**3GPP TSG- Meeting # *R5-255380***

**Bengaluru, India, 25th - 29th August, 2025**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.521-1** | **CR** | **3427** | **rev** | **1** | **Current version:** | **19.0.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network |  |

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| ***Title:*** | FR1 MUs up to 7.125GHz - RF single carrier UL SISO tests - MU and TT update in annex F | | | | | | | | | |
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| ***Source to WG:*** | Keysight Technologies UK Ltd | | | | | | | | | |
| ***Source to TSG:*** | R5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI17\_Test, NR\_lic\_bands\_BW\_R17-UEConTest | | | | |  | ***Date:*** | | | 2025-08-12 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19) Rel-20 (Release 20)* | |
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| ***Reason for change:*** | | Progress has been made in the MU/TT analysis for FR1 test cases for frequencies up to 7.125GHz in R5-254071. Annex F should be updated accordingly. | | | | | | | | |
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| ***Summary of change:*** | | Updated MU/TT for FR1 single carrier UL SISO test cases for frequency up to 7.125GHz. | | | | | | | | |
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| ***Consequences if not approved:*** | | Test specification will remain incomplete. | | | | | | | | |
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| ***Clauses affected:*** | | F.1.2, F.1.3, F.3.2, F.3.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Revision 1:  -Certain MU and TT values set in [ ] as more time for evaluation is requested by R&S. | | | | | | | | |

## <<< START OF CHANGES >>>

## F.1.2 Measurement of transmitter

- MU and TT for f>6GHz (bands n96, n104) already defined are working assumption based on analysis of single TE vendor. Values will be revisited once analysis from other TE vendors is available.

- MU and TT for f>6GHz (bands n96, n104) are FFS for test cases requiring operation in carrier aggregation, UL MIMO or Tx Diversity.

- MU and TT for spurious emission for intra-band UL contiguous CA with UL-MIMO test cases are working assumption. Values will be revisited once more analysis is available.

Table F.1.2-1: Maximum Test System Uncertainty for transmitter tests

|  |  |  |
| --- | --- | --- |
| Subclause | Maximum Test System Uncertainty | Derivation of Test System Uncertainty |
| 6.2.1 UE maximum output power | f ≤ 3.0GHz  ±0.7 dB, BW ≤ 40MHz  ±1.4 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.0 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±1.3 dB, BW ≤ 20MHz  ±1.5 dB, 20MHz < BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz |  |
| 6.2.2 Maximum Power Reduction (MPR) | f ≤ 3.0GHz  ±0.7 dB, BW ≤ 40MHz  ±1.4 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.0 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±1.3 dB, BW ≤ 20MHz  ±1.5 dB, 20MHz < BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz |  |
| 6.2.3 UE additional maximum output power reduction | f ≤ 3.0GHz  ±0.7 dB, BW ≤ 40MHz  ±1.4 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.0 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±1.3 dB, BW ≤ 20MHz  ±1.5 dB, 20MHz < BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz |  |
| 6.2.4 Configured transmitted power | For UL power ≥ 0 dBm  f ≤ 3.0GHz  ±0.7 dB, BW ≤ 40MHz  ±1.4 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.0 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±1.3 dB, BW ≤ 20MHz  ±1.5 dB, 20MHz < BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  For UL power < 0 dBm  f ≤ 3.0GHz  ±1.0 dB, BW ≤ 40MHz  ±1.4 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.3 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±1.5 dB, BW ≤ 40MHz  ±1.8 dB, 40MHz < BW ≤ 100MHz |  |
| 6.2A.1.1 UE maximum output power for CA (2UL CA) | For Inter-band CA  MAX (MUCC1, MUCC2) | MUCCX is MU of each UL CC specified in single UL case 6.2.1. |
| 6.2A.2.1 UE maximum output power reduction for CA (2UL CA) | For Inter-band CA  MAX (MUCC1, MUCC2)  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.2.2 for sum of powers of all CCs  Aggregated BW > 100M: TBD | MUCCX is MU of each UL CC specified in single UL case 6.2.2. |
| 6.2A.3.1 UE additional maximum output power reduction CA (2UL CA) | For Inter-band CA  MAX (MUCC1, MUCC2)  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.2.3 for sum of powers of all CCs  Aggregated BW > 100M: TBD | MUCCX is MU of each UL CC specified in single UL case 6.2.3. |
| 6.2A.4.1 Configured transmitted power for CA (2UL CA) | For Inter-band CA  MAX (MUCC1, MUCC2)  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.2.4 for sum of powers of all CCs  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD | MUCCX is MU of each UL CC specified in single UL case 6.2.4. |
| 6.2C.1 Configured transmitted power for SUL | Same as 6.2.4 |  |
| 6.2C.3 UE maximum output power for SUL | Same as 6.2.1 |  |
| 6.2C.4 UE maximum output power reduction for SUL | Same as 6.2.2 |  |
| 6.2C.5 UE additional maximum output power reduction for SUL | Same as 6.2.3 |  |
| 6.2D.1 UE maximum output power for UL MIMO | Same as 6.2.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.2.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.2D.1\_1 UE maximum output power for SUL with UL MIMO | Same as 6.2D.1 | Same as 6.2D.1 |
| 6.2D.1\_2 UE maximum output power for UL MIMO for UE supporting 4Tx | Same as 6.2D.1 | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.2.1 with SNR assumption reduced by 6dB compared to the single antenna case. |
| 6.2D.2 UE maximum output power reduction for UL MIMO | Same as 6.2.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.2.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.2D.2\_1 UE maximum output power reduction for SUL with UL MIMO | Same as 6.2.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.2.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.2D.2\_2 UE maximum output power reduction for UL MIMO for UE supporting 4Tx | Same as 6.2.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.2.2 with SNR assumption reduced by 6dB compared to the single antenna case. |
| 6.2D.3 UE additional maximum output power reduction for UL MIMO | Same as 6.2.3 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.2.3 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.2D.3\_1 UE additional maximum output power reduction for SUL with UL MIMO | Same as 6.2.3 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.2.3 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.2D.4 Configured transmitted power for UL MIMO | Same as 6.2.4 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.2.4 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.2D.4\_1 Configured transmitted power for SUL with UL MIMO | Same as 6.2D.4 | Same as 6.2D.4 |
| 6.2E.1.2 UE maximum output power for V2X / concurrent operation | For Inter-band concurrent operation  MAX (MUCC1, MUCC2) | MUCCX is MU of each UL CC specified in single UL case 6.2.1. |
| 6.2E.2.1 UE maximum output power reduction for V2X / non-concurrent operation | Same as 6.2.2 |  |
| 6.2E.2.1D UE maximum output power reduction for V2X / non-concurrent operation / SL-MIMO | Same as 6.2.2 for the sum of power at each of UE antenna connector |  |
| 6.2E.2.2 UE maximum output power reduction for V2X / concurrent operation | For Inter-band concurrent operation  MAX (MUNR, MUSL)  For Intra-band concurrent operation  Aggregated BW ≤ 100M: Same as 6.2.2 for sum of power of all CCs  Aggregated BW > 100M: TBD | MUNR is MU of NR CC specified in single UL case 6.2.2. MUSL is MU of SL CC specified in single UL case 6.2E.2.1. |
| 6.2E.3.1 UE additional maximum output power reduction for V2X / non-concurrent operation | Same as 6.2.3 |  |
| 6.2E.3.1D UE additional maximum output power reduction for V2X / non-concurrent operation / SL-MIMO | Same as 6.2.3 for the sum of power at each of UE antenna connector |  |
| 6.2E.4.1 Configured transmitted power for V2X / non-concurrent operation | Same as 6.2.4 |  |
| 6.2E.4.1D Configured transmitted power for V2X / non-concurrent operation / SL-MIMO | Same as 6.2.4 for the sum of power at each of UE antenna connector |  |
| 6.2E.4.2 Configured transmitted power for V2X / concurrent operation | For Inter-band concurrent operation  MAX (MUNR, MUSL)  For Intra-band concurrent operation  Aggregated BW ≤ 100M: Same as 6.2.4 for sum of power of all CCs  Aggregated BW > 100M: TBD | MUNR is MU of NR CC specified in single UL case 6.2.4. MUSL is MU of SL CC specified in single UL case 6.2E.4.1. |
| 6.2F.1 UE maximum output power for shared spectrum channel access | 4.2GHz < f ≤ 7.125GHz  ±1.3 dB, BW ≤ 20MHz  ±1.5 dB, 20MHz < BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz |  |
| 6.2F.2 UE maximum output power reduction for shared spectrum access | Same as 6.2F.1 |  |
| 6.2F.3 UE additional maximum output power reduction for shared spectrum access | Same as 6.2F.1 |  |
| 6.2F.4 Configured transmitted power for shared spectrum access | Same as 6.2F.1 |  |
| 6.2G.1 UE maximum output power for Tx Diversity | Same as 6.2.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.2.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.2G.1\_1 UE maximum output power for Tx Diversity for UE supporting 4Tx | Same as 6.2.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.2.1 with SNR assumption reduced by 6dB compared to the single antenna case. |
| 6.2G.2 UE maximum output power reduction for Tx Diversity | Same as 6.2.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.2.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.2G.2\_1 UE maximum output power reduction for Tx Diversity for UE supporting 4Tx | Same as 6.2.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.2.2 with SNR assumption reduced by 6dB compared to the single antenna case. |
| 6.2G.3 UE additional maximum output power reduction for Tx Diversity | Same as 6.2.3 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.2.3 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.2G.4 Configured transmitted power for Tx Diversity | Same as 6.2.4 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.2.4 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.2H.1.1 UE maximum output power for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: same as 6.2.1 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD |  |
| 6.2H.1.2 UE maximum output power reduction for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: same as 6.2.2 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD |  |
| 6.2H.1.3 UE additional maximum output power reduction for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: same as 6.2.3 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD |  |
| 6.2H.1.4 Configured transmitted power for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: same as 6.2.4 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD |  |
| 6.2H.3.1 UE maximum output power for inter-band UL CA with UL MIMO | MAX (MUCC1, MUCC2) | MUCCX is MU of each UL CC  For the component carrier configured with UL MIMO: Same as 6.2.1 for the sum of power at each of UE antenna connector  For the other component carrier: Same as 6.2.1 |
| 6.2I.1 UE maximum output power for RedCap | Same as 6.2.1 for BW ≤ 20MHz |  |
| 6.2I.2 UE maximum output power for eRedCap | Same as 6.2.1 for BW ≤ 20MHz |  |
| 6.2J.1 UE maximum output power for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.2.1 for the sum of power at each of UE antenna/TAB connector  Otherwise:  FFS | MU is for the sum of power at each of UE antenna/TAB connector, and is the same as the MU of single antenna port in 6.2.1 with SNR assumption reduced by 10\*log10(N); with N = Number of antenna/TAB connectors, compared to the single antenna case. |
| 6.2J.2 Configured transmitted power for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.2.4 for the sum of power at each of UE antenna/TAB connector  Otherwise:  FFS | MU is for the sum of power at each of UE antenna/TAB connector, and is the same as the MU of single antenna port in 6.2.4 with SNR assumption reduced by 10\*log10(N); with N = Number of antenna/TAB connectors, compared to the single antenna case. |
| 6.2L.3.1 UE maximum output power for inter-band UL CA with Tx Diversity | MAX (MUCC1, MUCC2) | MUCCX is MU of each UL CC  For the component carrier configured with Tx Diversity: Same as 6.2.1 for the sum of power at each of UE antenna connector  For the other component carrier: Same as 6.2.1 |
| 6.3.1 Minimum output power | f ≤ 3.0GHz  ±1.0 dB, BW ≤ 40MHz  ±1.4 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.3 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±1.5 dB, BW ≤ 40MHz  ±1.8 dB, 40MHz < BW ≤ 100MHz |  |
| 6.3.2 Transmit OFF power | f ≤ 3.0GHz  ±1.5 dB, BW ≤ 40MHz  ±1.7 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.8 dB, BW ≤ 40MHz  ±1.9 dB, 40MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  4.2GHz < f ≤ 6.0GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  [±2.3] dB, BW ≤ 20MHz  [±2.4] dB, 20MHz < BW ≤ 80MHz  [±2.5] dB, 80MHz < BW ≤ 100MHz |  |
| 6.3.3.2 General ON/OFF time mask | f ≤ 3.0GHz  ±1.5 dB, BW ≤ 40MHz  ±1.7 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.8 dB, BW ≤ 40MHz  ±1.9 dB, 40MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  4.2GHz < f ≤ 6.0GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  [±2.3] dB, BW ≤ 20MHz  [±2.4] dB, 20MHz < BW ≤ 80MHz  [±2.5] dB, 80MHz < BW ≤ 100MHz |  |
| 6.3.3.4 PRACH time mask | f ≤ 3.0GHz  ±1.5 dB, BW ≤ 40MHz  ±1.7 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.8 dB, BW ≤ 40MHz  ±1.9 dB, 40MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  4.2GHz < f ≤ 6.0GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  [±2.3] dB, BW ≤ 20MHz  [±2.4] dB, 20MHz < BW ≤ 80MHz  [±2.5] dB, 80MHz < BW ≤ 100MHz |  |
| 6.3.3.6 SRS time mask | f ≤ 3.0GHz  ±1.5 dB, BW ≤ 40MHz  ±1.7 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.8 dB, BW ≤ 40MHz  ±1.9 dB, 40MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  4.2GHz < f ≤ 6.0GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  [±2.3] dB, BW ≤ 20MHz  [±2.4] dB, 20MHz < BW ≤ 80MHz  [±2.5] dB, 80MHz < BW ≤ 100MHz |  |
| 6.3.4.2 Absolute power tolerance | For UL power ≥ 0 dBm  f ≤ 3.0GHz  ±1.0 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.4 dB, BW ≤ 40MHz  ±1.9 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 40MHz  ±2.2 dB, 40MHz < BW ≤ 100MHz  For UL power < 0 dBm  f ≤ 3.0GHz  ±1.2 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±1.6 dB, BW ≤ 40MHz  ±1.9 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±2.1 dB, BW ≤ 40MHz  ±2.3 dB, 40MHz < BW ≤ 100MHz | Test System uncertainty = SQRT (UL Meas Uncer2 + DL Meas Uncer2) |
| 6.3.4.3 Relative power tolerance | f ≤ 7.125GHz  ±0.7 dB, BW ≤ 40MHz  ±1.0 dB, 40MHz < BW ≤ 100MHz  Absolute Uplink power measurement for step 2.1 same as 6.2.1.  Absolute Uplink power measurement for step 1.1 same as 6.3.1. |  |
| 6.3.4.4 Aggregate power tolerance | f ≤ 7.125GHz  ±0.7 dB, BW ≤ 40MHz  ±1.0 dB, 40MHz < f ≤ 100MHz |  |
| 6.3A.1.1 Minimum output power for CA (2UL CA) | Same as 6.3.1 for each CC  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: Same as 6.3.1  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD |  |
| 6.3A.3.1 Transmit ON/OFF time mask for CA (2UL CA) | Same as 6.3.3.2 for each CC |  |
| 6.3A.3.2 Time mask for switching between two uplink carriers | Same as 6.3.3.2 for each CC |  |
| 6.3A.3.3 Time mask for switching between two uplink carriers with two transmit antenna connectors | Same as 6.3.3.2 for each CC |  |
| 6.3A.3.4 Time mask for switching between one uplink band with one transmit antenna connector and one uplink band with two transmit antenna connectors (3UL CA) | Same as inter-band uncertainty in 6.2A.2.1 for PCell and for sum of power at each of UE antenna connector on SCells. |  |
| 6.3A.3.5 Time mask for switching between two uplink bands with two transmit antenna connectors (3UL CA) | Same as inter-band uncertainty in 6.2A.2.1 and for sum of power at each of UE antenna connector on PCell and SCells. |  |
| 6.3A.3.6 Time mask for switching across three uplink bands | FFS |  |
| 6.3A.3.7 Time mask for switching across four uplink bands | FFS |  |
| 6.3A.4.1.1 Absolute power tolerance for CA (2UL CA) | Same as 6.3.4.2 for each CC |  |
| 6.3A.4.2.1 Power Control Relative power tolerance for CA (2UL CA) | Same as 6.3.4.3 for each CC |  |
| 6.3A.4.3.1 Aggregate power tolerance for CA (2UL CA) | Same as 6.3.4.4 for each CC |  |
| 6.3C.3.3 General transmit ON/OFF time mask for switching between two uplink carriers with two transmit antenna connectors | ON power: Same as 6.3.3.2 for sum of power at each of UE antenna connector on NUL and SUL. |  |
| 6.3C.3.4 General transmit ON/OFF time mask for switching between one uplink band with one transmit antenna connector and one uplink band with two transmit antenna connectors | ON power: Same as 6.3.3.2 for SUL carrier and for sum of power at each of UE antenna connector on NUL carriers |  |
| 6.3C.3.5 General transmit ON/OFF time mask for switching between two uplink bands with two transmit antenna connectors | ON power: Same as 6.3.3.2 for sum of power at each of UE antenna connector on NUL carriers and SUL carrier. |  |
| 6.3C.3.6 Time mask for switching across three uplink bands (3CC) | **Subtest 1:**  ON power: Same as 6.2D.2 for sum of power at each of UE antenna connector on NUL carriers. Same as 6.2C.4 for SUL carrier  **Subtest 2:**  ON power: Same as 6.2A.2.1 for inter-band UL CA for NUL bands. Same as 6.2D.2\_1 for SUL carrier. |  |
| 6.3C.3.6\_1 Time mask for switching across three uplink bands (more than 3CC) | ON power:  Same as 6.2D.2 for NUL band with single UL carrier, and same as 6.2H.1.2 for NUL band with intra-band UL CA carriers.  Same as 6.2C.4 for SUL carrier. |  |
| 6.3C.4.1 Absolute power tolerance for SUL | Same as 6.3.4.2 | Same as 6.3.4.2 |
| 6.3C.4.2 Power Control Relative power tolerance for SUL | Same as 6.3.4.3 | Same as 6.3.4.3 |
| 6.3C.4.3 Aggregate power tolerance for SUL | Same as 6.3.4.4 | Same as 6.3.4.4 |
| 6.3D.1 Minimum output power for UL MIMO | Same as 6.3.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.3.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.3D.1\_1 Minimum output power for SUL with UL MIMO | Same as 6.3D.1 | Same as 6.3D.1 |
| 6.3D.1\_2 Minimum output power UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.3D.2 Transmit OFF power for UL MIMO | Same as 6.3.2 for each antenna |  |
| 6.3D.2\_1 Transmit OFF power for SUL with UL MIMO | Same as 6.3D.2 |  |
| 6.3D.2\_2 Transmit OFF power for UL MIMO for UE supporting 4Tx | FFS |  |
| 6.3D.3 Transmit ON/OFF time mask for UL MIMO | ON power:  Same as 6.2D.1  OFF power:  Same as 6.3D.2 |  |
| 6.3D.3\_1 Transmit ON/OFF time mask for SUL with UL MIMO | Same as 6.3D.3 |  |
| 6.3D.3\_2 Transmit ON/OFF time mask for UL MIMO for UE supporting 4Tx | FFS |  |
| 6.3D.4.1 Absolute Power tolerance | Same as 6.3.4.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.3.4.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.3D.4.1\_1 Absolute power tolerance for SUL with UL MIMO | Same as 6.3D.4.1 | Same as 6.3D.4.1 |
| 6.3D.4.2 Relative Power tolerance | ±0.9 dB, BW ≤ 40MHz  ±1.4 dB, 40MHz < f ≤ 100MHz  Absolute Uplink power measurement for step 2.1 same as 6.2.1.  Absolute Uplink power measurement for step 1.1 same as 6.3.1. | MU is for the sum of power at each of UE antenna connector |
| 6.3D.4.2\_1 Relative power tolerance for SUL with UL MIMO | Same as 6.3D.4.2 | Same as 6.3D.4.2 |
| 6.3D.4.3 Aggregate Power tolerance | Same as 6.3.4.4 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.3.4.4 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.3D.4.3\_1 Aggregate power tolerance for SUL with UL MIMO | Same as 6.3D.4.3 | Same as 6.3D.4.3 |
| 6.3E.1.1 Minimum output power for V2X / non-concurrent operation | Same as 6.3.1 |  |
| 6.3E.1.1D Minimum output power for V2X / non-concurrent operation / SL-MIMO | Same as 6.3.1 for the sum of power at each of UE antenna connector |  |
| 6.3E.2.1 Transmit OFF power for V2X / non-concurrent operation | Same as 6.3.2 |  |
| 6.3E.2.1D Transmit OFF power for V2X / non-concurrent operation / SL-MIMO | Same as 6.3.2 for each antenna |  |
| 6.3E.3.1 Transmit ON/OFF time mask for V2X / non-concurrent operation | Same as 6.3.3.2 |  |
| 6.3E.3.1D Transmit ON/OFF time mask for V2X / non-concurrent operation / SL-MIMO | Same as 6.3.3.2 for each antenna |  |
| 6.3E.4.1.1 Absolute power tolerance for V2X / non-concurrent operation | Same as 6.3.4.2 |  |
| 6.3E.4.1.1D Absolute power tolerance for V2X / non-concurrent operation / SL-MIMO | Same as 6.3.4.2 for the sum of power at each of UE antenna connector |  |
| 6.3F.1 Minimum output power for shared spectrum channel access | 4.2GHz < f ≤ 7.125GHz  ±1.5 dB, BW ≤ 40MHz  ±1.8 dB, 40MHz < BW ≤ 100MHz |  |
| 6.3F.2 Transmit OFF power for shared spectrum channel access | 4.2GHz < f ≤ 6.0GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  [±2.3] dB, BW ≤ 20MHz  [±2.4] dB, 20MHz < BW ≤ 80MHz  [±2.5] dB, 80MHz < BW ≤ 100MHz |  |
| 6.3F.3.2 General ON/OFF time mask for shared spectrum channel access | 4.2GHz < f ≤ 6.0GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  [±2.3] dB, BW ≤ 20MHz  [±2.4] dB, 20MHz < BW ≤ 80MHz  [±2.5] dB, 80MHz < BW ≤ 100MHz |  |
| 6.3F.4.2 Absolute power tolerance for shared spectrum access | For UL power ≥ 0 dBm  4.2GHz < f ≤ 7.125GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 40MHz  ±2.2 dB, 40MHz < BW ≤ 100MHz  For UL power < 0 dBm  4.2GHz < f ≤ 7.125GHz  ±2.1 dB, BW ≤ 40MHz  ±2.3 dB, 40MHz < BW ≤ 100MHz | Test System uncertainty = SQRT (UL Meas Uncer2 + DL Meas Uncer2) |
| 6.3F.4.3 Relative power tolerance for shared spectrum channel access | Same as 6.3.4.3 for f ≤ 7.125GHz |  |
| 6.3F.4.4 Aggregate power tolerance for shared spectrum channel access | Same as 6.3.4.4 for f ≤ 7.125GHz |  |
| 6.3G.1 Minimum output power for Tx Diversity | Same as 6.3.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.3.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.3G.1\_1 Minimum output power for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.3G.2 Transmit OFF power for Tx Diversity | Same as 6.3.2 for each antenna |  |
| 6.3G.2\_1 Transmit OFF power for Tx Diversity for UE supporting 4Tx | FFS |  |
| 6.3G.3.1 General ON/OFF time mask for Tx Diversity | ON power:  Same as 6.2G.1  OFF power:  Same as 6.3G.2 |  |
| 6.3G.3.1\_1 General ON/OFF time mask for Tx Diversity for UE supporting 4Tx | FFS |  |
| 6.3G.3.2 PRACH time mask for Tx Diversity | Same as 6.3.3.4 for each antenna |  |
| 6.3G.3.3 SRS time mask for Tx Diversity | Same as 6.3.3.6 for each antenna |  |
| 6.3G.4.1 Absolute power tolerance for Tx Diversity | Same as 6.3.4.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.3.4.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.3G.4.2 Relative power tolerance for Tx Diversity | Same as 6.3.4.3 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.3.4.3 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.3G.4.3 Aggregate power tolerance for Tx Diversity | Same as 6.3.4.4 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.3.4.4 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.3H.1.1 Minimum output power for intra-band UL contiguous CA with UL MIMO | For each CC, same as 6.3.1 for the sum of power at each of UE antenna connector |  |
| 6.3H.1.2 Transmit OFF power for intra-band UL contiguous CA with UL MIMO | For each CC, same as 6.3.2 for each antenna |  |
| 6.3H.1.3 Transmit ON/OFF time mask for intra-band UL contiguous CA with UL MIMO | ON power:  Same as 6.2H.1.2  OFF power:  Same as 6.3H.1.2 |  |
| 6.3J.1 Minimum output power for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.3.1 for the sum of power of all antenna connectors (for ATG UE with omni-directional antennas) or of all TAB connectors (for ATG UE with antenna array)  Otherwise: FFS | MU is for the sum of power at each of UE antenna/TAB connector, and is the same as the MU of single antenna port in 6.2.1 with SNR assumption reduced by 10\*log10(N); with N = Number of antenna/TAB connectors, compared to the single antenna case. |
| 6.3J.2 Transmit OFF power for ATG | For ATG UEs with *maxOutputPowerATG-r18* up to 31dBm (up to PC1):  Same as 6.3.2 for each UE antenna/TAB connector  Otherwise, for each UE antenna/TAB connector:  f ≤ 3.0GHz  ±2.15 dB, BW ≤ 40MHz  ±2.35 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±2.45 dB, BW ≤ 40MHz  ±2.55 dB, 40MHz < BW ≤ 80MHz  ±2.85 dB, 80MHz < BW ≤ 100MHz  4.2GHz < f ≤ 6.0GHz  ±2.65 dB, BW ≤ 20MHz  ±2.75 dB, 20MHz < BW ≤ 80MHz  ±2.85 dB, 80MHz < BW ≤ 100MHz | Values achieved applying the relaxations defined in Table 6.3J.2.5-3. |
| 6.3J.3.3 PRACH time mask for ATG | FFS |  |
| 6.3J.3.4 SRS time mask for ATG | FFS |  |
| 6.3J.4.1 Absolute power tolerance for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.3.4.2 for the sum of power at each of UE antenna connector/TAB connector  Otherwise:  FFS | MU is for the sum of power at each of UE antenna/TAB connector, and is the same as the MU of single antenna port in 6.3.4.2 with SNR assumption reduced by 10\*log10(N); with N = Number of antenna/TAB connectors, compared to the single antenna case. |
| 6.3J.4.2 Relative power tolerance for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  ±0.7 dB, BW ≤ 40MHz  ±1.0 dB, 40MHz < BW ≤ 100MHz  Absolute Uplink power measurement for step 2.1 same as 6.2J.1.  Absolute Uplink power measurement for step 1.1 same as 6.3J.1.  Otherwise:  FFS | MU is for the sum of power at each of UE antenna/TAB connector, and is the same as the MU of single antenna port in 6.3.4.3 with SNR assumption reduced by 10\*log10(N); with N = Number of antenna/TAB connectors, compared to the single antenna case. |
| 6.3J.4.3 Aggregate power tolerance for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.3.4.4 for the sum of power at each of UE antenna connector/TAB connector  Otherwise:  FFS | MU is for the sum of power at each of UE antenna/TAB connector, and is the same as the MU of single antenna port in 6.3.4.4 with SNR assumption reduced by 10\*log10(N); with N = Number of antenna/TAB connectors, compared to the single antenna case. |
| 6.4.1 Frequency Error | ±15 Hz, f ≤ 3.0GHz  ±36 Hz, f > 3.0GHz  DL Signal level:  ±0.7 dB, f ≤ 3.0GHz  ±1.0 dB, 3.0GHz < f ≤ 4.2GHz  ±1.5 dB, 4.2GHz < f ≤ 7.125GHz |  |
| 6.4.2.1 Error Vector Magnitude | For up to 256QAM:  f ≤ 6.0GHz, BW ≤ 100MHz  15 dBm < PUL  PUSCH, PUCCH, PRACH: ±1.5 %  -25 dBm < PUL ≤ 15 dBm  PUSCH, PUCCH, PRACH: ±2.5 %  -40dBm ≤ PUL ≤ -25dBm  PUSCH, PUCCH, PRACH: ±3.0 %  For up to 256QAM:  6.0GHz < f ≤ 7.125GHz, BW ≤ 100MHz  15 dBm < PUL  PUSCH, PUCCH, PRACH: [±1.5] %  -25 dBm < PUL ≤ 15 dBm  PUSCH, PUCCH, PRACH: [±3.0] %  -40dBm ≤ PUL ≤ -25dBm  PUSCH, PUCCH, PRACH: [±3.9] %  Absolute Uplink power measurement same as 6.3.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4.2.1a Error Vector Magnitude including symbols with transient period | f ≤ 6.0GHz, BW ≤ 100MHz  ±2.28 %  6.0GHz < f ≤ 7.125GHz, BW ≤ 100MHz  TBD  Absolute Uplink power measurement same as 6.3.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4.2.2 Carrier Leakage | f ≤ 3.0GHz  ±0.8 dB, BW ≤ 40MHz  ±1.5 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±0.8 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±1.0 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  Absolute Uplink power measurement for step 2 and step 4 same as 6.2.1.  Absolute Uplink power measurement for step 6 and step 8 same as 6.3.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4.2.3 In-band emissions | f ≤ 3.0GHz  ±0.8 dB, BW ≤ 40MHz  ±1.5 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±0.8 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±1.0 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  Absolute Uplink power measurement for steps 1.2, 1.4, 2.2, and 2.4 same as 6.2.1.  Absolute Uplink power measurement for steps 1.6, 1.8, 2.6, and 2.8 same as 6.3.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4.2.4 EVM equalizer spectrum flatness | f ≤ 7.125GHz  ±1.4 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz |  |
| 6.4.2.5 EVM equalizer spectrum flatness for Pi/2 BPSK | Same as 6.4.2.4 |  |
| 6.4A.1.1 Frequency error for CA (2UL CA) | For inter-band CA: same as 6.4.1 for each CC  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: Same as 6.4.1 for each CC  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD |  |
| 6.4A.2.1.1 Error Vector Magnitude for CA (2UL CA) | For inter-band CA: same as 6.4.2.1 for each CC  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: Same as 6.4.2.1 for each CC  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD  Absolute Uplink power measurement same as 6.3A.1.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4A.2.2.1 Carrier leakage for CA (2UL CA) | For inter-band CA: same as 6.4.2.2 for each CC  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: Same as 6.4.2.2 for each CC  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD  Uplink power measurement for step 5 and step 7 same as 6.2A.1.1.  Absolute Uplink power measurement for step 9 and step 11 same as 6.3A.1.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4A.2.3.1 In-band emission for CA (2UL CA) | For inter-band CA: same as 6.4.2.3 for each CC  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: Same as 6.4.2.3 for each CC  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD  Absolute Uplink power measurement for step 5 and step 7 same as 6.2A.1.1.  Absolute Uplink power measurement for step 9 and step 11 same as 6.3A.1.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4C.1 Frequency error for SUL | Same as 6.4.1 |  |
| 6.4C.2.1 Error Vector Magnitude for SUL | Same as 6.4.2.1 |  |
| 6.4C.2.2 Carrier leakage for SUL | Same as 6.4.2.2 |  |
| 6.4C.2.3 In-band emissions for SUL | Same as 6.4.2.3 |  |
| 6.4C.2.4 EVM equalizer spectrum flatness for SUL | Same as 6.4.2.4 |  |
| 6.4D.1 Frequency error for UL MIMO | Same as 6.4.1 for each antenna |  |
| 6.4D.1\_1 Frequency error for SUL with UL MIMO | Same as 6.4D.1 |  |
| 6.4D.1\_2 Frequency error for UL MIMO for UE supporting 4Tx | Same as 6.4D.1 |  |
| 6.4D.2.1 Error Vector Magnitude for UL MIMO | Same as 6.4.2.1 for each antenna  Absolute Uplink power measurement same as 6.3D.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4D.2.1\_1 Error Vector Magnitude for SUL with UL MIMO | Same as 6.4D.2.1 |  |
| 6.4D.2.2 Carrier leakage for UL MIMO | Same as 6.4.2.2 for each antenna  Absolute Uplink power measurement for step 2 and step 4 same as 6.2D.1.  Absolute Uplink power measurement for step 6 and step 8 same as 6.3D.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4D.2.2\_1 Carrier leakage for SUL with UL MIMO | Same as 6.4D.2.2 |  |
| 6.4D.2.3 In-band emissions for UL MIMO | Same as 6.4.2.3 for each antenna  Absolute Uplink power measurement for steps 1.2 and 1.4 same as 6.2D.1.  Absolute Uplink power measurement for steps 1.6 and 1.8 same as 6.3D.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4D.2.3\_1 In-band emissions for SUL with UL MIMO | Same as 6.4D.2.3 |  |
| 6.4D.2.4 EVM equalizer spectrum flatness for UL MIMO | Same as 6.4.2.4 for each antenna |  |
| 6.4D.2.4\_1 EVM equalizer spectrum flatness for SUL with UL MIMO | Same as 6.4.2.4 for each antenna |  |
| 6.4D.3 Time alignment error for UL MIMO | ±25ns |  |
| 6.4D.3\_1 Time alignment error for SUL with UL MIMO | ±25ns |  |
| 6.4D.4 Requirements for Coherent UL MIMO | FFS |  |
| 6.4E.1.1 Frequency error for V2X / non-concurrent operation | Same as 6.4.1 |  |
| 6.4E.1.1D Frequency error for V2X / non-concurrent operation / SL-MIMO | Same as 6.4.1 for each antenna |  |
| 6.4E.2.2.1 Error Vector Magnitude for V2X / non-concurrent operation | Same as 6.4.2.1 |  |
| 6.4E.2.2.1D Error Vector Magnitude for V2X / non-concurrent operation / SL-MIMO | Same as 6.4.2.1 for each antenna |  |
| 6.4E.2.3.1 Carrier leakage for V2X / non-concurrent operation | Same as 6.4.2.2 |  |
| 6.4E.2.3.1D Carrier leakage for V2X / non-concurrent operation / SL-MIMO | Same as 6.4.2.2 for each antenna |  |
| 6.4E.2.4.1 In-band emissions for V2X / non-concurrent operation | Same as 6.4.2.3 |  |
| 6.4E.2.4.1D In-band emissions for V2X / non-concurrent operation / SL-MIMO | Same as 6.4.2.3 for each antenna |  |
| 6.4E.2.5.1 EVM equalizer spectrum flatness for V2X / non-concurrent operation | Same as 6.4.2.4 |  |
| 6.4E.2.5.1D EVM equalizer spectrum flatness for V2X / non-concurrent operation / SL-MIMO | Same as 6.4.2.4 for each antenna |  |
| 6.4F.1 Frequency Error for shared spectrum access | ±36 Hz, f > 3.0GHz  DL Signal level:  ±1.5 dB, 4.2GHz < f ≤ 7.125GHz |  |
| 6.4F.2.1 Error Vector Magnitude for shared spectrum access | Same as 6.4.2.1 |  |
| 6.4F.2.2 Carrier Leakage | f ≤ 3.0GHz  ±0.8 dB, BW ≤ 40MHz  ±1.5 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±0.8 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±1.0 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  Absolute Uplink power measurement for step 2 and step 4 same as 6.2.1.  Absolute Uplink power measurement for step 6 and step 8 same as 6.3.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4F.2.3 In-band emissions | f ≤ 3.0GHz  ±0.8 dB, BW ≤ 40MHz  ±1.5 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±0.8 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±1.0 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz  Absolute Uplink power measurement for steps 1.2, 1.4, 2.2, and 2.4 same as 6.2.1.  Absolute Uplink power measurement for steps 1.6, 1.8, 2.6, and 2.8 same as 6.3.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4F.2.4 EVM equalizer spectrum flatness | ±1.4 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz |  |
| 6.4G.1 Frequency Error for Tx Diversity | Same as 6.4.1 for each antenna |  |
| 6.4G.1\_1 Frequency error for Tx Diversity for UE supporting 4Tx | Same as 6.4.1 for each antenna |  |
| 6.4G.2.1 Error Vector Magnitude for Tx Diversity | Total EVM:  P1>Pmin and P2>Pmin:  Same as 6.4.2.1 using min(P1,P2) for PUL  Otherwise:  Same as 6.4.2.1 using max(P1,P2) for PUL  Uplink power measurement per antenna port when computing total EVM at power close to maximum output power:  -Same as 6.2.1.  Uplink power measurement per antenna port when computing total EVM at power close to minimum output power:  -Same as 6.3.1.  Relative Uplink power measurement:  -Same as 6.3.4.3 |  |
| 6.4G.2.2 Carrier Leakage for Tx Diversity | Same as 6.4.2.2 for each antenna  Absolute Uplink power measurement for step 2 and step 4 same as 6.2G.1.  Absolute Uplink power measurement for step 6 and step 8 same as 6.3G.1.  Relative Uplink power measurement same as 6.3G.4.3. |  |
| 6.4G.2.3 In-band emissions for Tx Diversity | Same as 6.4.2.3 for each antenna  Absolute Uplink power measurement for steps 1.2 and 1.4 same as 6.2G.1.  Absolute Uplink power measurement for steps 1.6 and 1.8 same as 6.3G.1.  Relative Uplink power measurement same as 6.3G.4.3. |  |
| 6.4G.2.4 EVM equalizer spectrum flatness for Tx Diversity | ±1.4 dB, BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz |  |
| 6.4H.1.1 Frequency error for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: Same as 6.4.1 for each antenna on each CC  Aggregated BW > 100M: TBD |  |
| 6.4H.1.2.1 Error Vector Magnitude for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: Same as 6.4D.2.1 for each layer on each CC  Aggregated BW > 100M: TBD |  |
| 6.4H.1.2.2 Carrier leakage for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: Same as 6.4.2.2 for each antenna on each CC  Aggregated BW > 100M: TBD  Uplink power measurement for step 5 and step 7 same as 6.2A.1.1.  Absolute Uplink power measurement for step 9 and step 11 same as 6.3A.1.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4H.1.2.3 In-band emissions for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: Same as 6.4.2.3 for each antenna on each CC  Aggregated BW > 100M: TBD  Absolute Uplink power measurement for step 5 and step 7 same as 6.2A.1.1.  Absolute Uplink power measurement for step 9 and step 11 same as 6.3A.1.1.  Relative Uplink power measurement same as 6.3.4.3. |  |
| 6.4H.1.3 Time alignment error for intra-band UL contiguous CA with UL MIMO | Same as 6.4D.3 for each CC |  |
| 6.4H.1.4 Coherent UL MIMO for intra-band UL contiguous CA with UL MIMO | FFS |  |
| 6.4J.1 Frequency error for ATG | Same as 6.4.1 for each UE antenna/TAB connector | Minimum requirement + TT |
| 6.4J.2.1 Error Vector Magnitude for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  For up to 256QAM:  f ≤ 6.0GHz, BW ≤ 100MHz  PUL = Maximum Output Power  PUSCH, PUCCH, PRACH: ±2 % at each UE antenna/TAB connector  PUL = Minimum Output Power  PUSCH, PUCCH, PRACH: ±3.0 % at each UE antenna/TAB connector  Absolute Uplink power measurement same as 6.3J.1.  Relative Uplink power measurement same as 6.3J.4.2. |  |
| 6.4J.2.1a Error Vector Magnitude including symbols with transient period for ATG | FFS |  |
| 6.4J.2.4 EVM equalizer spectrum flatness for ATG | FFS |  |
| 6.4J.2.5 EVM equalizer spectrum flatness for Pi/2 BPSK for ATG | FFS |  |
| 6.5.1 Occupied bandwidth | f ≤ 7.125GHz  1.5% of channel bandwidth |  |
| 6.5.2.2 Spectrum Emission Mask | ±1.5 dB, f ≤ 3.0GHz  ±1.8 dB, 3.0GHz < f ≤ 4.2GHz  ±2.0 dB, 4.2GHz < f ≤ 7.125GHz |  |
| 6.5.2.3 Additional spectrum emission mask | ±1.5 dB, f ≤ 3.0GHz  ±1.8 dB, 3.0GHz < f ≤ 4.2GHz  ±2.0 dB, 4.2GHz < f ≤ 7.125GHz |  |
| 6.5.2.4.1 NR ACLR | ±0.8 dB, f ≤ 4.0GHz  ±1.0 dB, 4.0GHz < f ≤ 7.125GHz |  |
| 6.5.2.4.2 UTRA ACLR | ±0.8 dB, f ≤ 4.0GHz  ±1.0 dB, 4.0GHz < f ≤ 7.125GHz |  |
| 6.5.3.1 General spurious emissions | for results > -60 dBm:  ±2.0 dB, 9kHz < f ≤ 3GHz  ±2.5 dB, 3GHz < f ≤ 4GHz  ±4.0 dB, 4GHz < f ≤ 19GHz  ±6.0 dB, 19GHz < f ≤ 26GHz |  |
| 6.5.3.2 Spurious emission for UE co-existence | for results > -60 dBm:  ±2.0 dB, 9kHz < f ≤ 3GHz  ±2.5 dB, 3GHz < f ≤ 4GHz  ±4.0 dB, 4GHz < f ≤ 19GHz  ±6.0 dB, 19GHz < f ≤ 26GHz |  |
| 6.5.3.3 Additional spurious emissions | for results > -60 dBm:  ±2.0 dB, 9kHz < f ≤ 3GHz  ±2.5 dB, 3GHz < f ≤ 4GHz  ±4.0 dB, 4GHz < f ≤ 19GHz  ±6.0 dB, 19GHz < f ≤ 26GHz |  |
| 6.5.4 Transmit intermodulation | f ≤ 3.0GHz  ±2.7 dB, BW ≤ 40MHz  ±3.1 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 4.2GHz  ±3.7 dB, BW ≤ 40MHz  ±4.0 dB, 40MHz < BW ≤ 100MHz  4.2GHz < f ≤ 7.125GHz  ±5.1 dB, BW ≤ 40MHz  ±5.3 dB, 40MHz < BW ≤ 100MHz | Overall system uncertainty comprises four quantities:  1. Wanted signal setting error  2. CW Interferer level error  3. Wanted signal meas. error  4. Intermodulation product measurement error  The relative level of the wanted signal and the CW interferer has 2 x effect on the intermodulation product.  Items 1, 2, 3 and 4 are assumed to be uncorrelated so can be root sum squared to provide the combined effect.  Test System uncertainty = SQRT [(2 x SQRT (Wanted setting\_error2 + CW\_level\_error2)) 2 + Wanted\_level\_meas error2 + Intermodulation product measurement error2] |
| 6.5A.1.1 Occupied bandwidth for CA (2UL CA) | For inter-band CA: same as 6.5.1 for each CC  For intra-band CA:  Aggregated BW ≤ 100M: same as 6.5.1 for aggregated channel bandwidth  Aggregated BW > 100M: TBD |  |
| 6.5A.2.2.1 Spectrum emission mask for CA (2UL CA) | For inter-band CA: same as 6.5.2.2 for each CC  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.2.2  Aggregated BW > 100M: TBD |  |
| 6.5A.2.3.1 Additional Spectrum emission mask for CA (2UL CA) | For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.2.3  Aggregated BW > 100M: TBD |  |
| 6.5A.2.4.1.1 NR ACLR for CA (2UL CA) | For inter-band CA: same as 6.5.2.4.1 for each CC  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.2.4.1  Aggregated BW > 100M: TBD |  |
| 6.5A.2.4.2.1 URTA ACLR for CA (2UL CA) | For inter-band CA: same as 6.5.2.4.2 for each CC |  |
| 6.5A.3.1.1 General spurious emissions for CA (2UL CA) | For inter-band CA: same as 6.5.3.1 for each CC  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.3.1  Aggregated BW > 100M: TBD |  |
| 6.5A.3.2.1 Spurious emission for UE co-existence for CA (2UL CA) | For inter-band CA: same as 6.5.3.2 for each CC  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.3.2  Aggregated BW > 100M: TBD |  |
| 6.5A.3.3.1 Additional Spurious emission for CA (2UL CA) | For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.3.2  Aggregated BW > 100M: TBD |  |
| 6.5A.4.1 Transmit intermodulation for CA (2UL CA) | For inter-band CA: same as 6.5.4, for each CC  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: same as 6.5.4, for each CC  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD |  |
| 6.5C.1 Occupied bandwidth for SUL | Same as 6.5.1 |  |
| 6.5C.2.2 Spectrum Emission Mask for SUL | Same as 6.5.2.2 |  |
| 6.5C.2.3 Additional spectrum emission mask for SUL | Same as 6.5.2.3 |  |
| 6.5C.2.4.1 NR ACLR for SUL | Same 6.5.2.4.1 |  |
| 6.5C.2.4.2 UTRA ACLR for SUL | Same as 6.5.2.4.2 |  |
| 6.5C.3.1 General spurious emissions for SUL | Same as 6.5.3.1 |  |
| 6.5C.3.2 Spurious emission for UE co-existence for SUL | Same as 6.5.3.2 |  |
| 6.5C.3.3 Additional spurious emissions for SUL | Same as 6.5.3.3 |  |
| 6.5C.4 Transmit intermodulation for SUL | Same as 6.5.4 |  |
| 6.5D.1 Occupied bandwidth for UL MIMO | Same as 6.5.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.1\_2 Occupied bandwidth for SUL with UL MIMO | Same as 6.5D.1 |  |
| 6.5D.1\_3 Occupied bandwidth for UL MIMO for UE supporting 4Tx | Same as 6.5D.1 | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.1 with SNR assumption reduced by 6dB compared to the single antenna case. |
| 6.5D.2.2 Spectrum emission mask for UL MIMO | Same as 6.5.2.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.2.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.2.2\_1 Spectrum emission mask for SUL with UL MIMO | Same as 6.5D.2.2 |  |
| ]6.5D.2.3 Additional spectrum emission mask for UL MIMO | Same as 6.5.2.3 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.2.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.2.4.1 NR ACLR for UL MIMO | Same as 6.5.2.4.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.2.4.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.2.4.1\_1 NR ACLR for SUL with UL MIMO | Same as 6.5.2.4.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.2.4.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.2.4.1\_2 NR ACLR for UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.5D.2.4.2 UTRA ACLR for UL MIMO | Same as 6.5.2.4.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.2.4.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.2.4.2\_1 UTRA ACLR for SUL with UL MIMO | Same as 6.5.2.4.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.2.4.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.3.1 General spurious emissions for UL MIMO | Same as 6.5.3.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.3.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.3.2 Spurious emissions for UE co-existence for UL MIMO | Same as 6.5.3.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.3.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.3.3 Additional spurious emissions for UL MIMO | Same as 6.5.3.3 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.3.3 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.3\_1.1 General spurious emissions for UL MIMO (Rel-16 onward) | Same as 6.5.3.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.3.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.3\_1.2 Spurious emissions for UE co-existence for UL MIMO (Rel-16 onward) | Same as 6.5.3.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.3.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.3\_1.3 Additional spurious emissions for UL MIMO (Rel-16 onward) | Same as 6.5.3.3 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.3.3 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.3\_2.1 General spurious emissions for SUL with UL MIMO | Same as 6.5.3.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.3.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.3\_2.2 Spurious emissions for UE co-existence for SUL with UL MIMO | Same as 6.5.3.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.3.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.3\_2.3 Additional spurious emissions for SUL with UL MIMO | Same as 6.5.3.3 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna port in 6.5.3.3 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5D.3\_3.1 General spurious emissions for UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.5D.3\_3.2 Spurious emissions for UE co-existence for UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.5D.4 Transmit intermodulation for UL MIMO | Same as 6.5.4 for each antenna |  |
| 6.5D.4\_1 Transmit intermodulation for SUL with UL MIMO | Same as 6.5.4 for each antenna |  |
| 6.5D.4\_2 Transmit intermodulation for UL MIMO for UE supporting 4Tx | FFS |  |
| 6.5E.1.1 Occupied bandwidth for V2X / non-concurrent operation | Same as 6.5.1 |  |
| 6.5E.1.1D Occupied bandwidth for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.1 for each antenna |  |
| 6.5E.2.2.1 Spectrum emission mask for V2X / non-concurrent operation | Same as 6.5.2.2 |  |
| 6.5E.2.2.1D Spectrum emission mask for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.2.2 for each antenna |  |
| 6.5E.2.2.2 Spectrum emission mask for V2X / concurrent operation | For Inter-band concurrent operation  MAX (MUNR, MUSL)  For Intra-band concurrent operation  Aggregated BW ≤ 100M: same as 6.5.3.2  Aggregated BW > 100M: TBD | MUNR is MU of NR CC specified in single UL case 6.5.2.2. MUSL is MU of SL CC specified in single UL case 6.5E.2.2.1. |
| 6.5E.2.3.1 Additional Spectrum emission mask for V2X / non-concurrent operation | Same as 6.5.2.3 |  |
| 6.5E.2.3.1D Additional Spectrum emission mask for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.2.3 for each antenna |  |
| 6.5E.2.4.1 Adjacent channel leakage ratio for V2X / non-concurrent operation | Same as 6.5.2.4 |  |
| 6.5E.2.4.1D Adjacent channel leakage ratio for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.2.4 for each antenna |  |
| 6.5E.2.4.2 Adjacent channel leakage for V2X / concurrent operation | For Inter-band concurrent operation  MAX (MUNR, MUSL)  For Intra-band concurrent operation  Aggregated BW ≤ 100M: Same as 6.5.2.4.1  Aggregated BW > 100M: TBD | MUNR is MU of NR CC specified in single UL case 6.5.2.4. MUSL is MU of SL CC specified in single UL case 6.5E.2.4.1. |
| 6.5E.3.1.1 General spurious emissions for V2X / non-concurrent operation | Same as 6.5.3.1 |  |
| 6.5E.3.1.1D General spurious emissions for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.3.1 for each antenna |  |
| 6.5E.3.2.1 Spurious emissions for UE co-existence for V2X / non-concurrent operation | Same as 6.5.3.2 |  |
| 6.5E.3.2.1D Spurious emissions for UE co-existence for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.3.2 for each antenna |  |
| 6.5E.3.2.2 Spurious emissions for UE co-existence for V2X / concurrent operation | For Inter-band concurrent operation  MAX (MUNR, MUSL)  For Intra-band concurrent operation  Aggregated BW ≤ 100M: same as 6.5.3.2  Aggregated BW > 100M: TBD | MUNR is MU of NR CC specified in single UL case 6.5.3.2. MUSL is MU of SL CC specified in single UL case 6.5E.3.2.1. |
| 6.5E.3.3.1 Additional spurious emissions requirements for V2X / non-concurrent operation | Same as 6.5.3.3 |  |
| 6.5E.4.1 Transmit intermodulation for V2X / non-concurrent operation | Same as 6.5.4 |  |
| 6.5E.4.1D Transmit intermodulation for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.4 for each antenna |  |
| 6.5E.4.2 Transmit intermodulation for V2X con-current operation | For intra-band concurrent operation:  Aggregated BW ≤ 100M: same as 6.5.4, for each CC  Aggregated BW > 100M: TBD |  |
| 6.5F.1 Occupied bandwidth for shared spectrum channel access | Same as 6.5.1 for f ≤ 7.125GHz |  |
| 6.5F.2.2 Spectrum emission mask for operation with shared spectrum channel access | ±1.5 dB, f ≤ 3.0GHz  ±1.8 dB, 3.0GHz < f ≤ 4.2GHz  ±2.0 dB, 4.2GHz < f ≤ 7.125GHz |  |
| 6.5F.2.4.1 NR ACLR | ±0.8 dB, f ≤ 4.0GHz  ±1.0 dB, 4.0GHz < f ≤ 7.125GHz |  |
| 6.5F.2.4.2 Shared spectrum channel access ACLR with additional requirement for NS\_29 | ±0.8 dB, f ≤ 4.0GHz  ±1.0 dB, 4.0GHz < f ≤ 7.125GHz |  |
| 6.5F.3.1 General spurious emissions | Same as in 6.5.3.1 |  |
| 6.5F.3.3 Additional spurious emissions for shared spectrum channel access | Same as in 6.5.3.1 |  |
| 6.5F.4 Transmit intermodulation for shared spectrum channel access | Same as 6.5.4 for each antenna with exception:  4.2GHz < f ≤ 7.125GHz  ±5.1 dB, BW ≤ 40MHz  ±5.3 dB, 40MHz < BW ≤ 100MHz |  |
| 6.5G.1 Occupied bandwidth for Tx Diversity | Same as 6.5.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.5.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5G.1\_1 Occupied bandwidth for Tx Diversity for UE supporting 4Tx | Same as 6.5.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.5.1 with SNR assumption reduced by 6dB compared to the single antenna case. |
| 6.5G.2.1 Spectrum emission mask for Tx Diversity | Same as 6.5.2.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.5.2.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5G.2.1\_1 Spectrum emission mask for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.5G.2.2 Additional spectrum emission mask for Tx Diversity | Same as 6.5.2.3 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.5.2.3 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5G.2.3.1 NR ACLR for Tx Diversity | Same as 6.5.2.4.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.5.2.4.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5G.2.3.1\_1 NR ACLR for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.5G.2.3.2 UTRA ACLR for Tx Diversity | Same as 6.5.2.4.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.5.2.4.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5G.3.1 General spurious emissions for Tx Diversity | Same as 6.5.3.1 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.5.3.1 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5G.3.2 Spurious emissions for UE co-existence for Tx Diversity | Same as 6.5.3.2 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.5.3.2 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5G.3.1\_1 General spurious emissions for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.5G.3.2\_1 Spurious emissions for UE co-existence for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.5G.3.3 Additional spurious emissions for Tx Diversity | Same as 6.5.3.3 for the sum of power at each of UE antenna connector | MU is for the sum of power at each of UE antenna connector, and is the same as the MU of single antenna connector in 6.5.3.3 with SNR assumption reduced by 3dB compared to the single antenna case. |
| 6.5G.4 Transmit intermodulation for Tx Diversity | Same as 6.5.4 for each antenna |  |
| 6.5G.4\_1 Transmit intermodulation for Tx Diversity for UE supporting 4Tx | FFS |  |
| 6.5H.1.1 Occupied bandwidth for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.1 for the sum of power at each UE antenna connector on aggregated channel bandwidth  Aggregated BW > 100M: TBD |  |
| 6.5H.1.2.1 Spectrum emission mask for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.2.2 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD |  |
| 6.5H.1.2.2 Additional spectrum emission mask for intra-band UL contiguous CA for UL MIMO | For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.2.3 for sum of power at each UE antenna connector  Aggregated BW > 100M: TBD |  |
| 6.5H.1.2.3 NR ACLR for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.2.4.1 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD |  |
| 6.5H.1.3.1 General spurious emissions for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.3.1 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD |  |
| 6.5H.1.3.2 Spurious emissions for UE co-existence for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.3.2 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD |  |
| 6.5H.1.3.3 Additional spurious emissions for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.3.3 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD |  |
| 6.5H.1.4 Transmit intermodulation for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.4, for each antenna on each CC  Aggregated BW > 100M: TBD |  |
| 6.5H.3.3.1 General spurious emissions for inter-band UL CA with UL MIMO | Same as 6.5D.3.1 for the carrier configured with UL MIMO  Same as 6.5.3.1 for the carrier without UL MIMO |  |
| 6.5H.3.3.2 Spurious emissions for UE co-existence for inter-band UL CA with UL MIMO | Same as 6.5D.3.2 for the carrier configured with UL MIMO  Same as 6.5.3.2 for the carrier without UL MIMO |  |
| 6.5J.1 Occupied bandwidth for ATG | Same as 6.5.1 for each UE antenna/TAB connector  Otherwise:  FFS |  |
| 6.5J.2.2 Spectrum emissions Mask for ATG | Same as 6.5.2.2 for each UE antenna/TAB connector | Minimum requirement + TT |
| 6.5J.3.1 General spurious emissions for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.5.3.1 for the sum of power at each of UE antenna/TAB connector  Otherwise:  FFS | MU is for the sum of power at each of UE antenna/TAB connector, and is the same as the MU of single antenna port in 6.2.1 with SNR assumption reduced by 10\*log10(N); with N = Number of antenna/TAB connectors, compared to the single antenna case. |
| 6.5L.3.3.1 General spurious emissions for inter-band UL CA with Tx Diversity | Same as 6.5G.3.1 for the carrier configured with Tx Diversity  Same as 6.5.3.1 for the carrier without Tx Diversity |  |
| 6.5L.3.3.2 Spurious emissions for UE co-existence for inter-band UL CA with Tx Diversity | Same as 6.5G.3.2 for the carrier configured with Tx Diversity  Same as 6.5.3.2 for the carrier without Tx Diversity |  |

## F.1.3 Measurement of receiver

- MU and TT for f>6GHz (band n96, n104) already defined are working assumption based on analysis of single TE vendor. Values will be revisited once analysis from other TE vendors is available.

- MU and TT for f>6GHz (bands n96, n104) are FFS for test cases requiring operation in carrier aggregation, UL MIMO or Tx Diversity.

Table F.1.3-1: Maximum Test System Uncertainty for receiver tests

|  |  |  |
| --- | --- | --- |
| Subclause | Maximum Test System Uncertainty | Derivation of Test System Uncertainty |
| 7.3.2 Reference sensitivity power level | ±0.7 dB, f ≤ 3.0GHz  ±1.0 dB, 3.0GHz < f ≤ 4.2GHz  ±1.5 dB, 4.2GHz < f ≤ 7.125GHz |  |
| 7.3.2\_1 Reference sensitivity power level for XR | Same as 7.3.2 |  |
| 7.3A Reference sensitivity for CA  (Same MU apply to all subsections including 7.3A.1, 7.3A.1\_1, 7.3A.2, 7.3A.3, 7.3A.4, etc.) | Same as 7.3.2 for each component carrier |  |
| 7.3C.2 Reference sensitivity power level | Same as 7.3.2 |  |
| 7.3D Reference sensitivity for MIMO | Same as 7.3.2 |  |
| 7.3D.2\_1 Reference sensitivity power level for SUL with UL MIMO | Same as 7.3D |  |
| 7.3D.2\_3 Reference sensitivity power level for UL MIMO for UE supporting 4Tx | Same as 7.3.2 |  |
| 7.3E.2 Reference sensitivity for V2X / non-concurrent operation | Same as 7.3.2 |  |
| 7.3E.3 Reference sensitivity for V2X / Concurrent operation | Same as 7.3.2 for NR V2X carrier and NR FR1 carrier |  |
| 7.3F.2 Reference sensitivity power level | ±0.7 dB, f ≤ 3.0GHz  ±1.0 dB, 3.0GHz < f ≤ 4.2GHz  ±1.5 dB, 4.2GHz < f ≤ 7.125GHz |  |
| 7.3G.1 Reference sensitivity for Tx Diversity for UE supporting 4Tx | Same as 7.3.2 |  |
| 7.3I.2 Reference sensitivity power level for RedCap | Same as 7.3.2 |  |
| 7.3I.3 Reference sensitivity power level for eRedCap | Same as 7.3.2 |  |
| 7.3J.2 Reference sensitivity power level for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Downlink power same as 7.3.2  Uplink power measurement same as 6.2J.1  Otherwise: FFS | The overall UL power is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.4 Maximum input level | Downlink power  ±0.7 dB, f ≤ 3.0GHz  ±1.0 dB, 3.0GHz < f ≤ 4.2GHz  ±1.5 dB, 4.2GHz < f ≤ 6.0GHz  [±2.0] dB, 6.0GHz < f ≤ 7.125GHz  Uplink power measurement same as 6.2.1 |  |
| 7.4A Maximum input level for CA  (Same MU apply to all subsections including 7.4A.1, 7.4A.2, 7.4A.3, 7.4A.4, etc.) | Same as 7.4 for each component carrier |  |
| 7.4D Maximum input level for UL MIMO | Downlink power same as 7.4  Uplink power measurement same as 6.2D.1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.4D\_1 Maximum input level for SUL with UL MIMO | Downlink power same as 7.4D  Uplink power measurement same as 6.2D.1\_1 | Same as 7.4D |
| 7.4E.1 Maximum input level for V2X / non-concurrent operation | V2X reception power same as 7.4 |  |
| 7.4F Maximum input level for shared spectrum channel access | Downlink power same as 7.4 for f ≤ 7.125GHz  Uplink power measurement same as 6.2F.1 |  |
| 7.4J Maximum input level for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Downlink power same as 7.4  Uplink power measurement same as 6.2J.1  Otherwise: FFS | The overall UL power is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.5 Adjacent channel selectivity | ACS value  1Rx, 2Rx, 4Rx:  ±1.6 dB, f ≤ 3.0GHz  ±2.3 dB, 3.0GHz < f ≤ 4.2GHz  ±3.0 dB, 4.2GHz < f ≤ 7.125GHz  8Rx:  ±1.8 dB, f ≤ 3.0GHz  ±2.7 dB, 3.0GHz < f ≤ 4.2GHz  ±3.4 dB, 4.2GHz < f ≤ 7.125GHz  Uplink power measurement same as 6.2.1 | Overall ACS uncertainty comprises three quantities:  1. Wanted signal level error  2. Interferer signal level error  3. Additional impact of interferer ACLR  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared to provide the ratio error of the two signals. The interferer ACLR effect is systematic, and is added arithmetically.  Test System uncertainty = [SQRT (wanted\_level\_error2 + interferer\_level\_error2)] + ACLR effect.  ACLR effect:  1Rx, 2Rx, 4Rx: f ≤ 3.0GHz: 0.4 dB  3.0GHz < f ≤ 6GHz: 0.7 dB  8Rx: f ≤ 3.0GHz: 0.59 dB  3.0GHz < f ≤ 6.0GHz: 1.02 dB |
| 7.5A Adjacent channel selectivity for CA  (Same MU apply to all subsections including 7.5A.1, 7.5A.2, 7.5A.3, 7.5A.4, etc.) | Same as 7.5 for each component carrier | Same as 7.5  The wanted signal level uncertainty applies for each CC.  Overall ACS uncertainty calculation includes the uncertainty for wanted level error only once, as the uncertainty of other CCs is not expected to have any significant effect. |
| 7.5D Adjacent channel selectivity for UL MIMO | ACS value same as 7.5  Uplink power measurement same as 6.2D.1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.5D\_1 Adjacent channel selectivity for SUL with UL MIMO | ACS value same as 7.5D  Uplink power measurement same as 6.2D.1\_1 | Same as 7.5D |
| 7.5D\_2 Adjacent channel selectivity for UL MIMO for UE supporting 4Tx | ACS value same as 7.5  Uplink power measurement same as 6.2D.2\_2 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.5E.1 Adjacent channel selectivity for V2X / non-concurrent operation | V2X reception power same as 7.5 | Same as 7.5 |
| 7.5E.2 Adjacent channel selectivity for V2X / concurrent operation | Same as 7.3.2 for NR V2X carrier and NR FR1 carrier | Same as 7.5 |
| 7.5F.1 Adjacent channel selectivity for shared spectrum channel access | ACS value  1Rx, 2Rx, 4Rx:  ±3.0 dB, 4.2GHz < f ≤ 7.125GHz  8Rx:  ±3.4 dB, 4.2GHz < f ≤ 7.125GHz  Uplink power measurement same as 6.2F.1 | Same as 7.5 |
| 7.5G.1 Adjacent channel selectivity for Tx Diversity for UE supporting 4Tx | ACS value same as 7.5  Uplink power measurement same as 6.2G.2\_1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.5J Adjacent channel selectivity for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  ACS value same as 7.5  Uplink power measurement same as 6.2J.1  Otherwise: FFS | The overall UL power is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.6.2 Inband Blocking | Blocking  1Rx, 2Rx, 4Rx:  ±1.6 dB, f ≤ 3.0GHz  ±2.3 dB, 3.0GHz < f ≤ 4.2GHz  ±3.0 dB, 4.2GHz < f ≤ 7.125GHz  8Rx:  ±1.8 dB, f ≤ 3.0GHz  ±2.7 dB, 3.0GHz < f ≤ 4.2GHz  ±3.4 dB, 4.2GHz < f ≤ 7.125GHz  Uplink power measurement same as 6.2.1 | Overall blocking uncertainty can have these contributions:  1. Wanted signal level error  2. Interferer signal level error  3. Interferer ACLR  4. Interferer broadband noise  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared to provide the ratio error of the two signals. The Interferer ACLR or Broadband noise effect is systematic, and is added arithmetically.  Test System uncertainty = [SQRT (wanted\_level\_error2 + interferer\_level\_error2)] + ACLR effect + Broadband noise effect.  In-band blocking, using modulated interferer:  ACLR effect:  1Rx, 2Rx, 4Rx: f ≤ 3.0GHz: 0.4 dB  3.0GHz < f ≤ 6GHz: 0.7 dB  8Rx: f ≤ 3.0GHz: 0.59 dB  3.0GHz < f ≤ 6.0GHz: 1.02 dB  Broadband noise not applicable |
| 7.6.3 Out-of-band blocking | 1Rx, 2Rx, 4Rx:  Wanted signal, f ≤ 3.0GHz  ±2.0 dB, Blocking, 1MHz < finterferer ≤ 3GHz  ±3.9 dB, Blocking, 3GHz < finterferer ≤ 12.75GHz  Wanted signal, 3.0GHz < f ≤ 4.2GHz  ±2.2 dB, Blocking, 1MHz < finterferer ≤ 3GHz  ±4.0 dB, Blocking, 3GHz < finterferer ≤ 12.75GHz  Wanted signal, 4.2GHz < f ≤ 7.125GHz  ±2.6 dB, Blocking, 1MHz < finterferer ≤ 3GHz  ±4.2 dB, Blocking, 3GHz < finterferer ≤ 12.75GHz  8Rx:  Wanted signal, f ≤ 3.0GHz  ±2.4 dB, Blocking, 1MHz < finterferer ≤ 3GHz  ±4.2 dB, Blocking, 3GHz < finterferer ≤ 12.75GHz  Wanted signal, 3.0GHz < f ≤ 4.2GHz  ±2.6 dB, Blocking, 1MHz < finterferer ≤ 3GHz  ±4.3 dB, Blocking, 3GHz < finterferer ≤ 12.75GHz  Wanted signal, 4.2GHz < f ≤ 7.125GHz  ±3.0 dB, Blocking, 1MHz < finterferer ≤ 3GHz  ±4.5 dB, Blocking, 3GHz < finterferer ≤ 12.75GHz  Uplink power measurement same as 6.2.1 | Out of band blocking, using CW interferer:  Interferer ACLR not applicable  Impact of interferer Broadband noise 1Rx, 2Rx, 4Rx: 0.8dB, 8Rx; 1.16 dB  Figures are combined to give Test System uncertainty, using formula given for 7.6.2 |
| 7.6.4 Narrow band blocking | Blocking  1Rx, 2Rx, 4Rx:  ± 2.0dB, f ≤ 3.0GHz  ± 2.4dB, 3.0GHz < f ≤ 4.2GHz  ± 3.1dB, 4.2GHz < f ≤ 7.125GHz  8Rx:  ± 2.4dB, f ≤ 3.0GHz  ± 2.8dB, 3.0GHz < f ≤ 4.2GHz  ± 3.5dB, 4.2GHz < f ≤ 7.125GHz  Uplink power measurement same as 6.2.1 | Narrow band blocking, using CW interferer:  Interferer ACLR not applicable  Impact of interferer Broadband noise 1Rx, 2Rx, 4Rx; 0.8dB, 8Rx: 1.16dB  Figures are combined to give Test System uncertainty, using formula given for 7.6.2 |
| 7.6A.2 Inband Blocking for CA  (Same MU apply to all subsections including 7.6A.2.1, 7.6A.2.2, 7.6A.2.3, 7.6A.2.4, etc.) | Same as 7.6.2 for each component carrier | Same as 7.6.2  The wanted signal level uncertainty applies for each CC.  Overall blocking uncertainty calculation includes the uncertainty for wanted level error only once, as the uncertainty of other CCs is not expected to have any significant effect. |
| 7.6A.3 Out-of-band Blocking for CA  (Same MU apply to all subsections including 7.6A.3.1, 7.6A.3.2, 7.6A.3.3, 7.6A.3.4, etc.) | Same as 7.6.3 for each component carrier | Same as 7.6.3  The wanted signal level uncertainty applies for each CC.  Overall blocking uncertainty calculation includes the uncertainty for wanted level error only once, as the uncertainty of other CCs is not expected to have any significant effect. |
| 7.6A.4 Narrow band Blocking for CA  (Same MU apply to all subsections including 7.6A.4.1, 7.6A.4.2, 7.6A.4.3, 7.6A.4.4, etc.) | Same as 7.6.4 for each component carrier | Same as 7.6.4  The wanted signal level uncertainty applies for each CC.  Overall blocking uncertainty calculation includes the uncertainty for wanted level error only once, as the uncertainty of other CCs is not expected to have any significant effect. |
| 7.6C.2 Inband Blocking for SUL | Same as 7.6.2 | Same as 7.6.2 |
| 7.6C.2\_1.1 Inband Blocking for SUL with 2 DL CA | Same as 7.6A.2 | Same as 7.6A.2 |
| 7.6C.3 Out-of-band blocking for SUL | Same as 7.6.3 | Same as 7.6.3 |
| 7.6D.2 Inband blocking for UL MIMO | Blocking same as 7.6.2  Uplink power measurement same as 6.2D.1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.6D.2\_1 In-band blocking for SUL with UL MIMO | Blocking same as 7.6.2  Uplink power measurement same as 6.2D.1\_1 |  |
| 7.6D.2\_2 In-band blocking for UL MIMO for UE supporting 4Tx | Blocking same as 7.6.2  Uplink power measurement same as 6.2D.2\_2 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.6D.3 Out-of-band blocking for UL MIMO | Wanted signal same as 7.6.3  Uplink power measurement same as 6.2D.1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.6D.3\_1 Out-of-band blocking for SUL with UL MIMO | Wanted signal same as 7.6D.3  Uplink power measurement same as 6.2D.1\_1 | Same as 7.6D.3 |
| 7.6D.3\_2 Out-of-band blocking for UL MIMO for UE supporting 4Tx | Wanted signal same as 7.6.3  Uplink power measurement same as 6.2D.2\_2 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.6D.4 Narrow-band blocking for UL MIMO | Blocking same as 7.6.4  Uplink power measurement same as 6.2D.1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.6D.4\_3 Narrow band blocking for UL MIMO for UE supporting 4Tx | Blocking same as 7.6.4  Uplink power measurement same as 6.2D.2\_2 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.6E.2.1 In-band blocking for V2X / non-concurrent operation | Blocking  1Rx, 2Rx, 4Rx:  ±3.0 dB, 4.2GHz < f ≤ 6.0GHz  8Rx:  ±3.4 dB, 4.2GHz < f ≤ 6.0GHz | Same as 7.6.2 |
| 7.6E.3.1 Out-of-band blocking for V2X / non-concurrent operation | 1Rx, 2Rx, 4Rx:  Wanted signal, 4.2GHz < f ≤ 6GHz  ±2.6 dB, Blocking, 1MHz < finterferer ≤ 3GHz  ±4.2 dB, Blocking, 3GHz < finterferer ≤ 12.75GHz  8Rx:  Wanted signal, 4.2GHz < f ≤ 6GHz  ±3.0 dB, Blocking, 1MHz < finterferer ≤ 3GHz  ±4.5 dB, Blocking, 3GHz < finterferer ≤ 12.75GHz | Same as 7.6.3 |
| 7.6F.2.1 In-band blocking for shared spectrum channel access | Blocking  1Rx, 2Rx, 4Rx:  ±3.0 dB, 4.2GHz < f ≤ 7.125GHz  8Rx:  ±3.4 dB, 4.2GHz < f ≤ 7.125GHz  Uplink power measurement same as 6.2F.1 | Same as 7.6.2 |
| 7.6G.1 In-band blocking for Tx Diversity for UE supporting 4Tx | Blocking same as 7.6.2  Uplink power measurement same as 6.2G.2\_1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.6G.2 Out-of-band blocking for Tx Diversity for UE supporting 4Tx | Wanted signal same as 7.6.3  Uplink power measurement same as 6.2G.2\_1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.6G.3 Narrow band blocking for Tx Diversity for UE supporting 4Tx | Blocking same as 7.6.4  Uplink power measurement same as 6.2G.2\_1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.6J.2 In-band blocking for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Blocking same as 7.6.2  Uplink power measurement same as 6.2J.1  Otherwise:  FFS | The overall UL power is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.6J.3 Out-of-band blocking for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Wanted signal same as 7.6.3  Uplink power measurement same as 6.2J.1  Otherwise:  FFS | Values in DL achieved applying the relaxations defined in Table 7.6J.3.5-5.  The overall UL power is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors. |
| 7.7 Spurious response | Same as 7.6.3 | Same as 7.6.3 |
| 7.7A Spurious response for CA  (Same MU apply to all subsections including 7.7A.1, 7.7A.2, 7.7A.3, etc.) | Same as 7.6A.3 | Same as 7.6A.3 |
| 7.7D Spurious response for UL MIMO | Same as 7.7  Uplink power measurement same as 6.2D.1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.7D\_1 Spurious response for SUL with UL MIMO | Same as 7.7D  Uplink power measurement same as 6.2D.1\_1 | Same as 7.7D |
| 7.7D\_2 Spurious response for UL MIMO for UE supporting 4Tx | Same as 7.7  Uplink power measurement same as 6.2D.2\_2 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.7E.1 Spurious response for V2X / non-concurrent operation | Same as 7.6E.3.1. | Same as 7.6E.3.1. |
| 7.7F.1 Spurious response for shared spectrum channel access | Same as 7.6.3 | Same as 7.6.3 |
| 7.7G.1 Spurious response for Tx Diversity for UE supporting 4Tx | Same as 7.7  Uplink power measurement same as 6.2G.2\_1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.7J Spurious response for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 7.6.3  Uplink power measurement same as 6.2J.1  Otherwise:  FFS | The overall UL power is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.8.2 Wide band Intermodulation | Intermodulation  ± 2.3dB, f ≤ 3.0GHz  ± 3.1dB, 3.0GHz < f ≤ 4.2GHz  ± 4.3dB, 4.2GHz < f ≤ 7.125GHz  Uplink power measurement same as 6.2.1 | Overall intermodulation uncertainty comprises three quantities:  1. Wanted signal level error  2. CW Interferer level error  3. Modulated Interferer level error  Effect of interferer ACLR has not been included as modulated interferer has larger frequency offset  The effect of the closer CW signal has twice the effect.  Items 1, 2 and 3 are assumed to be uncorrelated so can be root sum squared to provide the combined effect of the three signals.  Test System uncertainty = SQRT [(2 x CW\_level\_error)2 +(mod interferer\_level\_error)2 +(wanted signal\_level\_error)2] |
| 7.8A.2 Wide band Intermodulation for CA  (Same MU apply to all subsections including 7.8A.2.1, 7.8A.2.2, 7.8A.2.3, etc.) | Same as 7.8.2 for each component carrier | Same as 7.8.2  The wanted signal level uncertainty applies for each CC.  Overall intermodulation uncertainty calculation includes the uncertainty for wanted level error only once, as the uncertainty of other CCs is not expected to have any significant effect. |
| 7.8D.2 Intermodulation characteristics for UL MIMO | Intermodulation same as 7.8.2  Uplink power measurement same as 6.2D.1 | The overall UL power is the linear sum of the output powers over all Tx antenna connectors |
| 7.8D.2\_1 Wide band Intermodulation for SUL with UL MIMO | Intermodulation same as 7.8D.2  Uplink power measurement same as 6.2D.1\_1 | Same as 7.8D.2 |
| 7.8E.2.1 Wide band Intermodulation for V2X / non-concurrent operation | Intermodulation  ± 4.3dB, 4.2GHz < f ≤ 6.0GHz | Same as 7.8.2 |
| 7.8F.2 Wide band Intermodulation for shared spectrum channel access | Intermodulation  ± 2.3dB, f ≤ 3.0GHz  ± 3.1dB, 3.0GHz < f ≤ 4.2GHz  ± 4.3dB, 4.2GHz < f ≤ 7.125GHz  Uplink power measurement same as 6.2F.1 |  |
| 7.8J.2 Wide band intermodulation for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 7.8.2  Uplink power measurement same as 6.2J.1  Otherwise:  FFS | Same as 7.8.2  The overall UL power is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.9 Spurious emissions | for results > -60 dBm:  ±2.0 dB, 9kHz < f ≤ 3GHz  ±2.5 dB, 3GHz < f ≤ 4GHz  ±4.0 dB, 4GHz < f ≤ 19GHz  ±6.0 dB, 19GHz < f ≤ 26GHz |  |
| 7.9A.1 Spurious emissions for CA (2DL CA) | Same as 7.9 |  |
| 7.9J Spurious emissions for ATG | Same as 7.9 with “9kHz < f ≤ 3GHz”, “3GHz < f ≤ 4GHz” and “4GHz < f ≤ 19GHz”. |  |

## <<< Skip unchanged sections >>>

## F.3.2 Measurement of transmitter

- MU and TT for f>6GHz (band n96, n104) already defined are working assumption based on analysis of single TE vendor. Values will be revisited once analysis from other TE vendors is available.

- MU and TT for f>6GHz (bands n96, n104) are FFS for test cases requiring operation in carrier aggregation, UL MIMO or Tx Diversity.

Table F.3.2-1: Derivation of Test Requirements (Transmitter tests)

|  |  |  |
| --- | --- | --- |
| Sub clause | Test Tolerance (TT) | Formula for test requirement |
| 6.2.1 UE maximum output power | f ≤ 3.0GHz  0.7 dB, BW ≤ 40MHz  1.0 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 7.125GHz  1.0 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit - TT |
| 6.2.2 Maximum Power Reduction (MPR) | f ≤ 3.0GHz  0.7 dB, BW ≤ 40MHz  1.0 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 7.125GHz  1.0 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit - TT |
| 6.2.3 UE additional maximum output power reduction | f ≤ 3.0GHz  0.7 dB, BW ≤ 40MHz  1.0 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 7.125GHz  1.0 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit - TT |
| 6.2.4 Configured transmitted power | For UL power ≥ 0 dBm  f ≤ 3.0GHz  0.7 dB, BW ≤ 40MHz  1.0 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 7.125GHz  1.0 dB, BW ≤ 100MHz  For UL power < 0 dBm  f ≤ 7.125GHz  1.0 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit - TT |
| 6.2A.1.1 UE maximum output power for CA (2UL CA) | For Inter-band CA  MAX (TTCC1, TTCC2) | TTCCX is TT of each UL CC specified in single UL case 6.2.1. |
| 6.2A.2.1 UE maximum output power reduction for CA (2UL CA) | For Inter-band CA  MAX (TTCC1, TTCC2)  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.2.2 for sum of powers of all CCs  Aggregated BW > 100M: TBD | TTCCX is TT of each UL CC specified in single UL case 6.2.2. |
| 6.2A.3.1 UE additional maximum output power reduction CA (2UL CA) | For Inter-band CA  MAX (TTCC1, TTCC2)  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.2.3 for sum of powers of all CCs  Aggregated BW > 100M: TBD | TTCCX is TT of each UL CC specified in single UL case 6.2.3. |
| 6.2A.4.1 Configured transmitted power for CA (2UL CA) | For Inter-band CA  MAX (TTCC1, TTCC2)  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.2.4 for sum of powers of all CCs  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD | TTCCX is TT of each UL CC specified in single UL case 6.2.4. |
| 6.2C.1 Configured transmitted power for SUL | Same as 6.2.4 | Same as 6.2.4 |
| 6.2C.3 UE maximum output power for SUL | Same as 6.2.1 | Same as 6.2.1 |
| 6.2C.4 UE maximum output power reduction for SUL | Same as 6.2.2 | Same as 6.2.2 |
| 6.2C.5 UE additional maximum output power reduction for SUL | Same as 6.2.3 | Same as 6.2.3 |
| 6.2D.1 UE maximum output power for UL MIMO | Same as 6.2.1 for the sum of power at each of UE antenna connector | Same as 6.2.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.2D.1\_1 UE maximum output power for SUL with UL MIMO | Same as 6.2D.1 | Same as 6.2D.1 |
| 6.2D.1\_2 UE maximum output power for UL MIMO for UE supporting 4Tx | Same as 6.2D.1 | Same as 6.2D.1 |
| 6.2D.2 UE maximum output power reduction for UL MIMO | Same as 6.2.2 for the sum of power at each of UE antenna connector | Same as 6.2.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.2D.2\_1 UE maximum output power reduction for SUL with UL MIMO | Same as 6.2.2 for the sum of power at each of UE antenna connector | Same as 6.2.2 |
| 6.2D.2\_2 UE maximum output power reduction for UL MIMO for UE supporting 4Tx | Same as 6.2D.2 for the sum of power at each of UE antenna connector | Same as 6.2D.2 |
| 6.2D.3 UE additional maximum output power reduction for UL MIMO | Same as 6.2.3 for the sum of power at each of UE antenna connector | Same as 6.2.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.2D.3\_1 UE additional maximum output power reduction for SUL with UL MIMO | Same as 6.2.3 for the sum of power at each of UE antenna connector | Same as 6.2.3 |
| 6.2D.4 Configured transmitted power for UL MIMO | Same as 6.2.4 for the sum of power at each of UE antenna connector | Same as 6.2.4  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.2D.4\_1 Configured transmitted power for SUL with UL MIMO | Same as 6.2D.4 | Same as 6.2D.4 |
| 6.2E.1.2 UE maximum output power for V2X / concurrent operation | For Inter-band concurrent operation  MAX (TTCC1, TTCC2) | TTCCX is TT of each UL CC specified in single UL case 6.2.1. |
| 6.2E.2.1 UE maximum output power reduction for V2X / non-concurrent operation | Same as 6.2.2 | Same as 6.2.2 |
| 6.2E.2.1D UE maximum output power reduction for V2X / non-concurrent operation / SL-MIMO | Same as 6.2.2 for the sum of power at each of UE antenna connector | Same as 6.2.2 |
| 6.2E.2.2 UE maximum output power reduction for V2X / concurrent operation | For Inter-band concurrent operation  MAX (TTNR, TTSL)  For Intra-band concurrent operation  Aggregated BW ≤ 100M: Same as 6.2.2 for sum of power of all CCs  Aggregated BW > 100M: TBD | TTNR is TT of NR CC specified in single UL case 6.2.2. TTSL is TT of SL CC specified in single UL case 6.2E.2.1. |
| 6.2E.3.1 UE additional maximum output power reduction for V2X / non-concurrent operation | Same as 6.2.3 | Same as 6.2.3 |
| 6.2E.3.1D UE additional maximum output power reduction for V2X / non-concurrent operation / SL-MIMO | Same as 6.2.3 for the sum of power at each of UE antenna connector | Same as 6.2.3 |
| 6.2E.4.1 Configured transmitted power for V2X / non-concurrent operation | Same as 6.2.4 |  |
| 6.2E.4.1D Configured transmitted power for V2X / non-concurrent operation / SL-MIMO | Same as 6.2.4 for the sum of power at each of UE antenna connector |  |
| 6.2E.4.2 Configured transmitted power for V2X / concurrent operation | For Inter-band concurrent operation  MAX (TTNR, TTSL)  For Intra-band concurrent operation  Aggregated BW ≤ 100M: Same as 6.2.4 for sum of power of all CCs  Aggregated BW > 100M: TBD | TTNR is TT of NR CC specified in single UL case 6.2.4. TTSL is TT of SL CC specified in single UL case 6.2E.4.1. |
| 6.2F.1 UE maximum output power for shared spectrum channel access | 3.0GHz < f ≤ 7.125GHz  1.0 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit - TT |
| 6.2F.2 UE maximum output power reduction for shared spectrum access | Same as 6.2F.1 | Same as 6.2F. |
| 6.2F.3 UE additional maximum output power reduction for shared spectrum access | Same as 6.2F.1 | Same as 6.2F. |
| 6.2F.4 Configured transmitted power for shared spectrum access | Same as 6.2F.1 | Same as 6.2F |
| 6.2G.1 UE maximum output power for Tx Diversity | Same as 6.2.1 for the sum of power at each of UE antenna connector | Same as 6.2.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.2G.1\_1 UE maximum output power for Tx Diversity for UE supporting 4Tx | Same as 6.2.1 for the sum of power at each of UE antenna connector | Same as 6.2.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.2G.2 UE maximum output power reduction for Tx Diversity | Same as 6.2.2 for the sum of power at each of UE antenna connector | Same as 6.2.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.2G.2\_1 UE maximum output power reduction for Tx Diversity for UE supporting 4Tx | Same as 6.2.2 for the sum of power at each of UE antenna connector | Same as 6.2.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.2G.3 UE additional maximum output power reduction for Tx Diversity | Same as 6.2.3 for the sum of power at each of UE antenna connector | Same as 6.2.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.2G.4 Configured transmitted power for Tx Diversity | Same as 6.2.4 for the sum of power at each of UE antenna connector | Same as 6.2.4  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.2H.1.1 UE maximum output power for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: same as 6.2.1 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD | Same as 6.2.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.2H.1.2 UE maximum output power reduction for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: same as 6.2.2 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD | Same as 6.2.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.2H.1.3 UE additional maximum output power reduction for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: same as 6.2.3 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD | Same as 6.2.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.2H.1.4 Configured transmitted power for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: same as 6.2.4 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD | Same as 6.2.4  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.2H.3.1 UE maximum output power for inter-band UL CA with UL MIMO | MAX (TTCC1, TTCC2) | TTCCX is TT of each UL CC  For the component carrier configured with UL MIMO: Same as 6.2.1 for the sum of power at each of UE antenna connector  For the other component carrier: Same as 6.2.1 |
| 6.2I.1 UE maximum output power for RedCap | Same as 6.2.1 for BW ≤ 20MHz | Same as 6.2.1 |
| 6.2J.1 UE maximum output power for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.2.1 for the sum of power at each of UE antenna/TAB connector  Otherwise:  FFS | Same as 6.2.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna/TAB connectors |
| 6.2J.2 Configured transmitted power for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.2.4 for the sum of power at each of UE antenna/TAB connector  Otherwise:  FFS | Same as 6.2.4  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna/TAB connectors |
| 6.2L.3.1 UE maximum output power for inter-band UL CA with Tx Diversity | MAX (TTCC1, TTCC2) | TTCCX is TT of each UL CC  For the component carrier configured with Tx Diversity: Same as 6.2.1 for the sum of power at each of UE antenna connector  For the other component carrier: Same as 6.2.1 |
| 6.3.1 Minimum output power | f ≤ 3.0GHz  1.0 dB, BW ≤ 40MHz  1.3 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 7.125GHz  1.3 dB, BW ≤ 100MHz | Minimum requirement + TT |
| 6.3.2 Transmit OFF power | f ≤ 3.0GHz  1.5 dB, BW ≤ 40MHz  1.7 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 6.0GHz  1.8 dB, BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  [2.1] dB, BW ≤ 100MHz | Minimum requirement + TT |
| 6.3.3.2 General ON/OFF time mask | f ≤ 3.0GHz  1.5 dB, BW ≤ 40MHz  1.7 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 6.0GHz  1.8 dB, BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  2.1] dB, BW ≤ 100MHz | OFF Power:  Minimum requirement + TT  ON Power:  –Same as 6.2.1 |
| 6.3.3.4 PRACH time mask | f ≤ 3.0GHz  1.5 dB, BW ≤ 40MHz  1.7 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 6.0GHz  1.8 dB, BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  2.1] dB, BW ≤ 100MHz | OFF Power:  Minimum requirement + TT  ON Power:  Upper limit + TT, Lower limit - TT |
| 6.3.3.6 SRS time mask | f ≤ 3.0GHz  1.5 dB, BW ≤ 40MHz  1.7 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 6.0GHz  1.8 dB, BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  2.1] dB, BW ≤ 100MHz | OFF Power:  Minimum requirement + TT  ON Power:  Upper limit + TT, Lower limit - TT |
| 6.3.4.2 Absolute power tolerance | For UL Power ≥ 0dBm  f ≤ 3.0GHz  1.0 dB, BW ≤ 40MHz  1.4 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 7.125GHz  1.4 dB, BW ≤ 100MHz  For UL power < 0 dBm  f ≤ 3.0GHz  1.2 dB, BW ≤ 40MHz  1.4 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 7.125GHz  1.4 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit – TT |
| 6.3.4.3 Relative power tolerance | f ≤ 7.125GHz  0.7 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit – TT |
| 6.3.4.4 Aggregate power tolerance | f ≤ 7.125GHz  0.7 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit – TT |
| 6.3A.1.1 Minimum output power for CA (2UL CA) | Same as 6.3.1 | Minimum requirement + TT |
| 6.3A.3.1 Transmit ON/OFF time mask for CA (2UL CA) | Same as 6.3.3.2  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: Same as 6.3.3.2  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD | Minimum requirement + TT |
| 6.3A.3.2 Time mask for switching between two uplink carriers | ON power: same as 6.2A.2.1 for inter-band CA | Same as 6.2A.2.1 for inter-band CA |
| 6.3A.3.3 Time mask for switching between two uplink carriers with two transmit antenna connectors | ON power: same as 6.2A.2.1 for inter-band CA | Same as 6.2A.2.1 for inter-band CA |
| 6.3A.3.4 Time mask for switching between one uplink band with one transmit antenna connector and one uplink band with two transmit antenna connectors (3UL CA) | ON power: Same as inter-band tolerance in 6.2A.2.1 for PCell and for sum of power at each of UE antenna connector on SCells. | Same as 6.2A.2.1 for inter-band CA |
| 6.3A.3.5 Time mask for switching between two uplink bands with two transmit antenna connectors (3UL CA) | ON power: Same as inter-band tolerance in 6.2A.2.1 for sum of power at each of UE antenna connector on PCell and SCells. | Same as 6.2A.2.1 for inter-band CA |
| 6.3A.3.6 Time mask for switching across three uplink bands | FFS | FFS |
| 6.3A.3.7 Time mask for switching across four uplink bands | FFS | FFS |
| 6.3A.4.1.1 Absolute power tolerance for CA (2UL CA) | Same as 6.3.4.2 for each CC | Upper limit + TT, Lower limit – TT |
| 6.3A.4.2.1 Power Control Relative power tolerance for CA (2UL CA) | Same as 6.3.4.3 for each CC | Upper limit + TT, Lower limit – TT |
| 6.3A.4.3.1 Aggregate power tolerance for CA (2UL CA) | Same as 6.3.4.4 for each CC | Upper limit + TT, Lower limit – TT |
| 6.3C.1 Minimum output power for SUL | Same as 6.3.1 | Same as 6.3.1 |
| 6.3C.2 Transmit OFF power for SUL | Same as 6.3.2 | Same as 6.3.2 |
| 6.3C.3.1 Transmit ON/OFF time mask for SUL | Same as 6.3.3.2 | Same as 6.3.3.2 |
| 6.3C.3.2 General transmit ON/OFF time mask for switching between two uplink carriers | ON power: Same as 6.3.3.2 | ON power: Same as 6.3.3.2 |
| 6.3C.3.3 General transmit ON/OFF time mask for switching between two uplink carriers with two transmit antenna connectors | ON power: Same as 6.3.3.2 for sum of power at each of UE antenna connector on NUL and SUL. | ON power: Same as 6.3.3.2 |
| 6.3C.3.4 General transmit ON/OFF time mask for switching between one uplink band with one transmit antenna connector and one uplink band with two transmit antenna connectors | ON power: Same as 6.3.3.2 for SUL carrier and for sum of power at each of UE antenna connector on NUL carriers | ON power: Same as 6.3.3.2 |
| 6.3C.3.5 General transmit ON/OFF time mask for switching between two uplink bands with two transmit antenna connectors | ON power: Same as 6.3.3.2 for sum of power at each of UE antenna connector on NUL carriers and SUL carrier. | ON power: Same as 6.3.3.2 |
| 6.3C.3.6 Time mask for switching across three uplink bands (3CC) | **Subtest 1:**  ON power: Same as 6.2D.2 for sum of power at each of UE antenna connector on NUL carriers. Same as 6.2C.4 for SUL carrier  **Subtest 2:**  ON power: Same as 6.2A.2.1 for inter-band UL CA for NUL bands. Same as 6.2D.2\_1 for SUL carrier. | **Subtest 1:**  ON power: Same as 6.2D.2 for NUL carriers. Same as 6.2C.4 for SUL carrier  **Subtest 2:**  ON power: Same as 6.2A.2.1 for inter-band UL CA for NUL bands. Same as 6.2D.2\_1 for SUL carrier. |
| 6.3C.3.6\_1 Time mask for switching across three uplink bands (more than 3CC) | ON power:  Same as 6.2D.2 for NUL band with single UL carrier, and same as 6.2H.1.2 for NUL band with intra-band UL CA carriers.  Same as 6.2C.4 for SUL carrier. | ON power:  Same as 6.2D.2 for NUL band with single UL carrier, and same as 6.2H.1.2 for NUL band with intra-band UL CA carriers.  Same as 6.2C.4 for SUL carrier. |
| 6.3C.4.1 Absolute power tolerance for SUL | Same as 6.3.4.2 | Same as 6.3.4.2 |
| 6.3C.4.2 Power Control Relative power tolerance for SUL | Same as 6.3.4.3 | Same as 6.3.4.3 |
| 6.3C.4.3 Aggregate power tolerance for SUL | Same as 6.3.4.4 | Same as 6.3.4.4 |
| 6.3D.1 Minimum output power for UL MIMO | Same as 6.3.1 for the sum of power at each of UE antenna connector | Same as 6.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3D.1\_1 Minimum output power for SUL with UL MIMO | Same as 6.3D.1 | Same as 6.3D.1 |
| 6.3D.1\_2 Minimum output power UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.3D.2 Transmit OFF power for UL MIMO | Same as 6.3.2 for each antenna | Same as 6.3.2  Uplink power measurement applies to each Tx antenna connector |
| 6.3D.2\_1 Transmit OFF power for SUL with UL MIMO | Same as 6.3D.2 | Same as 6.3D.2 |
| 6.3D.2\_2 Transmit OFF power for UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.3D.3 Transmit ON/OFF time mask for UL MIMO | ON power:  Same as 6.2D.1  OFF power:  Same as 6.3D.2 | ON power:  Same as 6.2D.1  OFF power:  Same as 6.3D.2 |
| 6.3D.3\_1 Transmit ON/OFF time mask for SUL with UL MIMO | Same as 6.3D.3 | Same as 6.3D.3 |
| 6.3D.3\_2 Transmit ON/OFF time mask for UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.3D.4.1 Absolute Power tolerance | Same as 6.3.4.2 for the sum of power at each of UE antenna connector | Same as 6.3.4.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3D.4.1\_1 Absolute power tolerance for SUL with UL MIMO | Same as 6.3D.4.1 | Same as 6.3D.4.1 |
| 6.3D.4.2 Relative Power tolerance | Same as 6.3.4.3 for the sum of power at each of UE antenna connector | Same as 6.3.4.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3D.4.2\_1 Relative power tolerance for SUL with UL MIMO | Same as 6.3D.4.2 | Same as 6.3D.4.2 |
| 6.3D.4.3 Aggregate Power tolerance | Same as 6.3.4.4 for the sum of power at each of UE antenna connector | Same as 6.3.4.4  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3D.4.3\_1 Aggregate power tolerance for SUL with UL MIMO | Same as 6.3D.4.3 | Same as 6.3D.4.3 |
| 6.3E.1.1 Minimum output power for V2X / non-concurrent operation | Same as 6.3.1 | Same as 6.3.1 |
| 6.3E.1.1D Minimum output power for V2X / non-concurrent operation / SL-MIMO | Same as 6.3.1 for the sum of power at each of UE antenna connector | Same as 6.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3E.2.1 Transmit OFF power for V2X / non-concurrent operation | Same as 6.3.2 | Same as 6.3.2 |
| 6.3E.2.1D Transmit OFF power for V2X / non-concurrent operation / SL-MIMO | Same as 6.3.2 for each antenna | Same as 6.3.2  Uplink power measurement applies to each Tx antenna connector |
| 6.3E.3.1 Transmit ON/OFF time mask for V2X / non-concurrent operation | Same as 6.3.3.2 | Same as 6.3.3.2 |
| 6.3E.3.1D Transmit ON/OFF time mask for V2X / non-concurrent operation / SL-MIMO | ON power:  Same as 6.2E.1.1  OFF power:  Same as 6.3E.2.1 | ON power:  Same as 6.2E.1.1  OFF power:  Same as 6.3E.2.1 |
| 6.3E.4.1.1 Absolute power tolerance for V2X / non-concurrent operation | Same as 6.3.4.2 | Same as 6.3.4.2 |
| 6.3E.4.1.1D Absolute power tolerance for V2X / non-concurrent operation / SL-MIMO | Same as 6.3.4.2 for the sum of power at each of UE antenna connector | Same as 6.3.4.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3F.1 Minimum output power | 3.0GHz < f ≤ 7.125GHz  1.3 dB, BW ≤ 100MHz | Minimum requirement + TT |
| 6.3F.2 Transmit OFF power | 3.0GHz < f ≤ 6.0GHz  1.8 dB, BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  2.1 BW ≤ 100MHz | Minimum requirement + TT |
| 6.3F.3.2 General ON/OFF time mask | 3.0GHz < f ≤ 6.0GHz  1.8 dB, BW ≤ 100MHz  6.0GHz < f ≤ 7.125GHz  2.1 BW ≤ 100MHz | OFF Power:  Minimum requirement + TT  ON Power:  Upper limit + TT, Lower limit - TT |
| 6.3F.4.2 Absolute power tolerance for shared spectrum access | For UL Power ≥ 0dBm  4.2GHz < f ≤ 7.125GHz  1.4 dB, BW ≤ 100MHz  For UL power < 0 dBm  4.2GHz < f ≤ 7.125GHz  1.4 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit – TT |
| 6.3F.4.3 Relative power tolerance for shared spectrum channel access | Same as 6.3.4.3 for f ≤ 7.125GHz | Same as 6.3.4.3 for f ≤ 7.125GHz |
| 6.3F.4.4 Aggregate power tolerance for shared spectrum channel access | Same as 6.3.4.4 for f ≤ 7.125GHz | Same as 6.3.4.4 for f ≤ 7.125GHz |
| 6.3G.1 Minimum output power for Tx Diversity | Same as 6.3.1 for the sum of power at each of UE antenna connector | Same as 6.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3G.1\_1 Minimum output power for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.3G.2 Transmit OFF power for Tx Diversity | Same as 6.3.2 for each antenna | Same as 6.3.2  Uplink power measurement applies to each Tx antenna connector |
| 6.3G.2\_1 Transmit OFF power for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.3G.3.1 General ON/OFF time mask for Tx Diversity | ON power:  Same as 6.2G.1  OFF power:  Same as 6.3G.2 | ON power:  Same as 6.2G.1  OFF power:  Same as 6.3G.2 |
| 6.3G.3.1\_1 General ON/OFF time mask for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.3G.3.2 PRACH time mask for Tx Diversity | Same as 6.3.3.4 for each antenna | Same as 6.3.3.4  Uplink power measurement applies to each Tx antenna connector |
| 6.3G.3.3 SRS time mask for Tx Diversity | Same as 6.3.3.6 for each antenna | Same as 6.3.3.6  Uplink power measurement applies to each Tx antenna connector |
| 6.3G.4.1 Absolute power tolerance for Tx Diversity | Same as 6.3.4.2 for the sum of power at each of UE antenna connector | Same as 6.3.4.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3G.4.2 Relative power tolerance for Tx Diversity | Same as 6.3.4.3 for the sum of power at each of UE antenna connector | Same as 6.3.4.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3G.4.3 Aggregate power tolerance for Tx Diversity | Same as 6.3.4.4 for the sum of power at each of UE antenna connector | Same as 6.3.4.4  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3H.1.1 Minimum output power for intra-band UL contiguous CA with UL MIMO | For each CC, same as 6.3.1 for the sum of power at each of UE antenna connector | Same as 6.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.3H.1.2 Transmit OFF power for intra-band UL contiguous CA with UL MIMO | For each CC, same as 6.3.2 for each antenna | Same as 6.3.2  Uplink power measurement applies to each Tx antenna connector |
| 6.3H.1.3 Transmit ON/OFF time mask for intra-band UL contiguous CA with UL MIMO | ON power:  Same as 6.2H.1.2  OFF power:  Same as 6.3H.1.2 | ON power:  Same as 6.2H.1.2  OFF power:  Same as 6.3H.1.2 |
| 6.3J.1 Minimum output power for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.3.1 for the sum of power of all antenna connectors (for ATG UE with omni-directional antennas) or of all TAB connectors (for ATG UE with antenna array)  Otherwise: FFS | Same as 6.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 6.3J.2 Transmit OFF power for ATG | For ATG UEs with *maxOutputPowerATG-r18* up to 31dBm (up to PC1):  Same as 6.3.2 for each UE antenna/TAB connector  Otherwise, for each UE antenna/TAB connector:  f ≤ 3.0GHz  2.15 dB, BW ≤ 40MHz  2.35 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 6.0GHz  2.45 dB, BW ≤ 100MHz | Same as 6.3.2  Uplink power measurement applies to each Tx antenna connector or each TAB connector |
| 6.3J.3.3 PRACH time mask for ATG | FFS | FFS |
| 6.3J.3.4 SRS time mask for ATG | FFS | FFS |
| 6.3J.4.1 Absolute power tolerance for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.3.4.2 for the sum of power at each of UE antenna connector/TAB connector  Otherwise:  FFS | Same as 6.3.4.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 6.3J.4.2 Relative power tolerance for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.3.4.3 for the sum of power at each of UE antenna connector/TAB connector  Otherwise:  FFS | Same as 6.3.4.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 6.3J.4.3 Aggregate power tolerance for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.3.4.4 for the sum of power at each of UE antenna connector/TAB connector  Otherwise:  FFS | Same as 6.3.4.4  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 6.4.1 Frequency Error | f ≤ 7.125GHz  15 Hz | Modulated carrier frequency:  Upper limit + TT, Lower limit – TT  DL power:  REFSENS + TT |
| 6.4.2.1 Error Vector Magnitude | For up to 64QAM  f ≤ 6.0GHz, BW ≤ 100MHz  0%  6.0GHz < f ≤ 7.125GHz, BW ≤ 100MHz  [0%], -25dBm < PUL  [0.9%], -40dBm ≤ PUL ≤ -25dBm, 64QAM  For 256QAM  f ≤ 6.0GHz, BW ≤ 100MHz  0.3%, 15dBm < PUL  0.8%, -25dBm < PUL ≤ 15dBm,  1.1%, -40dBm ≤ PUL ≤ -25dBm  6.0GHz < f ≤ 7.125GHz, BW ≤ 100MHz  [0.3%], 15dBm < PUL  [1.1%], -25dBm < PUL ≤ 15dBm,  [1.74%], -40dBm ≤ PUL ≤ -25dBm | Minimum requirement + TT  EVM\_meas\_Increase = sqrt(Minimum requirement^2 + MTSU^2) - Minimum requirement; it is the increase of measured EVM due to test equipment uncertainty.  EVM\_meas\_Increase\_Relative = EVM\_meas\_Increase / Minimum requirement [%]  If (EVM\_meas\_Increase\_Relative < 7.5%)  TT = 0%  Else if (7.5% ≤ EVM\_meas\_Increase\_Relative ≤ 50%)  TT = EVM\_meas\_Increase  Else  Skip the test as not testable. |
| 6.4.2.1a Error Vector Magnitude including symbols with transient period | f ≤ 6.0GHz, BW ≤ 100MHz  0%  6.0GHz < f ≤ 7.125GHz, BW ≤ 100MHz  TBD | Same as 6.4.2.1 |
| 6.4.2.2 Carrier Leakage | 0.8 dB, f ≤ 7.125GHz, BW ≤ 100MHz | Minimum requirement + TT |
| 6.4.2.3 In-band emissions | 0.8 dB, f ≤ 7.125GHz, BW ≤ 100MHz | Minimum requirement + TT |
| 6.4.2.4 EVM equalizer spectrum flatness | 1.4 dB, f ≤ 7.125GHz, BW ≤ 100MHz | Minimum requirement + TT |
| 6.4.2.5 EVM equalizer spectrum flatness for Pi/2 BPSK | Same as 6.4.2.4 | Minimum requirement + TT |
| 6.4A.1.1 Frequency error for CA (2UL CA) | For inter-band CA: same as 6.4.1 for each CC  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: Same as 6.4.1 for each CC  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD | Modulated carrier frequency:  Upper limit + TT, Lower limit – TT |
| 6.4A.2.1.1 Error Vector Magnitude for CA (2UL CA) | For up to 64QAM  0%  For 256QAM  For inter-band CA: same as 6.4.2.1 for each CC  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: Same as 6.4.2.1 for each CC  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD | Minimum requirement + TT |
| 6.4A.2.2.1 Carrier leakage for CA (2UL CA) | For inter-band CA: same as 6.4.2.2 for each CC  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: Same as 6.4.2.2 for each CC  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD | Minimum requirement + TT |
| 6.4A.2.3.1 In-band emissions for CA (2UL CA) | For inter-band CA: same as 6.4.2.3 for each CC  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: Same as 6.4.2.3 for each CC  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD | Minimum requirement + TT |
| 6.4C.1 Frequency error for SUL | Same as 6.4.1 | Minimum requirement + TT |
| 6.4C.2.1 Error Vector Magnitude for SUL | Same as 6.4.2.1 | Minimum requirement + TT |
| 6.4C.2.2 Carrier leakage for SUL | Same as 6.4.2.2 | Minimum requirement + TT |
| 6.4C.2.3 In-band emissions for SUL | Same as 6.4.2.3 | Minimum requirement + TT |
| 6.4C.2.4 EVM equalizer spectrum flatness for SUL | Same as 6.4.2.4 | Minimum requirement + TT |
| 6.4D.1 Frequency error for UL MIMO | Same as 6.4.1 for each antenna | Same as 6.4.1 |
| 6.4D.1\_1 Frequency error for SUL with UL MIMO | Same as 6.4D.1 | Same as 6.4D.1 |
| 6.4D.1\_2 Frequency error for UL MIMO for UE supporting 4Tx | Same as 6.4D.1 | Same as 6.4D.1 |
| 6.4D.2.1 Error Vector Magnitude for UL MIMO | Same as 6.4.2.1 for each antenna | Same as 6.4.2.1 |
| 6.4D.2.1\_1 Error Vector Magnitude for SUL with UL MIMO | Same as 6.4D.2.1 | Same as 6.4D.2.1 |
| 6.4D.2.2 Carrier leakage for UL MIMO | Same as 6.4.2.2 for each antenna | Same as 6.4.2.2 |
| 6.4D.2.2\_1 Carrier leakage for SUL with UL MIMO | Same as 6.4.2.2 for each antenna | Same as 6.4.2.2 |
| 6.4D.2.3 In-band emissions for UL MIMO | Same as 6.4.2.3 for each antenna | Same as 6.4.2.3 |
| 6.4D.2.3\_1 In-band emissions for SUL with UL MIMO | Same as 6.4.2.3 for each antenna | Same as 6.4.2.3 |
| 6.4D.2.4 EVM equalizer spectrum flatness for UL MIMO | Same as 6.4.2.4 for each antenna | Same as 6.4.2.4 |
| 6.4D.2.4\_1 EVM equalizer spectrum flatness for SUL with UL MIMO | Same as 6.4.2.4 for each antenna | Same as 6.4.2.4 |
| 6.4D.3 Time alignment error for UL MIMO | 25ns | Minimum Requirement + TT |
| 6.4D.3\_1 Time alignment error for SUL with UL MIMO | 25ns | Minimum Requirement + TT |
| 6.4D.4 Requirements for Coherent UL MIMO | FFS | FFS |
| 6.4E.1.1 Frequency error for V2X / non-concurrent operation | Same as 6.4.1 | Same as 6.4.1 |
| 6.4E.1.1D Frequency error for V2X / non-concurrent operation / SL-MIMO | Same as 6.4.1 for each antenna | Same as 6.4.1 |
| 6.4E.2.2.1 Error Vector Magnitude for V2X / non-concurrent operation | Same as 6.4.2.1 | Same as 6.4.2.1 |
| 6.4E.2.2.1D Error Vector Magnitude for V2X / non-concurrent operation / SL-MIMO | Same as 6.4.2.1 for each antenna | Same as 6.4.2.1 |
| 6.4E.2.3.1 Carrier leakage for V2X / non-concurrent operation | Same as 6.4.2.2 | Same as 6.4.2.2 |
| 6.4E.2.3.1D Carrier leakage for V2X / non-concurrent operation / SL-MIMO | Same as 6.4.2.2 for each antenna | Same as 6.4.2.2 |
| 6.4E.2.4.1 In-band emissions for V2X / non-concurrent operation | Same as 6.4.2.3 | Same as 6.4.2.3 |
| 6.4E.2.4.1D In-band emissions for V2X / non-concurrent operation / SL-MIMO | Same as 6.4.2.3 for each antenna | Same as 6.4.2.3 |
| 6.4E.2.5.1 EVM equalizer spectrum flatness for V2X / non-concurrent operation | Same as 6.4.2.4 | Same as 6.4.2.4 |
| 6.4E.2.5.1D EVM equalizer spectrum flatness for V2X / non-concurrent operation / SL-MIMO | Same as 6.4.2.4 for each antenna | Same as 6.4.2.4 |
| 6.4F.1 Frequency Error | 15 Hz | Modulated carrier frequency:  Upper limit + TT, Lower limit – TT  DL power:  REFSENS + TT |
| 6.4F.2.1 Error Vector Magnitude for shared spectrum access | Same as 6.4.2.1 | Minimum requirement + TT |
| 6.4F.2.2 Carrier Leakage | Same as 6.4.2.2 | Same as 6.4.2.2 |
| 6.4F.2.3 In-band emissions | Same as 6.4.2.3 | Same as 6.4.2.3 |
| 6.4F.2.4 EVM equalizer spectrum flatness | Same as 6.4.2.4 | Same as 6.4.2.4 |
| 6.4G.1 Frequency Error for Tx Diversity | Same as 6.4.1 for each antenna | Same as 6.4.1 |
| 6.4G.1\_1 Frequency error for Tx Diversity for UE supporting 4Tx | Same as 6.4.1 for each antenna | Same as 6.4.1 |
| 6.4G.2.1 Error Vector Magnitude for Tx Diversity | Same as 6.4.2.1 | Same as 6.4.2.1 |
| 6.4G.2.2 Carrier Leakage for Tx Diversity | Same as 6.4.2.2 for each antenna | Same as 6.4.2.2 |
| 6.4G.2.3 In-band emissions for Tx Diversity | Same as 6.4.2.3 for each antenna | Same as 6.4.2.3 |
| 6.4G.2.4 EVM equalizer spectrum flatness for Tx Diversity | Same as 6.4.2.4 for each antenna | Same as 6.4.2.4 |
| 6.4H.1.1 Frequency error for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: Same as 6.4.1 for each antenna on each CC  Aggregated BW > 100M: TBD | Modulated carrier frequency:  Upper limit + TT, Lower limit – TT |
| 6.4H.1.2.1 Error Vector Magnitude for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M:  For up to 64QAM: 0%  For 256QAM: Same as 6.4D.2.1 for each layer on each CC  Aggregated BW > 100M: TBD | Minimum requirement + TT |
| 6.4H.1.2.2 Carrier leakage for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: Same as 6.4.2.2 for each antenna on each CC  Aggregated BW > 100M: TBD | Minimum requirement + TT |
| 6.4H.1.2.3 In-band emissions for intra-band UL contiguous CA with UL MIMO | Aggregated BW ≤ 100M: Same as 6.4.2.3 for each antenna on each CC  Aggregated BW > 100M: TBD | Minimum requirement + TT |
| 6.4H.1.3 Time alignment error for intra-band UL contiguous CA with UL MIMO | 25ns for each CC | Minimum Requirement + TT |
| 6.4H.1.4 Coherent UL MIMO for intra-band UL contiguous CA with UL MIMO | FFS | FFS |
| 6.4J.2.1 Error Vector Magnitude for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  For up to 64QAM  0%  For 256QAM  f ≤ 6.0GHz, BW ≤ 100MHz  0.6%, PUL = Maximum Output Power,  1.1%, PUL = Minimum Output Power | Same as 6.4.2.1 |
| 6.4J.2.1a Error Vector Magnitude including symbols with transient period for ATG | FFS |  |
| 6.4J.2.4 EVM equalizer spectrum flatness for ATG | FFS |  |
| 6.4J.2.5 EVM equalizer spectrum flatness for Pi/2 BPSK for ATG | FFS |  |
| 6.5.1 Occupied bandwidth | f ≤ 7.125GHz  0 kHz | Minimum requirement + TT |
| 6.5.2.2 Spectrum Emission Mask | 1.5 dB, f ≤ 3.0GHz  1.8 dB, 3.0GHz < f ≤ 7.125GHz | Minimum requirement + TT |
| 6.5.2.3 Additional spectrum emission mask | 1.5 dB, f ≤ 3.0GHz  1.8 dB, 3.0GHz < f ≤ 7.125GHz | Minimum requirement + TT |
| 6.5.2.4.1 NR ACLR | f ≤ 7.125GHz  Absolute requirement  0 dB  Relative requirement  0.8 dB | Absolute requirement  ACLR Minimum Requirement + TT  Relative requirement  ACLR Minimum Requirement - TT |
| 6.5.2.4.2 UTRA ACLR | Same as 6.5.2.4.1 | Same as 6.5.2.4.1 |
| 6.5.3.1 General spurious emissions | 0 dB | Minimum requirement + TT |
| 6.5.3.2 Spurious emission for UE co-existence | 0 dB | Minimum requirement + TT |
| 6.5.3.3 Additional spurious emissions | 0 dB | Minimum requirement + TT |
| 6.5.4 Transmit intermodulation | f ≤ 7.125GHz  0 dB | CW interferer Minimum Requirement - TT |
| 6.5A.1.1 Occupied bandwidth for CA (2UL CA) | For inter-band CA: same as 6.5.1 for each CC  For intra-band CA:  Aggregated BW ≤ 100M: same as 6.5.1 for aggregated channel bandwidth  Aggregated BW > 100M: TBD |  |
| 6.5A.2.2.1 Spectrum emission mask for CA (2UL CA) | For inter-band CA: same as 6.5.2.2 for each CC  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.2.2  Aggregated BW > 100M: TBD | Minimum requirement + TT |
| 6.5A.2.3.1 Additional Spectrum emission mask for CA (2UL CA) | For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.2.3  Aggregated BW > 100M: TBD |  |
| 6.5A.2.4.1.1 NR ACLR for CA (2UL CA) | For inter-band CA: same as 6.5.2.4.1 for each CC  For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.2.4.1  Aggregated BW > 100M: TBD | Same as 6.5.2.4.1 |
| 6.5A.2.4.2.1 UTRA ACLR for CA (2UL CA) | For inter-band CA: same as 6.5.2.4.2 for each CC | Same as 6.5.2.4.2 |
| 6.5A.3.1.1 General spurious emissions for CA (2UL CA) | 0 dB | Minimum requirement + TT |
| 6.5A.3.2.1 Spurious emissions for UE co-existence for CA (2UL CA) | 0 dB | Minimum requirement + TT |
| 6.5A.3.3.1 Additional Spurious emission for CA (2UL CA) | 0dB |  |
| 6.5A.4.1 Transmit intermodulation for CA (2UL CA) | 0 dB  For intra-band contiguous UL CA:  Aggregated BW ≤ 100M: 0 dB  Aggregated BW > 100M: TBD  For intra-band non-contiguous CA: TBD | CW interferer Minimum Requirement - TT |
| 6.5C.1 Occupied bandwidth for SUL | Same as 6.5.1 | Same as 6.5.1 |
| 6.5C.2.2 Spectrum Emission Mask for SUL | Same as 6.5.2.2 | Same as 6.5.2.2 |
| 6.5C.2.3 Additional spectrum emission mask for SUL | Same as 6.5.2.3 | Same as 6.5.2.3 |
| 6.5C.2.4.1 NR ACLR for SUL | Same as 6.5.2.4.1 | Same as 6.5.2.4.1 |
| 6.5C.2.4.2 UTRA ACLR for SUL | Same as 6.5.2.4.2 | Same as 6.5.2.4.2 |
| 6.5C.3.1 General spurious emissions for SUL | Same as 6.5.3.1 | Same as 6.5.3.1 |
| 6.5C.3.2 Spurious emission for UE co-existence for SUL | Same as 6.5.3.2 | Same as 6.5.3.2 |
| 6.5C.3.3 Additional spurious emissions for SUL | Same as 6.5.3.3 | Same as 6.5.3.3 |
| 6.5C.4 Transmit intermodulation for SUL | Same as 6.5.4 | Same as 6.5.4 |
| 6.5D.1 Occupied bandwidth for UL MIMO | Same as 6.5.1 for the sum of power at each of UE antenna connector | Same as 6.5.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.1\_2 Occupied bandwidth for SUL with UL MIMO | Same as 6.5D.1 | Same as 6.5D.1 |
| 6.5D.1\_3 Occupied bandwidth for UL MIMO for UE supporting 4Tx | Same as 6.5D.1 | Same as 6.5D.1 |
| 6.5D.2.2 Spectrum emission mask for UL MIMO | Same as 6.5.2.2 for the sum of power at each of UE antenna connector | Same as 6.5.2.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.2.2\_1 Spectrum emission mask for SUL with UL MIMO | Same as 6.5D.2.2 | Same as 6.5D.2.2 |
| 6.5D.2.2\_2 Spectrum emission mask for UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.5D.2.3 Additional spectrum emission mask for UL MIMO | Same as 6.5.2.3 for the sum of power at each of UE antenna connector | Same as 6.5.2.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.2.4.1 NR ACLR for UL MIMO | Same as 6.5.2.4.1 for the sum of power at each of UE antenna connector | Same as 6.5.2.4.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.2.4.1\_1 NR ACLR for SUL with UL MIMO | Same as 6.5.2.4.1 for the sum of power at each of UE antenna connector | Same as 6.5.2.4.1 |
| 6.5D.2.4.1\_2 NR ACLR for UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.5D.2.4.2 UTRA ACLR for UL MIMO | Same as 6.5.2.4.2 for the sum of power at each of UE antenna connector | Same as 6.5.2.4.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.2.4.2\_1 UTRA ACLR for SUL with UL MIMO | Same as 6.5.2.4.2 for the sum of power at each of UE antenna connector | Same as 6.5.2.4.2 |
| 6.5D.3.1 General spurious emissions for UL MIMO | Same as 6.5.3.1 for the sum of power at each of UE antenna connector | Same as 6.5.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.3.2 Spurious emissions for UE co-existence for UL MIMO | Same as 6.5.3.2 for the sum of power at each of UE antenna connector | Same as 6.5.3.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.3.3 Additional spurious emissions for UL MIMO | Same as 6.5.3.3 for the sum of power at each of UE antenna connector | Same as 6.5.3.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.3\_1.1 General spurious emissions for UL MIMO (Rel-16 onward) | Same as 6.5.3.1 for the sum of power at each of UE antenna connector | Same as 6.5.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.3\_1.2 Spurious emissions for UE co-existence for UL MIMO (Rel-16 onward) | Same as 6.5.3.2 for the sum of power at each of UE antenna connector | Same as 6.5.3.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.3\_1.3 Additional spurious emissions for UL MIMO (Rel-16 onward) | Same as 6.5.3.3 for the sum of power at each of UE antenna connector | Same as 6.5.3.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.3\_2.1 General spurious emissions for SUL with UL MIMO | Same as 6.5.3.1 for the sum of power at each of UE antenna connector | Same as 6.5.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.3\_2.2 Spurious emissions for UE co-existence for SUL with UL MIMO | Same as 6.5.3.2 for the sum of power at each of UE antenna connector | Same as 6.5.3.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.3\_2.3 Additional spurious emissions for SUL with UL MIMO | Same as 6.5.3.3 for the sum of power at each of UE antenna connector | Same as 6.5.3.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5D.3\_3.1 General spurious emissions for UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.5D.3\_3.2 Spurious emissions for UE co-existence for UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.5D.4 Transmit intermodulation for UL MIMO | Same as 6.5.4 for each antenna | Same as 6.5.4 |
| 6.5D.4\_1 Transmit intermodulation for SUL with UL MIMO | Same as 6.5.4 for each antenna | Same as 6.5.4 |
| 6.5D.4\_2 Transmit intermodulation for UL MIMO for UE supporting 4Tx | FFS | FFS |
| 6.5E.1.1 Occupied bandwidth for V2X / non-concurrent operation | Same as 6.5.1 | Same as 6.5.1 |
| 6.5E.1.1D Occupied bandwidth for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.1 for each antenna | Same as 6.5.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5E.2.2.1 Spectrum emission mask for V2X / non-concurrent operation | Same as 6.5.2.2 | Same as 6.5.2.2 |
| 6.5E.2.2.1D Spectrum emission mask for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.2.2 for each antenna | Same as 6.5.2.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5E.2.2.2 Spectrum emission mask for V2X / concurrent operation | For Inter-band concurrent operation  same as 6.5.2.2 for each CC  For Intra-band concurrent operation  Aggregated BW ≤ 100M: Same as 6.5.2.2  Aggregated BW > 100M: TBD | Minimum requirement + TT |
| 6.5E.2.3.1 Additional Spectrum emission mask for V2X / non-concurrent operation | Same as 6.5.2.3 | Same as 6.5.2.3 |
| 6.5E.2.3.1D Additional Spectrum emission mask for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.2.3 for each antenna | Same as 6.5.2.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5E.2.4.1 Adjacent channel leakage ratio for V2X / non-concurrent operation | Same as 6.5.2.4 | Same as 6.5.2.4 |
| 6.5E.2.4.1D Adjacent channel leakage ratio for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.2.4 for each antenna | Same as 6.5.2.4  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5E.2.4.2 Adjacent channel leakage for V2X / concurrent operation | For Inter-band concurrent operation  same as 6.5.2.4.1 for each CC  For Intra-band concurrent operation  Aggregated BW ≤ 100M: Same as 6.5.2.4.1  Aggregated BW > 100M: TBD | Same as 6.5.2.4.1 |
| 6.5E.3.1.1 General spurious emissions for V2X / non-concurrent operation | 0 dB | Same as 6.5.3.1 |
| 6.5E.3.1.1D General spurious emissions for V2X / non-concurrent operation / SL-MIMO | 0 dB | Same as 6.5.3.1 |
| 6.5E.3.2.1 Spurious emissions for UE co-existence for V2X / non-concurrent operation | 0 dB | Same as 6.5.3.2 |
| 6.5E.3.2.1D Spurious emissions for UE co-existence for V2X / non-concurrent operation / SL-MIMO | 0 dB | Same as 6.5.3.2 |
| 6.5E.3.2.2 Spurious emissions for UE co-existence for V2X / concurrent operation | 0 dB | Same as 6.5.3.2 |
| 6.5E.3.3.1 Additional spurious emissions requirements for V2X / non-concurrent operation | 0 dB | Same as 6.5.3.3 |
| 6.5E.4.1 Transmit intermodulation for V2X / non-concurrent operation | Same as 6.5.4 | Same as 6.5.4 |
| 6.5E.4.1D Transmit intermodulation for V2X / non-concurrent operation / SL-MIMO | Same as 6.5.4 for each antenna | Same as 6.5.4 |
| 6.5E.4.2 Transmit intermodulation for V2X con-current operation | For intra-band concurrent operation:  Aggregated BW ≤ 100M: same as 6.5.4, for each CC  Aggregated BW > 100M: TBD | Same as 6.5.4 |
| 6.5F.1 Occupied bandwidth for shared spectrum channel access | Same as 6.5.1 for f ≤ 7.125GHz | Same as 6.5.1 for f ≤ 7.125GHz |
| 6.5F.2.2 Spectrum emission mask for operation with shared spectrum channel access | 1.5 dB, f ≤ 3.0GHz  1.8 dB, 3.0GHz < f ≤ 7.125GHz | Minimum requirement + TT |
| 6.5F.2.4.1 NR ACLR | Absolute requirement  0 dB  Relative requirement  0.8 dB | Absolute requirement  ACLR Minimum Requirement + TT  Relative requirement  ACLR Minimum Requirement - TT |
| 6.5F.2.4.2 Shared spectrum channel access ACLR with additional requirement for NS\_29 | Same as 6.5F.2.4.1 | Same as 6.5F.2.4.1 |
| 6.5F.3.1 General spurious emissions | 0 dB | Minimum requirement + TT |
| 6.5F.3.3 Additional spurious emissions for shared spectrum channel access | 0 dB | Minimum requirement + TT |
| 6.5F.4 Transmit intermodulation for shared spectrum channel access | 0 dB | CW interferer Minimum Requirement - TT |
| 6.5G.1 Occupied bandwidth for Tx Diversity | Same as 6.5.1 for the sum of power at each of UE antenna connector | Same as 6.5.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5G.1\_1 Occupied bandwidth for Tx Diversity for UE supporting 4Tx | Same as 6.5.1 for the sum of power at each of UE antenna connector | Same as 6.5.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5G.2.1 Spectrum emission mask for Tx Diversity | Same as 6.5.2.2 for the sum of power at each of UE antenna connector | Same as 6.5.2.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5G.2.1\_1 Spectrum emission mask for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.5G.2.2 Additional spectrum emission mask for Tx Diversity | Same as 6.5.2.3 for the sum of power at each of UE antenna connector | Same as 6.5.2.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5G.2.3.1 NR ACLR for Tx Diversity | Same as 6.5.2.4.1 for the sum of power at each of UE antenna connector | Same as 6.5.2.4.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5G.2.3.2 UTRA ACLR for Tx Diversity | Same as 6.5.2.4.2 for the sum of power at each of UE antenna connector | Same as 6.5.2.4.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5G.2.3.1\_1 NR ACLR for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.5G.3.1 General spurious emissions for Tx Diversity | Same as 6.5.3.1 for the sum of power at each of UE antenna connector | Same as 6.5.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5G.3.2 Spurious emissions for UE co-existence for Tx Diversity | Same as 6.5.3.2 for the sum of power at each of UE antenna connector | Same as 6.5.3.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5G.3.3 Additional spurious emissions for Tx Diversity | Same as 6.5.3.3 for the sum of power at each of UE antenna connector | Same as 6.5.3.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5G.3.1\_1 General spurious emissions for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.5G.3.2\_1 Spurious emissions for UE co-existence for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.5G.4 Transmit intermodulation for Tx Diversity | Same as 6.5.4 for each antenna | Same as 6.5.4 |
| 6.5G.4\_1 Transmit intermodulation for Tx Diversity for UE supporting 4Tx | FFS | FFS |
| 6.5H.1.1 Occupied bandwidth for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.1 for the sum of power at each UE antenna connector for aggregated channel bandwidth  Aggregated BW > 100M: TBD | Minimum requirement + TT |
| 6.5H.1.2.1 Spectrum emission mask for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.2.2 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD | Same as 6.5.2.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5H.1.2.2 Additional spectrum emission mask for intra-band UL contiguous CA for UL MIMO | For intra-band contiguous CA  Aggregated BW ≤ 100M: same as 6.5.2.3 for sum of power at each UE antenna connector  Aggregated BW > 100M: TBD | Same as 6.5.3.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 6.5H.1.2.3 NR ACLR for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.2.4.1 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD | Same as 6.5.2.4.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5H.1.3.1 General spurious emissions for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.3.1 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD | Same as 6.5.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5H.1.3.2 Spurious emissions for UE co-existence for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.3.2 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD | Same as 6.5.3.2  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5H.1.3.3 Additional spurious emissions for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.3.3 for sum of powers of all CCs and both antennas  Aggregated BW > 100M: TBD | Same as 6.5.3.3  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over both Tx antenna connectors |
| 6.5H.1.4 Transmit intermodulation for intra-band UL contiguous CA for UL MIMO | Aggregated BW ≤ 100M: same as 6.5.4, for each antenna on each CC  Aggregated BW > 100M: TBD | Same as 6.5.4 |
| 6.5H.3.3.1 General spurious emissions for inter-band UL CA with UL MIMO | Same as 6.5D.3.1 for the carrier configured with UL MIMO  Same as 6.5.3.1 for the carrier without UL MIMO | Minimum requirement + TT |
| 6.5H.3.3.2 Spurious emissions for UE co-existence for inter-band UL CA with UL MIMO | Same as 6.5D.3.2 for the carrier configured with UL MIMO  Same as 6.5.3.2 for the carrier without UL MIMO | Minimum requirement + TT |
| 6.5J.1 Occupied bandwidth for ATG | Same as 6.5.1 for at each UE antenna/TAB connector | Same as 6.5.1 |
| 6.5J.3.1 General spurious emissions for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 6.5.3.1 for the sum of power at each of UE antenna connector | Same as 6.5.3.1  Uplink power measurement applies to overall UL power, which is the linear sum of the output powers over all Tx antenna/TAB connectors |
| 6.5L.3.3.1 General spurious emissions for inter-band UL CA with Tx Diversity | Same as 6.5G.3.1 for the carrier configured with Tx Diversity  Same as 6.5.3.1 for the carrier without Tx Diversity | Minimum requirement + TT |
| 6.5L.3.3.2 Spurious emissions for UE co-existence for inter-band UL CA with Tx Diversity | Same as 6.5G.3.2 for the carrier configured with Tx Diversity  Same as 6.5.3.2 for the carrier without Tx Diversity | Minimum requirement + TT |

## F.3.3 Measurement of receiver

- MU and TT for f>6GHz (band n96, n104) already defined are working assumption based on analysis of single TE vendor. Values will be revisited once analysis from other TE vendors is available.

- MU and TT for f >6GHz (bands n96, n104) are FFS for test cases requiring operation in carrier aggregation, UL MIMO or Tx Diversity.

Table F.3.3-1: Derivation of Test Requirements (Receiver tests)

|  |  |  |
| --- | --- | --- |
| Sub clause | Test Tolerance (TT) | Formula for test requirement |
| 7.3.2 Reference sensitivity power level | 0.7 dB, f ≤ 3.0GHz  1.0 dB, 3.0GHz < f ≤ 7.125GHz | Reference sensitivity power level + TT  T-put limit unchanged |
| 7.3.2\_1 Reference sensitivity power level for XR | Same as 7.3.2 | Same as 7.3.,2 |
| 7.3A Reference sensitivity for CA  (Same TT apply to all subsections including 7.3A.1, 7.3A.1\_1, 7.3A.2, 7.3A.3, 7.3A.4, etc.) | Same as 7.3.2 for each component carrier | Same as 7.3.2 for each component carrier |
| 7.3C.2 Reference sensitivity power level | Same as 7.3.2 | Same as 7.3.2 |
| 7.3D Reference sensitivity for MIMO | Same as 7.3.2 | Same as 7.3.2 |
| 7.3D.2\_1 Reference sensitivity power level for SUL with UL MIMO | Same as 7.3D | Same as 7.3D |
| 7.3D.2\_3 Reference sensitivity power level for UL MIMO for UE supporting 4Tx | Same as 7.3.2 | Same as 7.3.2 |
| 7.3E.2 Reference sensitivity for V2X / non-concurrent operation | Same as 7.3.2 | Same as 7.3.2 |
| 7.3E.3 Reference sensitivity for V2X / Concurrent operation | Same as 7.3.2 for NR V2X carrier and NR FR1 carrier | Same as 7.3.2 |
| 7.3F Reference sensitivity for shared spectrum channel access | 1.0 dB, 3.0GHz < f ≤ 7.125GHz | Same as 7.3.2 |
| 7.3G.1 Reference sensitivity for Tx Diversity for UE supporting 4Tx | Same as 7.3.2 | Same as 7.3.2 |
| 7.3I.2 Reference sensitivity power level for RedCap | Same as 7.3.2 | Same as 7.3.2 |
| 7.3J.2 Reference sensitivity power level for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  same as 7.3.2  Otherwise: FFS | The overall UL power is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.4 Maximum input level | 0.7 dB, f ≤ 3.0GHz  1.0 dB, 3.0GHz < f ≤ 6.0GHz  [1.5] dB, 6.0GHz < f ≤ 7.125GHz | Maximum input level - TT |
| 7.4A Maximum input level for CA  (Same TT apply to all subsections including 7.4A.1, 7.4A.2, 7.4A.3, 7.4A.4, etc.) | Same as 7.4 for each component carrier | Same as 7.4 for each component carrier |
| 7.4D Maximum input level for UL MIMO | Same as 7.4 | Same as 7.4  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.4D\_1 Maximum input level for SUL with UL MIMO | Same as 7.4D | Same as 7.4D |
| 7.4E.1 Maximum input level for V2X / non-concurrent operation | V2X reception power same as 7.4 | Same as 7.4 |
| 7.4F Maximum input level for shared spectrum channel access | Same as 7.4 for f ≤ 7.125GHz | Same as 7.4 for f ≤ 7.125GHz |
| 7.4J Maximum input level for ATG | For ATG UEs with no more than 2 transmit antenna connectors/ transceiver array boundary (TAB) connectors:  Same as 7.4  Otherwise: FFS | Same as 7.4  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.5 Adjacent channel selectivity | 0 dB | Wanted signal power + TT  Interferer signal power unchanged  T-put limit unchanged |
| 7.5A Adjacent channel selectivity for CA  (Same TT apply to all subsections including 7.5A.1, 7.5A.2, 7.5A.3, 7.5A.4, etc.) | Same as 7.5 for each component carrier | Same as 7.5 for each component carrier |
| 7.5D Adjacent channel selectivity for UL MIMO | Same as 7.5 | Same as 7.5  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.5D\_1 Adjacent channel selectivity for SUL with UL MIMO | Same as 7.5D | Same as 7.5D |
| 7.5D\_2 Adjacent channel selectivity for UL MIMO for UE supporting 4Tx | Same as 7.5D | Same as 7.5D |
| 7.5E.1 Adjacent channel selectivity for V2X / non-concurrent operation | V2X reception power same as 7.5 | Same as 7.5 |
| 7.5E.2 Adjacent channel selectivity for V2X / concurrent operation | Same as 7.3.2 for NR V2X carrier and NR FR1 carrier | Same as 7.5 |
| 7.5F.1 Adjacent channel selectivity for shared spectrum channel access | Same as 7.5 | Same as 7.5 |
| 7.5G.1 Adjacent channel selectivity for Tx Diversity for UE supporting 4Tx | Same as 7.5 | Same as 7.5  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.5J Adjacent channel selectivity for ATG | Same as 7.5 | Same as 7.5  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.6.2 Inband Blocking | 0 dB | Wanted signal power + TT  Interferer signal power unchanged  T-put limit unchanged |
| 7.6.3 Out-of-band blocking | 0 dB | Wanted signal power + TT  Interferer signal power unchanged  T-put limit unchanged |
| 7.6.4 Narrow band blocking | 0 dB | Wanted signal power + TT  Interferer signal power unchanged  T-put limit unchanged |
| 7.6A.2 Inband Blocking for CA  (Same TT apply to all subsections including 7.6A.2.1, 7.6A.2.2, 7.6A.2.3, 7.6A.2.4, etc.) | Same as 7.6.2 for each component carrier | Same as 7.6.2 for each component carrier |
| 7.6A.3 Out-of-band Blocking for CA  (Same TT apply to all subsections including 7.6A.3.1, 7.6A.3.2, 7.6A.3.3, 7.6A.3.4, etc.) | Same as 7.6.3 for each component carrier | Same as 7.6.3 for each component carrier |
| 7.6A.4 Narrow band Blocking for CA  (Same TT apply to all subsections including 7.6A.4.1, 7.6A.4.2, 7.6A.4.3, 7.6A.4.4, etc.) | Same as 7.6.4 for each component carrier | Same as 7.6.4 for each component carrier |
| 7.6C.2 Inband Blocking for SUL | Same as 7.6.2 | Same as 7.6.2 |
| 7.6C.2\_1.1 Inband Blocking for SUL with 2 DL CA | Same as 7.6A.2 | Same as 7.6A.2 |
| 7.6C.3 Out-of-band blocking for SUL | Same as 7.6.3 | Same as 7.6.3 |
| 7.6D.2 Inband blocking for UL MIMO | Same as 7.6.2 | Same as 7.6.2  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.6D.2\_1 In-band blocking for SUL with UL MIMO | Same as 7.6D.2 | Same as 7.6D.2 |
| 7.6D.2\_2 In-band blocking for UL MIMO for UE supporting 4Tx | Same as 7.6D.2 | Same as 7.6D.2 |
| 7.6D.3 Out-of-band blocking for UL MIMO | Same as 7.6.3 | Same as 7.6.3  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.6D.3\_1 Out-of-band blocking for SUL with UL MIMO | Same as 7.6D.3 | Same as 7.6D.3 |
| 7.6D.3\_2 Out-of-band blocking for UL MIMO for UE supporting 4Tx | Same as 7.6D.3 | Same as 7.6D.3 |
| 7.6D.4 Narrow-band blocking for UL MIMO | Same as 7.6.4 | Same as 7.6.4  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.6D.4\_3 Narrow band blocking for UL MIMO for UE supporting 4Tx | Same as 7.6D.4 | Same as 7.6D.4 |
| 7.6E.2.1 In-band blocking for V2X / non-concurrent operation | Same as 7.6.2 | Same as 7.6.2 |
| 7.6E.3.1 Out-of-band blocking for V2X / non-concurrent operation | Same as 7.6.3 | Same as 7.6.3 |
| 7.6F.2.1 In-band blocking for shared spectrum channel access | Same as 7.6.2 | Same as 7.6.2 |
| 7.6F.3.1 Out-of-band blocking for shared spectrum channel access | Same as 7.6.3 | Same as 7.6.3 |
| 7.6G.1 In-band blocking for Tx Diversity for UE supporting 4Tx | Same as 7.6.2 | Same as 7.6.2  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.6G.2 Out-of-band blocking for Tx Diversity for UE supporting 4Tx | Same as 7.6.3 | Same as 7.6.3  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.6G.3 Narrow band blocking for Tx Diversity for UE supporting 4Tx | Same as 7.6.4 | Same as 7.6.4  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.6J.2 In-band blocking for ATG | Same as 7.6.2 | Same as 7.6.2  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.6J.3 Out-of-band blocking for ATG | Same as 7.6.3 | Same as 7.6.3  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.7 Spurious response | 0 dB | Wanted signal power + TT  Interferer signal power unchanged  T-put limit unchanged |
| 7.7A Spurious response for CA  (Same TT apply to all subsections including 7.7A.1, 7.7A.2, 7.7A.3, etc.) | Same as 7.7 for each component carrier | Same as 7.7 for each component carrier |
| 7.7D Spurious response for UL MIMO | Same as 7.7 | Same as 7.7  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.7D\_1 Spurious response for SUL with UL MIMO | Same as 7.7D | Same as 7.7D |
| 7.7D\_2 Spurious response for UL MIMO for UE supporting 4Tx | Same as 7.7D | Same as 7.7D |
| 7.7E.1 Spurious response for V2X / non-concurrent operation | Same as 7.7 | Same as 7.7 |
| 7.7F.1 Spurious response for shared spectrum channel access | Same as 7.7 | Same as 7.7 |
| 7.7G.1 Spurious response for Tx Diversity for UE supporting 4Tx | Same as 7.7 | Same as 7.7  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.7J Spurious response for ATG | Same as 7.7 | Same as 7.7  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.8.2 Wide band Intermodulation | 0 dB | Wanted signal power +TT  CW Interferer signal power unchanged  Modulated Interferer signal power unchanged  T-put limit unchanged |
| 7.8A.2 Wide band Intermodulation for CA  (Same TT apply to all subsections including 7.8A.2.1, 7.8A.2.2, 7.8A.2.3, etc.) | Same as 7.8.2 for each component carrier | Same as 7.8.2 for each component carrier |
| 7.8D.2 Intermodulation characteristics for UL MIMO | Same as 7.8.2 | Same as 7.8.2  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors |
| 7.8D.2\_1 Wide band Intermodulation for SUL with UL MIMO | Same as 7.8D.2 | Same as 7.8D.2 |
| 7.8E.2.1 Wide band Intermodulation for V2X / non-concurrent operation | Same as 7.8.2 | Same as 7.8.2 |
| 7.8F Intermodulation characteristics for shared spectrum channel access | Same as 7.8.2 | Same as 7.8.2  Uplink power measurement window applies to overall UL power, which is the linear sum of the output powers over all Tx antenna connectors or all TAB connectors |
| 7.8J.2 Wide band intermodulation for ATG | Same as 7.8.2 | Same as 7.8.2 |
| 7.9 Spurious emissions | 0 dB | Minimum requirement + TT |
| 7.9A.1 Spurious emissions for CA (2DL CA) | Same as 7.9 | Same as 7.9 |
| 7.9J Spurious emissions for ATG | Same as 7.9 | Same as 7.9 |

## <<< END OF CHANGES >>>