB | 3.01 +/- (3 + TT) |
|  | 15 | 2 | Alternating 1 and 5 | TPC=0dB | 6.99 | 4dB ≤ ΔP < 10dB | 6.99 +/- (3.5 + TT) |
| 5 |  | 3 | Alternating 1 and 15 | TPC=0dB | 11.76 | 10dB ≤ ΔP < 15dB | 11.76 +/- (4 + TT) |
|  |  | 1 | Alternating 1 and 2 | TPC=0dB | 3.01 | 3dB ≤ ΔP < 4dB | 3.01 +/- (3 + TT) |
|  | 30 | 2 | Alternating 1 and 10 | TPC=0dB | 10.00 | 10dB ≤ ΔP < 15dB | 10.00 +/- (4 + TT) |
|  |  | 1 | Alternating 1 and 2 | TPC=0dB | 3.01 | 3dB ≤ ΔP < 4dB | 3.01 +/- (3 + TT) |
|  |  | 2 | Alternating 1 and 5 | TPC=0dB | 6.99 | 4dB ≤ ΔP < 10dB | 6.99 +/- (3.5 + TT) |
|  | 15 | 3 | Alternating 1 and 20 | TPC=0dB | 13.01 | 10dB ≤ ΔP < 15dB | 13.01 +/- (4 + TT) |
|  |  | 4 | Alternating 1 and 50 | TPC=0dB | 16.99 | 15dB ≤ ΔP | 16.99 +/- (5 + TT) |
|  |  | 1 | Alternating 1 and 2 | TPC=0dB | 3.01 | 3dB ≤ ΔP < 4dB | 3.01 +/- (3 + TT) |
| 10,15,20, 25,30,35, 40,45, 50 | 30 | 2 | Alternating 1 and 5 | TPC=0dB | 6.99 | 4dB ≤ ΔP < 10dB | 6.99 +/- (3.5 + TT) |
|  |  | 3 | Alternating 1 and 24 | TPC=0dB | 13.80 | 10dB ≤ ΔP < 15dB | 13.80 +/- (4 + TT) |
|  |  | 1 | Alternating 1 and 5 | TPC=0dB | 6.99 | 4dB ≤ ΔP < 10dB | 6.99 +/- (3.5 + TT) |
|  | 60 | 2 | Alternating 1 and 10 | TPC=0dB | 10.00 | 10dB ≤ ΔP < 15dB | 10.00 +/- (4 + TT) |
|  |  | 1 | Alternating 1 and 2 | TPC=0dB | 3.01 | 3dB ≤ ΔP < 4dB | 3.01 +/- (3 + TT) |
|  | 30 | 2 | Alternating 1 and 5 | TPC=0dB | 6.99 | 4dB ≤ ΔP < 10dB | 6.99 +/- (3.5 + TT) |
|  |  | 3 | Alternating 1 and 81 | TPC=0dB | 19.08 | 15dB < ΔP | 19.08 +/- (5 + TT) |
| 60, 70,80,90,100 |  | 1 | Alternating 1 and 2 | TPC=0dB | 3.01 | 3dB ≤ ΔP < 4dB | 3.01 +/- (3 + TT) |
|  | 60 | 2 | Alternating 1 and 5 | TPC=0dB | 6.99 | 4dB ≤ ΔP < 10dB | 6.99 +/- (3.5 + TT) |
|  |  | 3 | Alternating 1 and 75 | TPC=0dB | 18.75 | 15dB < ΔP | 18.75 +/- (5 + TT) |
| Note 1: The starting resource block shall be RB# 0.  Note 2: TT=0.7dB  Note 3: Applicable if PUMAX ≥ P ≥ Pmin. Pmin as defined in sub-clause 6.3.1. | | | | | | | |

#### 6.3.4.4 Aggregate power tolerance

6.3.4.4.1 Test purpose

To verify the ability of the UE transmitter to maintain its power during non-contiguous transmissions within 21ms in response to 0 dB commands with respect to the first UE transmission and all other power control parameters as specified in 38.213 kept constant.

6.3.4.4.2 Test applicability

This test case applies to all types of NR Power Class 1 release 15 and forward.

This test case applies to all types of NR Power Class 2 and Power Class 3 UE release 15 and forward that don’t support Tx diversity.

6.3.4.4.3 Minimum conformance requirements

The aggregate power control tolerance is the ability of the UE transmitter to maintain its power in a sub-frame(1ms) during non-contiguous transmissions within 21ms in response to 0 dB commands with respect to the first UE transmission and all other power control parameters as specified in 38.213 kept constant.

The minimum requirement specified in Table 6.3.4.4.3-1 apply in the power range bounded by the minimum output power as specified in sub-clause 6.3.1 and the maximum output power as specified in sub-clause 6.2.2.

Table 6.3.4.4.3-1: Aggregate power tolerance

|  |  |  |
| --- | --- | --- |
| TPC command | UL channel | Aggregate power tolerance within 21ms |
| 0 dB | PUCCH | ± 2.5 dB |
| 0 dB | PUSCH | ± 3.5 dB |

The normative reference for this requirement is TS 38.01-1 [2] clause 6.3.4.4

6.3.4.4.4 Test description

6.3.4.4.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and sub-carrier spacing based on NR operating bands specified in table 5.3.5-1. All of these configurations shall be tested with applicable test parameters for each combination of test channel bandwidth and sub-carrier spacing, and are shown in table 6.3.4.4.4.1-1 and table 6.3.4.4.4.1-2. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.4.4.4.1-1: Test Configuration Table: PUCCH sub-test

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Mid range (NOTE 1) |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Mid, Highest |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest, Highest |
| Test Parameters | | | |
|  | Downlink Configuration | | Uplink Configuration |
| Test ID | Modulation | RB allocation | PUCCH format = Format 1  Length in OFDM symbols = 14 |
| 1 | CP-OFDM QPSK | Full RB (NOTE 2) |
| NOTE 1: For NR band n28, 30MHz test channel bandwidth is tested with Low range test frequencies.  NOTE 2: Full RB allocation shall be used per each SCS and channel BW as specified in Table 7.3.2.4.1-2. | | | |

Table 6.3.4.4.4.1-2: Test Configuration Table: PUSCH sub-test

|  |  |  |  |
| --- | --- | --- | --- |
| Initial Conditions | | | |
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Mid range (NOTE 2) | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest, Highest | |
| Test Parameters for Channel Bandwidths | | | |
| Test ID | Downlink Configuration | Uplink Configuration | |
|  | N/A for aggregate power tolerance testcase | Modulation | RB allocation (NOTE 1) |
| 1 | CP-OFDM QPSK | Outer\_Full |
| NOTE 1: The specific configuration of each RF allocation is defined in Table 6.1-1.  NOTE 2: For NR band n28, 30MHz test channel bandwidth is tested with Low range test frequencies. | | | |

1. Connect the SS to the UE antenna connectors as shown in TS 38.508-1 [5] Annex A, Figure A.3.1.1.1 for TE diagram and section A.3.2 for UE diagram.

2. The parameter settings for the cell are set up according to TS 38.508-1 [5] subclause 4.4.3.

3. Downlink signals are initially set up according to Annex C.0, C.1, C.2, and uplink signals according to G.0, G.1, G.2, G.3.0.

4. The UL and DL Reference Measurement channels are set according to Table 6.3.4.4.4.1-1 (PUCCH sub-test) and Table 6.3.4.4.4.1-2 (PUSCH sub-test)

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On,* Test Mode *On* and Test Loop Function *On* according to TS 38.508-1 [5] clause 4.5. Message contents are defined in clause 6.3.4.4.4.3.

6.3.4.4.4.2 Test procedure

The procedure is separated in two subtests to verify PUCCH and PUSCH aggregate power control tolerance respectively. The uplink transmission patterns are described in figure 6.3.4.4.4.2-1.

Figure 6.3.4.4.4.2-1 Test uplink transmission

1. PUCCH sub test:

1.1. The SS transmits PDSCH via PDCCH DCI format 1\_1 for C\_RNTI to transmit the DL RMC according to Table 6.3.4.4.4.1-1. The SS sends downlink MAC padding bits on the DL RMC. The transmission of PDSCH will make the UE send uplink ACK/NACK using PUCCH. Send uplink power control commands for PUCCH to the UE using 1dB power step size to ensure that the UE output power measured by the test system is within the Uplink power control window, defined as – (Uplink power control window size / 2) dB to + (Uplink power control window size / 2) dB of the target power level + 0 dBm, where:

- Uplink power control window size = 1dB (UE power step size) + 2.0dB (UE power step tolerance) + (Test system relative power measurement uncertainty), where, the UE power step tolerance is specified in TS 38.101-1 [2], Table 6.3.4.3-1 and is 2.0dB for PUCCH with 1dB power step size, and the Test system relative power measurement uncertainty is specified in Table F.1.2-1.

1.2. Every 5 sub-frames (5ms) transmit to the UE downlink PDSCH MAC padding bits as well as 0 dB TPC command for PUCCH via the PDCCH to make the UE transmit ACK/NACK on the PUCCH for 1 sub-frame(1ms). The downlink transmission is scheduled in the appropriate slots to make the UE transmit PUCCH as described in figure 6.3.4.4.4.2-1

1.3. Measure the power of 5 consecutive PUCCH transmissions to verify the UE transmitted PUCCH power is maintained within 21ms.

2. PUSCH sub test:

2.1. The SS sends uplink scheduling information via PDCCH DCI format 0\_1 for C\_RNTI to schedule the PUSCH. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. Send uplink power control commands for PUSCH to the UE using 1dB power step size to ensure that the UE output power measured by the test system is within the Uplink power control window, defined as – (Uplink power control window size / 2) dB to + (Uplink power control window size / 2) dB of the target power level + 0 dBm, where:

- Uplink power control window size = 1dB (UE power step size) + 0.7dB (UE power step tolerance) + (Test system relative power measurement uncertainty), where, the UE power step tolerance is specified in TS 38.101-1 [2], Table 6.3.4.3-1 and is 0.7dB for PUSCH with 1dB power step size, and the Test system relative power measurement uncertainty is specified in Table F.1.2-1.

NOTE: The purpose of the Uplink power control window is to ensure that the actual UE output power is as close as possible to the target power level. The relationship between the Uplink power control window, the target power level and the corresponding possible actual UE Uplink power window is illustrated in Annex F.4.4.

2.2. Every 5 sub-frames (5ms) schedule the UE's PUSCH data transmission for 1 sub-frame(1ms), and transmit 0 dB TPC command for PUSCH via the PDCCH to make the UE transmit PUSCH. The uplink transmission patterns are described in figure 6.3.4.4.4.2-1,

2.3. Measure the power of 5 consecutive PUSCH transmissions to verify the UE transmitted PUSCH power is maintained within 21ms transmissions.

6.3.4.4.4.3 Message contents

Message contents are according to TS 38.508-1 [5] subclause 4.6.

6.3.4.4.5 Test requirement

The requirement for the power measurements made in step (1.3) and (2.3) of the test procedure shall not exceed the values specified in Table 6.3.4.4.5-1. The power measurement period shall be 1 sub-frame(1ms).

Table 6.3.4.4.5-1: Power control tolerance

|  |  |  |
| --- | --- | --- |
| TPC command | UL channel | Test requirement measured power |
| 0 dB | PUCCH | Given 5power measurements in the pattern, the 2nd, and later measurements shall be within ± (2.5 + TT) dB of the 1st measurement. |
| 0 dB | PUSCH | Given 5 power measurements in the pattern, the 2nd, and later measurements shall be within ± (3.5 + TT) dB of the 1st measurement. |
| Note 1: For SCS 30kHz 1 sub-frame corresponds to 2 slots and for SCS 60kHz 1 sub-frame corresponds to 4 slots, so 2 TPC commands will be sent for a single measurement period.  Note 2: TT=0.7dB. | | |