Annex A (normative): Measurement channels

# A.1 General

The throughput values defined in the measurement channels specified in Annex A, are calculated and are valid per datastream (codeword). For multi-stream (more than one codeword) transmissions, the throughput referenced in the minimum requirements is the sum of throughputs of all datastreams (codewords).

The UE category entry in the definition of the reference measurement channel in Annex A is only informative and reveals the UE categories, which can support the corresponding measurement channel. Whether the measurement channel is used for testing a certain UE category or not is specified in the individual minimum requirements.

# A.2 UL reference measurement channels

## A.2.1 General

The measurement channels in the following subclauses are defined to derive the requirements in clause 6 (Transmitter Characteristics) and clause 7 (Receiver Characteristics). The measurement channels represent example configurations of physical channels for different data rates.

The measurement channels in the following clauses are applicable to both FDD and TDD.

The active uplink slots for TDD configurations are specified in table A.2.1-1. TDD slot patterns defined for reference sensitivity tests will be used for TDD UL RMCs.

Table A.2.1-1: TDD active uplink slots

|  |  |
| --- | --- |
| SCS | Active Uplink slots |
| 15 kHz | 4, 9 |
| 30 kHz | 8, 9, 18, 19 |
| 60 kHz | 16, 17, 18, 19, 36, 37, 38, 39 |

Table A.2.1-2: TDD active uplink slots for PC1.5 UE with maxUplinkDutyCycle-PC1dot5-MPE-FR1-r16≤20%

|  |  |
| --- | --- |
| SCS | Active Uplink slots |
| 15 kHz | 4 |
| 30 kHz | 8, 9 |
| 60 kHz | 16, 17, 18, 19 |

## A.2.2 Reference measurement channels for FDD

### A.2.2.1 DFT-s-OFDM Pi/2-BPSK

Table A.2.2.1-1: Reference Channels for DFT-s-OFDM Pi/2-BPSK

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks (LCRB) | DFT-s-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 1 | 11 | pi/2 BPSK | 0 | 24 | 16 | 2 | 1 | 132 | 132 |
|  | 5 | 11 | pi/2 BPSK | 0 | 160 | 16 | 2 | 1 | 660 | 660 |
|  | 9 | 11 | pi/2 BPSK | 0 | 288 | 16 | 2 | 1 | 1188 | 1188 |
|  | 10 | 11 | pi/2 BPSK | 0 | 320 | 16 | 2 | 1 | 1320 | 1320 |
|  | 12 | 11 | pi/2 BPSK | 0 | 384 | 16 | 2 | 1 | 1584 | 1584 |
|  | 15 | 11 | pi/2 BPSK | 0 | 480 | 16 | 2 | 1 | 1980 | 1980 |
|  | 18 | 11 | pi/2 BPSK | 0 | 576 | 16 | 2 | 1 | 2376 | 2376 |
|  | 24 | 11 | pi/2 BPSK | 0 | 768 | 16 | 2 | 1 | 3168 | 3168 |
|  | 25 | 11 | pi/2 BPSK | 0 | 808 | 16 | 2 | 1 | 3300 | 3300 |
|  | 30 | 11 | pi/2 BPSK | 0 | 984 | 16 | 2 | 1 | 3960 | 3960 |
|  | 32 | 11 | pi/2 BPSK | 0 | 1032 | 16 | 2 | 1 | 4224 | 4224 |
|  | 36 | 11 | pi/2 BPSK | 0 | 1128 | 16 | 2 | 1 | 4752 | 4752 |
|  | 45 | 11 | pi/2 BPSK | 0 | 1416 | 16 | 2 | 1 | 5940 | 5940 |
|  | 50 | 11 | pi/2 BPSK | 0 | 1544 | 16 | 2 | 1 | 6600 | 6600 |
|  | 60 | 11 | pi/2 BPSK | 0 | 1864 | 16 | 2 | 1 | 7920 | 7920 |
|  | 64 | 11 | pi/2 BPSK | 0 | 2024 | 16 | 2 | 1 | 8448 | 8448 |
|  | 75 | 11 | pi/2 BPSK | 0 | 2408 | 16 | 2 | 1 | 9900 | 9900 |
|  | 80 | 11 | pi/2 BPSK | 0 | 2472 | 16 | 2 | 1 | 10560 | 10560 |
|  | 81 | 11 | pi/2 BPSK | 0 | 2536 | 16 | 2 | 1 | 10692 | 10692 |
|  | 90 | 11 | pi/2 BPSK | 0 | 2792 | 16 | 2 | 1 | 11880 | 11880 |
|  | 100 | 11 | pi/2 BPSK | 0 | 3104 | 16 | 2 | 1 | 13200 | 13200 |
|  | 108 | 11 | pi/2 BPSK | 0 | 3368 | 16 | 2 | 1 | 14256 | 14256 |
|  | 120 | 11 | pi/2 BPSK | 0 | 3752 | 16 | 2 | 1 | 15840 | 15840 |
|  | 128 | 11 | pi/2 BPSK | 0 | 3976 | 24 | 2 | 2 | 16896 | 16896 |
|  | 135 | 11 | pi/2 BPSK | 0 | 4104 | 24 | 2 | 2 | 17820 | 17820 |
|  | 160 | 11 | pi/2 BPSK | 0 | 4872 | 24 | 2 | 2 | 21120 | 21120 |
|  | 162 | 11 | pi/2 BPSK | 0 | 5000 | 24 | 2 | 2 | 21384 | 21384 |
|  | 180 | 11 | pi/2 BPSK | 0 | 5512 | 24 | 2 | 2 | 23760 | 23760 |
|  | 216 | 11 | pi/2 BPSK | 0 | 6664 | 24 | 2 | 2 | 28512 | 28512 |
|  | 243 | 11 | pi/2 BPSK | 0 | 7560 | 24 | 2 | 2 | 32076 | 32076 |
|  | 270 | 11 | pi/2 BPSK | 0 | 8448 | 24 | 2 | 3 | 35640 | 35640 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 6.1.4.1-1 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where LCRB ≤ NRB. | | | | | | | | | | |

Table A.2.2.1-2: Void

Table A.2.2.1-3: Void

### A.2.2.2 DFT-s-OFDM QPSK

Table A.2.2.2-1: Reference Channels for DFT-s-OFDM QPSK

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks (LCRB) | DFT-s-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 1 | 11 | QPSK | 2 | 48 | 16 | 2 | 1 | 264 | 132 |
|  | 5 | 11 | QPSK | 2 | 256 | 16 | 2 | 1 | 1320 | 660 |
|  | 9 | 11 | QPSK | 2 | 456 | 16 | 2 | 1 | 2376 | 1188 |
|  | 10 | 11 | QPSK | 2 | 504 | 16 | 2 | 1 | 2640 | 1320 |
|  | 12 | 11 | QPSK | 2 | 608 | 16 | 2 | 1 | 3168 | 1584 |
|  | 15 | 11 | QPSK | 2 | 768 | 16 | 2 | 1 | 3960 | 1980 |
|  | 18 | 11 | QPSK | 2 | 928 | 16 | 2 | 1 | 4752 | 2376 |
|  | 20 | 11 | QPSK | 2 | 1032 | 16 | 2 | 1 | 5280 | 2640 |
|  | 24 | 11 | QPSK | 2 | 1192 | 16 | 2 | 1 | 6336 | 3168 |
|  | 25 | 11 | QPSK | 2 | 1256 | 16 | 2 | 1 | 6600 | 3300 |
|  | 30 | 11 | QPSK | 2 | 1544 | 16 | 2 | 1 | 7920 | 3960 |
|  | 32 | 11 | QPSK | 2 | 1608 | 16 | 2 | 1 | 8448 | 4224 |
|  | 36 | 11 | QPSK | 2 | 1800 | 16 | 2 | 1 | 9504 | 4752 |
|  | 45 | 11 | QPKS | 2 | 2208 | 16 | 2 | 1 | 11880 | 5940 |
|  | 50 | 11 | QPSK | 2 | 2472 | 16 | 2 | 1 | 13200 | 6600 |
|  | 60 | 11 | QPSK | 2 | 3104 | 16 | 2 | 1 | 15840 | 7920 |
|  | 64 | 11 | QPSK | 2 | 3240 | 16 | 2 | 1 | 16896 | 8448 |
|  | 75 | 11 | QPSK | 2 | 3752 | 16 | 2 | 1 | 19800 | 9900 |
|  | 80 | 11 | QPSK | 2 | 3976 | 24 | 2 | 2 | 21120 | 10560 |
|  | 81 | 11 | QPSK | 2 | 4040 | 24 | 2 | 2 | 21384 | 10692 |
|  | 90 | 11 | QPSK | 2 | 4488 | 24 | 2 | 2 | 23760 | 11880 |
|  | 100 | 11 | QPSK | 2 | 5000 | 24 | 2 | 2 | 26400 | 13200 |
|  | 108 | 11 | QPSK | 2 | 5384 | 24 | 2 | 2 | 28512 | 14256 |
|  | 120 | 11 | QPSK | 2 | 5896 | 24 | 2 | 2 | 31680 | 15840 |
|  | 128 | 11 | QPSK | 2 | 6408 | 24 | 2 | 2 | 33792 | 16896 |
|  | 135 | 11 | QPSK | 2 | 6664 | 24 | 2 | 2 | 35640 | 17820 |
|  | 160 | 11 | QPSK | 2 | 7944 | 24 | 2 | 3 | 42240 | 21120 |
|  | 162 | 11 | QPSK | 2 | 8064 | 24 | 2 | 3 | 42768 | 21384 |
|  | 180 | 11 | QPSK | 2 | 8976 | 24 | 2 | 3 | 47520 | 23760 |
|  | 216 | 11 | QPSK | 2 | 10752 | 24 | 2 | 3 | 57024 | 28512 |
|  | 243 | 11 | QPSK | 2 | 12040 | 24 | 2 | 4 | 64152 | 32076 |
|  | 270 | 11 | QPSK | 2 | 13320 | 24 | 2 | 4 | 71280 | 35640 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 6.1.4.1-1 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where LCRB ≤ NRB. | | | | | | | | | | |

Table A.2.2.2-2: Void

Table A.2.2.2-3: Void

### A.2.2.3 DFT-s-OFDM 16QAM

Table A.2.2.3-1: Reference Channels for DFT-s-OFDM 16QAM

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks (LCRB) | DFT-s-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 1 | 11 | 16QAM | 10 | 176 | 16 | 2 | 1 | 528 | 132 |
|  | 5 | 11 | 16QAM | 10 | 888 | 16 | 2 | 1 | 2640 | 660 |
|  | 9 | 11 | 16QAM | 10 | 1608 | 16 | 2 | 1 | 4752 | 1188 |
|  | 10 | 11 | 16QAM | 10 | 1800 | 16 | 2 | 1 | 5280 | 1320 |
|  | 12 | 11 | 16QAM | 10 | 2088 | 16 | 2 | 1 | 6336 | 1584 |
|  | 15 | 11 | 16QAM | 10 | 2664 | 16 | 2 | 1 | 7920 | 1980 |
|  | 18 | 11 | 16QAM | 10 | 3240 | 16 | 2 | 1 | 9504 | 2376 |
|  | 24 | 11 | 16QAM | 10 | 4224 | 24 | 1 | 1 | 12672 | 3168 |
|  | 25 | 11 | 16QAM | 10 | 4352 | 24 | 1 | 1 | 13200 | 3300 |
|  | 30 | 11 | 16QAM | 10 | 5248 | 24 | 1 | 1 | 15840 | 3960 |
|  | 32 | 11 | 16QAM | 10 | 5632 | 24 | 1 | 1 | 16896 | 4224 |
|  | 36 | 11 | 16QAM | 10 | 6272 | 24 | 1 | 1 | 19008 | 4752 |
|  | 45 | 11 | 16QAM | 10 | 7808 | 24 | 1 | 1 | 23760 | 5940 |
|  | 50 | 11 | 16QAM | 10 | 8712 | 24 | 1 | 2 | 26400 | 6600 |
|  | 60 | 11 | 16QAM | 10 | 10504 | 24 | 1 | 2 | 31680 | 7920 |
|  | 64 | 11 | 16QAM | 10 | 11272 | 24 | 1 | 2 | 33792 | 8448 |
|  | 75 | 11 | 16QAM | 10 | 13064 | 24 | 1 | 2 | 39600 | 9900 |
|  | 80 | 11 | 16QAM | 10 | 14088 | 24 | 1 | 2 | 42240 | 10560 |
|  | 81 | 11 | 16QAM | 10 | 14088 | 24 | 1 | 2 | 42768 | 10692 |
|  | 90 | 11 | 16QAM | 10 | 15880 | 24 | 1 | 2 | 47520 | 11880 |
|  | 100 | 11 | 16QAM | 10 | 17424 | 24 | 1 | 3 | 52800 | 13200 |
|  | 108 | 11 | 16QAM | 10 | 18960 | 24 | 1 | 3 | 57024 | 14256 |
|  | 120 | 11 | 16QAM | 10 | 21000 | 24 | 1 | 3 | 63360 | 15840 |
|  | 128 | 11 | 16QAM | 10 | 22536 | 24 | 1 | 3 | 67584 | 16896 |
|  | 135 | 11 | 16QAM | 10 | 23568 | 24 | 1 | 3 | 71280 | 17820 |
|  | 160 | 11 | 16QAM | 10 | 28168 | 24 | 1 | 4 | 84480 | 21120 |
|  | 162 | 11 | 16QAM | 10 | 28168 | 24 | 1 | 4 | 85536 | 21384 |
|  | 180 | 11 | 16QAM | 10 | 31752 | 24 | 1 | 4 | 95040 | 23760 |
|  | 216 | 11 | 16QAM | 10 | 37896 | 24 | 1 | 5 | 114048 | 28512 |
|  | 243 | 11 | 16QAM | 10 | 43032 | 24 | 1 | 6 | 128304 | 32076 |
|  | 270 | 11 | 16QAM | 10 | 47112 | 24 | 1 | 6 | 142560 | 35640 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 6.1.4.1-1 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where LCRB ≤ NRB. | | | | | | | | | | |

Table A.2.2.3-2: Void

Table A.2.2.3-3: Void

### A.2.2.4 DFT-s-OFDM 64QAM

Table A.2.2.4-1: Reference Channels for DFT-s-OFDM 64QAM

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks (LCRB) | DFT-s-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 1 | 11 | 64QAM | 18 | 408 | 16 | 2 | 1 | 792 | 132 |
|  | 5 | 11 | 64QAM | 18 | 2024 | 16 | 2 | 1 | 3960 | 660 |
|  | 9 | 11 | 64QAM | 18 | 3624 | 16 | 2 | 1 | 7128 | 1188 |
|  | 10 | 11 | 64QAM | 18 | 3968 | 24 | 1 | 1 | 7920 | 1320 |
|  | 12 | 11 | 64QAM | 18 | 4736 | 24 | 1 | 1 | 9504 | 1584 |
|  | 15 | 11 | 64QAM | 18 | 6016 | 24 | 1 | 1 | 11880 | 1980 |
|  | 18 | 11 | 64QAM | 18 | 7168 | 24 | 1 | 1 | 14256 | 2376 |
|  | 24 | 11 | 64QAM | 18 | 9480 | 24 | 1 | 2 | 19008 | 3168 |
|  | 25 | 11 | 64QAM | 18 | 9992 | 24 | 1 | 2 | 19800 | 3300 |
|  | 30 | 11 | 64QAM | 18 | 12040 | 24 | 1 | 2 | 23760 | 3960 |
|  | 32 | 11 | 64QAM | 18 | 12808 | 24 | 1 | 2 | 25344 | 4224 |
|  | 36 | 11 | 64QAM | 18 | 14344 | 24 | 1 | 2 | 28512 | 4752 |
|  | 45 | 11 | 64QAM | 18 | 17928 | 24 | 1 | 3 | 35640 | 5940 |
|  | 50 | 11 | 64QAM | 18 | 19968 | 24 | 1 | 3 | 39600 | 6600 |
|  | 60 | 11 | 64QAM | 18 | 24072 | 24 | 1 | 3 | 47520 | 7920 |
|  | 64 | 11 | 64QAM | 18 | 25608 | 24 | 1 | 4 | 50688 | 8448 |
|  | 75 | 11 | 64QAM | 18 | 30216 | 24 | 1 | 4 | 59400 | 9900 |
|  | 80 | 11 | 64QAM | 18 | 31752 | 24 | 1 | 4 | 63360 | 10560 |
|  | 81 | 11 | 64QAM | 18 | 32264 | 24 | 1 | 4 | 64152 | 10692 |
|  | 90 | 11 | 64QAM | 18 | 35856 | 24 | 1 | 5 | 71280 | 11880 |
|  | 108 | 11 | 64QAM | 18 | 43032 | 24 | 1 | 6 | 85536 | 14256 |
|  | 100 | 11 | 64QAM | 18 | 39936 | 24 | 1 | 5 | 79200 | 13200 |
|  | 120 | 11 | 64QAM | 18 | 48168 | 24 | 1 | 6 | 95040 | 15840 |
|  | 128 | 11 | 64QAM | 18 | 51216 | 24 | 1 | 7 | 101376 | 16896 |
|  | 135 | 11 | 64QAM | 18 | 54296 | 24 | 1 | 7 | 106920 | 17820 |
|  | 160 | 11 | 64QAM | 18 | 63528 | 24 | 1 | 8 | 126720 | 21120 |
|  | 162 | 11 | 64QAM | 18 | 64552 | 24 | 1 | 8 | 128304 | 21384 |
|  | 180 | 11 | 64QAM | 18 | 71688 | 24 | 1 | 9 | 142560 | 23760 |
|  | 216 | 11 | 64QAM | 18 | 86040 | 24 | 1 | 11 | 171072 | 28512 |
|  | 243 | 11 | 64QAM | 18 | 96264 | 24 | 1 | 12 | 192456 | 32076 |
|  | 270 | 11 | 64QAM | 18 | 108552 | 24 | 1 | 13 | 213840 | 35640 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 6.1.4.1-1 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where LCRB ≤ NRB. | | | | | | | | | | |

Table A.2.2.4-2: Void

Table A.2.2.4-3: Void

### A.2.2.5 DFT-s-OFDM 256QAM

Table A.2.2.5-1: Reference Channels for DFT-s-OFDM 256QAM

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks (LCRB) | DFT-s-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 1 | 11 | 256QAM | 20 | 704 | 16 | 2 | 1 | 1056 | 132 |
|  | 5 | 11 | 256QAM | 20 | 3496 | 16 | 2 | 1 | 5280 | 660 |
|  | 9 | 11 | 256QAM | 20 | 6272 | 24 | 1 | 1 | 9504 | 1188 |
|  | 10 | 11 | 256QAM | 20 | 7040 | 24 | 1 | 1 | 10560 | 1320 |
|  | 12 | 11 | 256QAM | 20 | 8456 | 24 | 1 | 2 | 12672 | 1584 |
|  | 15 | 11 | 256QAM | 20 | 10504 | 24 | 1 | 2 | 15840 | 1980 |
|  | 18 | 11 | 256QAM | 20 | 12552 | 24 | 1 | 2 | 19008 | 2376 |
|  | 24 | 11 | 256QAM | 20 | 16896 | 24 | 1 | 3 | 25344 | 3168 |
|  | 25 | 11 | 256QAM | 20 | 17424 | 24 | 1 | 3 | 26400 | 3300 |
|  | 30 | 11 | 256QAM | 20 | 21000 | 24 | 1 | 3 | 31680 | 3960 |
|  | 32 | 11 | 256QAM | 20 | 22536 | 24 | 1 | 3 | 33792 | 4224 |
|  | 36 | 11 | 256QAM | 20 | 25104 | 24 | 1 | 3 | 38016 | 4752 |
|  | 45 | 11 | 256QAM | 20 | 31752 | 24 | 1 | 4 | 47520 | 5940 |
|  | 50 | 11 | 256QAM | 20 | 34816 | 24 | 1 | 5 | 52800 | 6600 |
|  | 60 | 11 | 256QAM | 20 | 42016 | 24 | 1 | 5 | 63360 | 7920 |
|  | 64 | 11 | 256QAM | 20 | 45096 | 24 | 1 | 6 | 67584 | 8448 |
|  | 75 | 11 | 256QAM | 20 | 53288 | 24 | 1 | 7 | 79200 | 9900 |
|  | 80 | 11 | 256QAM | 20 | 56368 | 24 | 1 | 7 | 84480 | 10560 |
|  | 81 | 11 | 256QAM | 20 | 57376 | 24 | 1 | 7 | 85536 | 10692 |
|  | 90 | 11 | 256QAM | 20 | 63528 | 24 | 1 | 8 | 95040 | 11880 |
|  | 108 | 11 | 256QAM | 20 | 75792 | 24 | 1 | 9 | 114048 | 14256 |
|  | 100 | 11 | 256QAM | 20 | 69672 | 24 | 1 | 9 | 105600 | 13200 |
|  | 120 | 11 | 256QAM | 20 | 83976 | 24 | 1 | 10 | 126720 | 15840 |
|  | 128 | 11 | 256QAM | 20 | 90176 | 24 | 1 | 11 | 135168 | 16896 |
|  | 135 | 11 | 256QAM | 20 | 94248 | 24 | 1 | 12 | 142560 | 17820 |
|  | 160 | 11 | 256QAM | 20 | 112648 | 24 | 1 | 14 | 168960 | 21120 |
|  | 162 | 11 | 256QAM | 20 | 114776 | 24 | 1 | 14 | 171072 | 21384 |
|  | 180 | 11 | 256QAM | 20 | 127080 | 24 | 1 | 16 | 190080 | 23760 |
|  | 216 | 11 | 256QAM | 20 | 151608 | 24 | 1 | 18 | 228096 | 28512 |
|  | 243 | 11 | 256QAM | 20 | 172176 | 24 | 1 | 21 | 256608 | 32076 |
|  | 270 | 11 | 256QAM | 20 | 188576 | 24 | 1 | 23 | 285120 | 35640 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 5.1.3.1-2 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where LCRB ≤ NRB. | | | | | | | | | | |

Table A.2.2.5-2: Void

Table A.2.2.5-3: Void

### A.2.2.6 CP-OFDM QPSK

Table A.2.2.6-1: Reference Channels for CP-OFDM QPSK

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks (LCRB) | CP-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 1 | 11 | QPSK | 2 | 48 | 16 | 2 | 1 | 264 | 132 |
|  | 5 | 11 | QPSK | 2 | 256 | 16 | 2 | 1 | 1320 | 660 |
|  | 6 | 11 | QPSK | 2 | 304 | 16 | 2 | 1 | 1584 | 792 |
|  | 9 | 11 | QPSK | 2 | 456 | 16 | 2 | 1 | 2376 | 1188 |
|  | 10 | 11 | QPSK | 2 | 504 | 16 | 2 | 1 | 2640 | 1320 |
|  | 11 | 11 | QPSK | 2 | 552 | 16 | 2 | 1 | 2904 | 1452 |
|  | 12 | 11 | QPSK | 2 | 608 | 16 | 2 | 1 | 3168 | 1584 |
|  | 13 | 11 | QPSK | 2 | 672 | 16 | 2 | 1 | 3432 | 1716 |
|  | 15 | 11 | QPSK | 2 | 768 | 16 | 2 | 1 | 3960 | 1980 |
|  | 16 | 11 | QPSK | 2 | 808 | 16 | 2 | 1 | 4224 | 2112 |
|  | 18 | 11 | QPSK | 2 | 928 | 16 | 2 | 1 | 4752 | 2376 |
|  | 19 | 11 | QPSK | 2 | 984 | 16 | 2 | 1 | 5016 | 2508 |
|  | 24 | 11 | QPSK | 2 | 1192 | 16 | 2 | 1 | 6336 | 3168 |
|  | 25 | 11 | QPSK | 2 | 1256 | 16 | 2 | 1 | 6600 | 3300 |
|  | 26 | 11 | QPSK | 2 | 1288 | 16 | 2 | 1 | 6864 | 3432 |
|  | 31 | 11 | QPSK | 2 | 1544 | 16 | 2 | 1 | 8184 | 4092 |
|  | 33 | 11 | QPSK | 2 | 1672 | 16 | 2 | 1 | 8712 | 4356 |
|  | 38 | 11 | QPSK | 2 | 1928 | 16 | 2 | 1 | 10032 | 5016 |
|  | 39 | 11 | QPSK | 2 | 2024 | 16 | 2 | 1 | 10296 | 5148 |
|  | 40 | 11 | QPSK | 2 | 2024 | 16 | 2 | 1 | 10560 | 5280 |
|  | 47 | 11 | QPSK | 2 | 2408 | 16 | 2 | 1 | 12408 | 6204 |
|  | 51 | 11 | QPSK | 2 | 2536 | 16 | 2 | 1 | 13464 | 6732 |
|  | 52 | 11 | QPSK | 2 | 2600 | 16 | 2 | 1 | 13728 | 6864 |
|  | 53 | 11 | QPSK | 2 | 2664 | 16 | 2 | 1 | 13992 | 6996 |
|  | 54 | 11 | QPSK | 2 | 2664 | 16 | 2 | 1 | 14256 | 7128 |
|  | 61 | 11 | QPSK | 2 | 3104 | 16 | 2 | 1 | 16104 | 8052 |
|  | 65 | 11 | QPSK | 2 | 3240 | 16 | 2 | 1 | 17160 | 8580 |
|  | 67 | 11 | QPSK | 2 | 3368 | 16 | 2 | 1 | 17688 | 8844 |
|  | 68 | 11 | QPSK | 2 | 3368 | 16 | 2 | 1 | 17952 | 8976 |
|  | 78 | 11 | QPSK | 2 | 3848 | 24 | 2 | 2 | 20592 | 10296 |
|  | 79 | 11 | QPSK | 2 | 3912 | 24 | 2 | 2 | 20856 | 10428 |
|  | 80 | 11 | QPSK | 2 | 3976 | 24 | 2 | 2 | 21120 | 10560 |
|  | 81 | 11 | QPSK | 2 | 4040 | 24 | 2 | 2 | 21384 | 10692 |
|  | 93 | 11 | QPSK | 2 | 4616 | 24 | 2 | 2 | 24552 | 12276 |
|  | 95 | 11 | QPSK | 2 | 4744 | 24 | 2 | 2 | 25080 | 12540 |
|  | 106 | 11 | QPSK | 2 | 5256 | 24 | 2 | 2 | 27984 | 13992 |
|  | 107 | 11 | QPSK | 2 | 5256 | 24 | 2 | 2 | 28248 | 14124 |
|  | 108 | 11 | QPSK | 2 | 5384 | 24 | 2 | 2 | 28512 | 14256 |
|  | 109 | 11 | QPSK | 2 | 5384 | 24 | 2 | 2 | 28776 | 14388 |
|  | 121 | 11 | QPSK | 2 | 6024 | 24 | 2 | 2 | 31944 | 15972 |
|  | 123 | 11 | QPSK | 2 | 6152 | 24 | 2 | 2 | 32472 | 16236 |
|  | 133 | 11 | QPSK | 2 | 6664 | 24 | 2 | 2 | 35112 | 17556 |
|  | 135 | 11 | QPSK | 2 | 6664 | 24 | 2 | 2 | 35640 | 17820 |
|  | 137 | 11 | QPSK | 2 | 6792 | 24 | 2 | 2 | 36168 | 18084 |
|  | 160 | 11 | QPSK | 2 | 7944 | 24 | 2 | 3 | 42240 | 21120 |
|  | 162 | 11 | QPSK | 2 | 8064 | 24 | 2 | 3 | 42768 | 21384 |
|  | 189 | 11 | QPSK | 2 | 9480 | 24 | 2 | 3 | 49896 | 24948 |
|  | 216 | 11 | QPSK | 2 | 10752 | 24 | 2 | 3 | 57024 | 28512 |
|  | 217 | 11 | QPSK | 2 | 10752 | 24 | 2 | 3 | 57288 | 28644 |
|  | 245 | 11 | QPSK | 2 | 12296 | 24 | 2 | 4 | 64680 | 32340 |
|  | 270 | 11 | QPSK | 2 | 13320 | 24 | 2 | 4 | 71280 | 35640 |
|  | 273 | 11 | QPSK | 2 | 13576 | 24 | 2 | 4 | 72072 | 36036 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 5.1.3.1-1 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where LCRB ≤ NRB. | | | | | | | | | | |

Table A.2.2.6-1a: Reference Channels for CP-OFDM QPSK for shared spectrum access

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks | CP-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 11 | 11 | QPSK | 2 | 552 | 16 | 2 | 1 | 2904 | 1452 |
|  | 22 | 11 | QPSK | 2 | 1128 | 16 | 2 | 1 | 5808 | 2904 |
|  | 33 | 11 | QPSK | 2 | 1672 | 16 | 2 | 1 | 8712 | 4356 |
|  | 44 | 11 | QPSK | 2 | 2216 | 16 | 2 | 1 | 11616 | 5808 |
|  | 51 | 11 | QPSK | 2 | 2536 | 16 | 2 | 1 | 13464 | 6732 |
|  | 106 | 11 | QPSK | 2 | 5256 | 24 | 2 | 2 | 27984 | 13992 |
|  | 162 | 11 | QPSK | 2 | 8064 | 24 | 2 | 3 | 42768 | 21384 |
|  | 216 | 11 | QPSK | 2 | 10752 | 24 | 2 | 3 | 57024 | 28512 |
|  | 217 | 11 | QPSK | 2 | 10752 | 24 | 2 | 3 | 57288 | 28644 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 5.1.3.1-1 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where allocated resource blocks≤ NRB. | | | | | | | | | | |

Table A.2.2.6-2: Void

Table A.2.2.6-2: Void

Table A.2.2.6-3: Void

### A.2.2.7 CP-OFDM 16QAM

Table A.2.2.7-1: Reference Channels for CP-OFDM 16QAM

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks (LCRB) | CP-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 1 | 11 | 16QAM | 10 | 176 | 16 | 2 | 1 | 528 | 132 |
|  | 5 | 11 | 16QAM | 10 | 888 | 16 | 2 | 1 | 2640 | 660 |
|  | 6 | 11 | 16QAM | 10 | 1064 | 16 | 2 | 1 | 3168 | 792 |
|  | 9 | 11 | 16QAM | 10 | 1608 | 16 | 2 | 1 | 4752 | 1188 |
|  | 10 | 11 | 16QAM | 10 | 1800 | 16 | 2 | 1 | 5280 | 1320 |
|  | 11 | 11 | 16QAM | 10 | 1928 | 16 | 2 | 1 | 5808 | 1452 |
|  | 12 | 11 | 16QAM | 10 | 2088 | 16 | 2 | 1 | 6336 | 1584 |
|  | 13 | 11 | 16QAM | 10 | 2280 | 16 | 2 | 1 | 6864 | 1716 |
|  | 15 | 11 | 16QAM | 10 | 2664 | 16 | 2 | 1 | 7920 | 1980 |
|  | 16 | 11 | 16QAM | 10 | 2792 | 16 | 2 | 1 | 8448 | 2112 |
|  | 18 | 11 | 16QAM | 10 | 3240 | 16 | 2 | 1 | 9504 | 2376 |
|  | 19 | 11 | 16QAM | 10 | 3368 | 16 | 2 | 1 | 10032 | 2508 |
|  | 24 | 11 | 16QAM | 10 | 4224 | 24 | 1 | 1 | 12672 | 3168 |
|  | 25 | 11 | 16QAM | 10 | 4352 | 24 | 1 | 1 | 13200 | 3300 |
|  | 26 | 11 | 16QAM | 10 | 4480 | 24 | 1 | 1 | 13728 | 3432 |
|  | 31 | 11 | 16QAM | 10 | 5376 | 24 | 1 | 1 | 16368 | 4092 |
|  | 33 | 11 | 16QAM | 10 | 5760 | 24 | 1 | 1 | 17424 | 4356 |
|  | 38 | 11 | 16QAM | 10 | 6656 | 24 | 1 | 1 | 20064 | 5016 |
|  | 39 | 11 | 16QAM | 10 | 6784 | 24 | 1 | 1 | 20592 | 5148 |
|  | 40 | 11 | 16QAM | 10 | 7040 | 24 | 1 | 1 | 21120 | 5280 |
|  | 47 | 11 | 16QAM | 10 | 8192 | 24 | 1 | 1 | 24816 | 6204 |
|  | 51 | 11 | 16QAM | 10 | 8968 | 24 | 1 | 2 | 26928 | 6732 |
|  | 52 | 11 | 16QAM | 10 | 9224 | 24 | 1 | 2 | 27456 | 6864 |
|  | 53 | 11 | 16QAM | 10 | 9224 | 24 | 1 | 2 | 27984 | 6996 |
|  | 54 | 11 | 16QAM | 10 | 9480 | 24 | 1 | 2 | 28512 | 7128 |
|  | 61 | 11 | 16QAM | 10 | 10760 | 24 | 1 | 2 | 32208 | 8052 |
|  | 65 | 11 | 16QAM | 10 | 11272 | 24 | 1 | 2 | 34320 | 8580 |
|  | 67 | 11 | 16QAM | 10 | 11784 | 24 | 1 | 2 | 35376 | 8844 |
|  | 68 | 11 | 16QAM | 10 | 11784 | 24 | 1 | 2 | 35904 | 8976 |
|  | 78 | 11 | 16QAM | 10 | 13576 | 24 | 1 | 2 | 41184 | 10296 |
|  | 79 | 11 | 16QAM | 10 | 13832 | 24 | 1 | 2 | 41712 | 10428 |
|  | 80 | 11 | 16QAM | 10 | 14088 | 24 | 1 | 2 | 42240 | 10560 |
|  | 81 | 11 | 16QAM | 10 | 14088 | 24 | 1 | 2 | 42768 | 10692 |
|  | 93 | 11 | 16QAM | 10 | 16392 | 24 | 1 | 2 | 49404 | 12276 |
|  | 95 | 11 | 16QMA | 10 | 16392 | 24 | 1 | 2 | 50160 | 12540 |
|  | 106 | 11 | 16QAM | 10 | 18432 | 24 | 1 | 3 | 55968 | 13992 |
|  | 107 | 11 | 16QAM | 10 | 18960 | 24 | 1 | 3 | 56496 | 14124 |
|  | 108 | 11 | 16QAM | 10 | 18960 | 24 | 1 | 3 | 57024 | 14256 |
|  | 109 | 11 | 16QAM | 10 | 18960 | 24 | 1 | 3 | 57552 | 14388 |
|  | 121 | 11 | 16QAM | 10 | 21000 | 24 | 1 | 3 | 63888 | 15972 |
|  | 123 | 11 | 16QAM | 10 | 21504 | 24 | 1 | 3 | 64944 | 16236 |
|  | 133 | 11 | 16QAM | 10 | 23040 | 24 | 1 | 3 | 70224 | 17556 |
|  | 135 | 11 | 16QAM | 10 | 23568 | 24 | 1 | 3 | 71280 | 17820 |
|  | 137 | 11 | 16QAM | 10 | 24072 | 24 | 1 | 3 | 72336 | 18084 |
|  | 160 | 11 | 16QAM | 10 | 28168 | 24 | 1 | 4 | 84480 | 21120 |
|  | 162 | 11 | 16QAM | 10 | 28168 | 24 | 1 | 4 | 85536 | 21384 |
|  | 189 | 11 | 16QAM | 10 | 32776 | 24 | 1 | 4 | 99792 | 24948 |
|  | 216 | 11 | 16QAM | 10 | 37896 | 24 | 1 | 5 | 114048 | 28512 |
|  | 217 | 11 | 16QAM | 10 | 37896 | 24 | 1 | 5 | 114576 | 28644 |
|  | 245 | 11 | 16QAM | 10 | 43032 | 24 | 1 | 6 | 129360 | 32340 |
|  | 270 | 11 | 16QAM | 10 | 47112 | 24 | 1 | 6 | 142560 | 35640 |
|  | 273 | 11 | 16QAM | 10 | 48168 | 24 | 1 | 6 | 144144 | 36036 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 5.1.3.1-1 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where LCRB ≤ NRB. | | | | | | | | | | |

Table A.2.2.7-1a: Reference Channels for CP-OFDM 16QAM for shared spectrum access

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks | CP-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 11 | 11 | 16QAM | 10 | 1928 | 16 | 2 | 1 | 5808 | 1452 |
|  | 22 | 11 | 16QAM | 10 | 3840 | 16 | 2 | 1 | 11616 | 2904 |
|  | 33 | 11 | 16QAM | 10 | 5760 | 24 | 1 | 1 | 17424 | 4356 |
|  | 44 | 11 | 16QAM | 10 | 7680 | 24 | 1 | 1 | 23232 | 5808 |
|  | 51 | 11 | 16QAM | 10 | 8968 | 24 | 1 | 2 | 26928 | 6732 |
|  | 106 | 11 | 16QAM | 10 | 18432 | 24 | 1 | 3 | 55968 | 13992 |
|  | 162 | 11 | 16QAM | 10 | 28168 | 24 | 1 | 4 | 85536 | 21384 |
|  | 216 | 11 | 16QAM | 10 | 37896 | 24 | 1 | 5 | 114048 | 28512 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 5.1.3.1-1 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where allocated resource blocks≤ NRB | | | | | | | | | | |

Table A.2.2.7-2: Void

Table A.2.2.7-3: Void

### A.2.2.8 CP-OFDM 64QAM

Table A.2.2.8-1: Reference Channels for CP-OFDM 64QAM

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks (LCRB) | CP-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 1 | 11 | 64QAM | 19 | 408 | 16 | 2 | 1 | 792 | 132 |
|  | 5 | 11 | 64QAM | 19 | 2024 | 16 | 2 | 1 | 3960 | 660 |
|  | 9 | 11 | 64QAM | 19 | 3624 | 16 | 2 | 1 | 7128 | 1188 |
|  | 10 | 11 | 64QAM | 19 | 3968 | 24 | 1 | 1 | 7920 | 1320 |
|  | 11 | 11 | 64QAM | 19 | 4352 | 24 | 1 | 1 | 8712 | 1452 |
|  | 12 | 11 | 64QAM | 19 | 4736 | 24 | 1 | 1 | 9504 | 1584 |
|  | 13 | 11 | 64QAM | 19 | 5120 | 24 | 1 | 1 | 10296 | 1716 |
|  | 15 | 11 | 64QAM | 19 | 6016 | 24 | 1 | 1 | 11880 | 1980 |
|  | 18 | 11 | 64QAM | 19 | 7168 | 24 | 1 | 1 | 14256 | 2376 |
|  | 19 | 11 | 64QAM | 19 | 7552 | 24 | 1 |  | 15048 | 2508 |
|  | 24 | 11 | 64QAM | 19 | 9480 | 24 | 1 | 2 | 19008 | 3168 |
|  | 25 | 11 | 64QAM | 19 | 9992 | 24 | 1 | 2 | 19800 | 3300 |
|  | 26 | 11 | 64QAM | 19 | 10504 | 24 | 1 | 2 | 20592 | 3432 |
|  | 31 | 11 | 64QAM | 19 | 12296 | 24 | 1 | 2 | 24552 | 4092 |
|  | 33 | 11 | 64QAM | 19 | 13064 | 24 | 1 | 2 | 26136 | 4356 |
|  | 38 | 11 | 64QAM | 19 | 15112 | 24 | 1 | 2 | 30096 | 5016 |
|  | 39 | 11 | 64QAM | 19 | 15624 | 24 | 1 | 2 | 30888 | 5148 |
|  | 47 | 11 | 64QAM | 19 | 18960 | 24 | 1 | 3 | 37224 | 6204 |
|  | 51 | 11 | 64QAM | 19 | 20496 | 24 | 1 | 3 | 40392 | 6732 |
|  | 52 | 11 | 64QAM | 19 | 21000 | 24 | 1 | 3 | 41184 | 6864 |
|  | 53 | 11 | 64QAM | 19 | 21000 | 24 | 1 | 3 | 41976 | 6996 |
|  | 61 | 11 | 64QAM | 19 | 24567 | 24 | 1 | 3 | 48312 | 8052 |
|  | 65 | 11 | 64QAM | 19 | 26120 | 24 | 1 | 4 | 51480 | 8580 |
|  | 67 | 11 | 64QAM | 19 | 26632 | 24 | 1 | 4 | 53064 | 8844 |
|  | 78 | 11 | 64QAM | 19 | 31240 | 24 | 1 | 4 | 61776 | 10296 |
|  | 79 | 11 | 64QAM | 19 | 31752 | 24 | 1 | 4 | 62568 | 10428 |
|  | 80 | 11 | 64QAM | 19 | 31752 | 24 | 1 | 4 | 63360 | 10560 |
|  | 81 | 11 | 64QAM | 19 | 32264 | 24 | 1 | 4 | 64152 | 10692 |
|  | 93 | 11 | 64QAM | 19 | 36896 | 24 | 1 | 5 | 73656 | 12276 |
|  | 95 | 11 | 64QAM | 19 | 37896 | 24 | 1 | 5 | 75240 | 12540 |
|  | 106 | 11 | 64QAM | 19 | 42016 | 24 | 1 | 5 | 83952 | 13992 |
|  | 107 | 11 | 64QAM | 19 | 43032 | 24 | 1 | 6 | 84744 | 14124 |
|  | 108 | 11 | 64QAM | 19 | 43032 | 24 | 1 | 6 | 85536 | 14256 |
|  | 109 | 11 | 64QAM | 19 | 44040 | 24 | 1 | 6 | 86328 | 14388 |
|  | 121 | 11 | 64QAM | 19 | 48168 | 24 | 1 | 6 | 95832 | 15972 |
|  | 123 | 11 | 64QAM | 19 | 49176 | 24 | 1 | 6 | 97416 | 16236 |
|  | 133 | 11 | 64QAM | 19 | 53288 | 24 | 1 | 7 | 105336 | 17556 |
|  | 135 | 11 | 64QAM | 19 | 54296 | 24 | 1 | 7 | 106920 | 17820 |
|  | 137 | 11 | 64QAM | 19 | 54296 | 24 | 1 | 7 | 108504 | 18084 |
|  | 160 | 11 | 64QAM | 19 | 63528 | 24 | 1 | 8 | 126720 | 21120 |
|  | 162 | 11 | 64QAM | 19 | 64552 | 24 | 1 | 8 | 128304 | 21384 |
|  | 189 | 11 | 64QAM | 19 | 75792 | 24 | 1 | 9 | 149688 | 24948 |
|  | 216 | 11 | 64QAM | 19 | 86040 | 24 | 1 | 11 | 171072 | 28512 |
|  | 217 | 11 | 64QAM | 19 | 86040 | 24 | 1 | 11 | 171864 | 28644 |
|  | 245 | 11 | 64QAM | 19 | 98376 | 24 | 1 | 12 | 194040 | 32340 |
|  | 270 | 11 | 64QAM | 19 | 108552 | 24 | 1 | 13 | 213840 | 35640 |
|  | 273 | 11 | 64QAM | 19 | 108552 | 24 | 1 | 13 | 216216 | 36036 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 5.1.3.1-1 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where LCRB ≤ NRB. | | | | | | | | | | |

Table A.2.2.8-1a: Reference Channels for CP-OFDM 64QAM for shared spectrum access

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks | CP-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 11 | 11 | 64QAM | 19 | 4352 | 24 | 1 | 1 | 8712 | 1452 |
|  | 22 | 11 | 64QAM | 19 | 8712 | 24 | 1 | 2 | 17424 | 2904 |
|  | 33 | 11 | 64QAM | 19 | 13064 | 24 | 1 | 2 | 26136 | 4356 |
|  | 44 | 11 | 64QAM | 19 | 17424 | 24 | 1 | 3 | 34848 | 5808 |
|  | 51 | 11 | 64QAM | 19 | 20496 | 24 | 1 | 3 | 40392 | 6732 |
|  | 106 | 11 | 64QAM | 19 | 42016 | 24 | 1 | 5 | 83952 | 13992 |
|  | 162 | 11 | 64QAM | 19 | 64552 | 24 | 1 | 8 | 128304 | 21384 |
|  | 216 | 11 | 64QAM | 19 | 86040 | 24 | 1 | 11 | 171072 | 28512 |
|  | 217 | 11 | 64QAM | 19 | 86040 | 24 | 1 | 11 | 171864 | 28644 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 5.1.3.1-1 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where allocated resource blocks≤ NRB | | | | | | | | | | |

Table A.2.2.8-2: Void

Table A.2.2.8-3: Void

### A.2.2.9 CP-OFDM 256QAM

Table A.2.2.9-1: Reference Channels for CP-OFDM 256QAM

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks (LCRB) | DFT-s-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 1 | 11 | 256QAM | 20 | 704 | 16 | 2 | 1 | 1056 | 132 |
|  | 5 | 11 | 256QAM | 20 | 3496 | 16 | 2 | 1 | 5280 | 660 |
|  | 9 | 11 | 256QAM | 20 | 6272 | 24 | 1 | 1 | 9504 | 1188 |
|  | 10 | 11 | 256QAM | 20 | 7040 | 24 | 1 | 1 | 10560 | 1320 |
|  | 11 | 11 | 256QAM | 20 | 7680 | 24 | 1 | 1 | 11616 | 1452 |
|  | 12 | 11 | 256QAM | 20 | 8456 | 24 | 1 | 2 | 12672 | 1584 |
|  | 13 | 11 | 256QAM | 20 | 9224 | 24 | 1 | 2 | 13728 | 1716 |
|  | 15 | 11 | 256QAM | 20 | 10504 | 24 | 1 | 2 | 15840 | 1980 |
|  | 18 | 11 | 256QAM | 20 | 12552 | 24 | 1 | 2 | 19008 | 2376 |
|  | 19 | 11 | 256QAM | 20 | 13320 | 24 | 1 | 2 | 20064 | 2508 |
|  | 24 | 11 | 256QAM | 20 | 16896 | 24 | 1 | 3 | 25344 | 3168 |
|  | 25 | 11 | 256QAM | 20 | 17424 | 24 | 1 | 3 | 26400 | 3300 |
|  | 26 | 11 | 256QAM | 20 | 18432 | 24 | 1 | 3 | 27456 | 3432 |
|  | 31 | 11 | 256QAM | 20 | 22032 | 24 | 1 | 3 | 32736 | 4092 |
|  | 33 | 11 | 256QAM | 20 | 23040 | 24 | 1 | 3 | 34848 | 4356 |
|  | 38 | 11 | 256QAM | 20 | 26632 | 24 | 1 | 4 | 40128 | 5016 |
|  | 39 | 11 | 256QAM | 20 | 27656 | 24 | 1 | 4 | 41184 | 5148 |
|  | 47 | 11 | 256QAM | 20 | 32776 | 24 | 1 | 4 | 49632 | 6204 |
|  | 51 | 11 | 256QAM | 20 | 35856 | 24 | 1 | 5 | 53856 | 6732 |
|  | 52 | 11 | 256QAM | 20 | 36896 | 24 | 1 | 5 | 54912 | 6864 |
|  | 53 | 11 | 256QAM | 20 | 36896 | 24 | 1 | 5 | 55968 | 6996 |
|  | 61 | 11 | 256QAM | 20 | 43032 | 24 | 1 | 6 | 64416 | 8052 |
|  | 65 | 11 | 256QAM | 20 | 46104 | 24 | 1 | 6 | 68640 | 8580 |
|  | 67 | 11 | 256QAM | 20 | 47112 | 24 | 1 | 6 | 70752 | 8844 |
|  | 78 | 11 | 256QAM | 20 | 55304 | 24 | 1 | 7 | 82368 | 10296 |
|  | 79 | 11 | 256QAM | 20 | 55304 | 24 | 1 | 7 | 83424 | 10428 |
|  | 80 | 11 | 256QAM | 20 | 56368 | 24 | 1 | 7 | 84480 | 10560 |
|  | 81 | 11 | 256QAM | 20 | 57376 | 24 | 1 | 7 | 85536 | 10692 |
|  | 93 | 11 | 256QAM | 20 | 65576 | 24 | 1 | 8 | 98208 | 12276 |
|  | 95 | 11 | 256QAM | 20 | 67584 | 24 | 1 | 8 | 100320 | 12540 |
|  | 106 | 11 | 256QAM | 20 | 73776 | 24 | 1 | 9 | 111936 | 13992 |
|  | 107 | 11 | 256QAM | 20 | 75792 | 24 | 1 | 9 | 112992 | 14124 |
|  | 108 | 11 | 256QAM | 20 | 75792 | 24 | 1 | 9 | 114048 | 14256 |
|  | 109 | 11 | 256QAM | 20 | 75792 | 24 | 1 | 9 | 115104 | 14388 |
|  | 121 | 11 | 256QAM | 20 | 86040 | 24 | 1 | 11 | 127776 | 15972 |
|  | 123 | 11 | 256QAM | 20 | 86040 | 24 | 1 | 11 | 129888 | 16236 |
|  | 133 | 11 | 256QAM | 20 | 94248 | 24 | 1 | 12 | 140448 | 17556 |
|  | 135 | 11 | 256QAM | 20 | 94248 | 24 | 1 | 12 | 142560 | 17820 |
|  | 137 | 11 | 256QAM | 20 | 96264 | 24 | 1 | 12 | 144672 | 18084 |
|  | 160 | 11 | 256QAM | 20 | 112648 | 24 | 1 | 14 | 168960 | 21120 |
|  | 162 | 11 | 256QAM | 20 | 114776 | 24 | 1 | 14 | 171072 | 21384 |
|  | 189 | 11 | 256QAM | 20 | 131176 | 24 | 1 | 16 | 199584 | 24948 |
|  | 216 | 11 | 256QAM | 20 | 151608 | 24 | 1 | 18 | 228096 | 28512 |
|  | 217 | 11 | 256QAM | 20 | 151608 | 24 | 1 | 18 | 229152 | 28644 |
|  | 245 | 11 | 256QAM | 20 | 172176 | 24 | 1 | 21 | 258720 | 32340 |
|  | 270 | 11 | 256QAM | 20 | 188576 | 24 | 1 | 23 | 285120 | 35640 |
|  | 273 | 11 | 256QAM | 20 | 192624 | 24 | 1 | 23 | 288288 | 36036 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 5.1.3.1-2 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where LCRB ≤ NRB. | | | | | | | | | | |

Table A.2.2.9-1a: Reference Channels for CP-OFDM 256QAM for shared spectrum access

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Allocated resource blocks | DFT-s-OFDM Symbols per slot (Note 1) | Modulation | MCS Index (Note 2) | Payload size | Transport block CRC | LDPC Base Graph | Number of code blocks per slot (Note 3) | Total number of bits per slot | Total modulated symbols per slot |
| Unit |  |  |  |  | Bits | Bits |  |  | Bits |  |
|  | 11 | 11 | 256QAM | 20 | 7680 | 24 | 1 | 1 | 11616 | 1452 |
|  | 22 | 11 | 256QAM | 20 | 15368 | 24 | 1 | 2 | 23232 | 2904 |
|  | 33 | 11 | 256QAM | 20 | 23040 | 24 | 1 | 3 | 34848 | 4356 |
|  | 44 | 11 | 256QAM | 20 | 30728 | 24 | 1 | 4 | 46464 | 5808 |
|  | 51 | 11 | 256QAM | 20 | 35856 | 24 | 1 | 5 | 53856 | 6732 |
|  | 106 | 11 | 256QAM | 20 | 73776 | 24 | 1 | 9 | 111936 | 13992 |
|  | 162 | 11 | 256QAM | 20 | 114776 | 24 | 1 | 14 | 171072 | 21384 |
|  | 216 | 11 | 256QAM | 20 | 151608 | 24 | 1 | 18 | 228096 | 28512 |
|  | 217 | 11 | 256QAM | 20 | 151608 | 24 | 1 | 18 | 229152 | 28644 |
| NOTE 1: PUSCH mapping Type-A and single-symbol DM-RS configuration Type-1 with 2 additional DM-RS symbols, such that the DM-RS positions are set to symbols 2, 7, 11. DMRS is [TDM'ed] with PUSCH data. DM-RS symbols are not counted.  NOTE 2: MCS Index is based on MCS table 5.1.3.1-2 defined in TS 38.214 [10].  NOTE 3: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  NOTE 4: The RMCs apply to all channel bandwidth where allocated resource blocks≤ NRB | | | | | | | | | | |

Table A.2.2.9-2: Void

Table A.2.2.9-3: Void

## A.2.3 Reference measurement channels for TDD

The TDD UL RMCs are defined in clause A.2.2 with the active UL slots specified in table A.2.1-1 and TDD slot patterns as defined for reference sensitivity tests.

### A.2.3.1 DFT-s-OFDM Pi/2-BPSK

Void

### A.2.3.2 DFT-s-OFDM QPSK

Void

### A.2.3.3 DFT-s-OFDM 16QAM

Void

### A.2.3.4 DFT-s-OFDM 64QAM

Void

### A.2.3.5 DFT-s-OFDM 256QAM

Void

### A.2.3.6 CP-OFDM QPSK

Void

### A.2.3.7 CP-OFDM 16QAM

Void

### A.2.3.8 CP-OFDM 64QAM

Void

### A.2.3.9 CP-OFDM 256QAM

Void

# A.3 DL reference measurement channels

## A.3.1 General

Unless otherwise stated, Tables A.3.2.2-1, A.3.2.2-2, A.3.2.2-3, A.3.3.2-1, A.3.3.2-2 and A.3.3.2-3 are applicable for measurements of the Receiver Characteristics (clause 7) with the exception of subclauses 7.4 (Maximum input level).

Unless otherwise stated, Tables A.3.2.3-1, A.3.2.3-2, A.3.2.3-3, A.3.3.3-1, A.3.3.3-2 and A.3.3.3-3 are applicable for subclauses 7.4 (Maximum input level) and for UE not supporting PDSCH 256QAM,

Unless otherwise stated, Tables A.3.2.4-1, A.3.2.4-2, A.3.2.4-3, A.3.3.4-1, A.3.3.4-2 and A.3.3.4-3 are applicable for subclauses 7.4 (Maximum input level) and for UE supporting PDSCH 256QAM,

Unless otherwise stated, Tables A.3.2.2-1, A.3.2.2-2, A.3.2.2-3, A.3.3.2-1, A.3.3.2-2 and A.3.3.2-3 also apply for the modulated interferer used in Clauses 7.5, 7.6 and 7.8 with test specific bandwidths.

In case of carrier aggregation scenarios, the k1 values and number of HARQ processes of the Reference Measurement Channels specified in Annex A.3 shall be adapted as specified in table A.3.1-2 and A.3.1-3.

Table A.3.1-1: Common reference channel parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Value |
| CORESET frequency domain allocation | |  | Full BW |
| CORESET time domain allocation | |  | 2 OFDM symbols at the begin of each slot |
| PDSCH mapping type | |  | Type A |
| PDSCH start symbol index (S) | |  | 2 |
| Number of consecutive PDSCH symbols (L) | |  | 12 |
| PDSCH PRB bundling | | PRBs | 2 |
| Dynamic PRB bundling | |  | false |
|  | |  |  |
| Overhead value for TBS determination | |  | 0 |
| First DMRS position for Type A PDSCH mapping | |  | 2 |
| DMRS type | |  | Type 1 |
| Number of additional DMRS | |  | 2 |
| FDM between DMRS and PDSCH | |  | Disable |
| CSI‑RS for tracking | First subcarrier index in the PRB used for CSI-RS (k0) |  | 0 for CSI-RS resource 1,2,3,4 |
| OFDM symbols in the PRB used for CSI‑RS |  | l0 = 6 for CSI-RS resource 1 and 3  l0 = 10 for CSI-RS resource 2 and 4 |
| Number of CSI-RS ports |  | 1 for CSI-RS resource 1,2,3,4 |
| CDM Type |  | 'No CDM' for CSI-RS resource 1,2,3,4 |
| Density (ρ) |  | 3 for CSI-RS resource 1,2,3,4 |
| CSI‑RS periodicity | Slots | 15 kHz SCS: 20 for CSI-RS resource 1,2,3,4  30 kHz SCS: 40 for CSI-RS resource 1,2,3,4  60 kHz SCS: 80 for CSI-RS resource 1,2,3,4 |
| CSI‑RS offset | Slots | 15 kHz SCS:  0 for CSI-RS resource 1 and 2  1 for CSI-RS resource 3 and 4  30 kHz SCS:  1 for CSI-RS resource 1 and 2  2 for CSI-RS resource 3 and 4  60 kHz SCS:  2 for CSI-RS resource 1 and 2  3 for CSI-RS resource 3 and 4 |
| Frequency Occupation |  | Start PRB 0  Number of PRB = BWP size |
| QCL info |  | TCI state #0 |
| PTRS configuration | |  | PTRS is not configured |

Table A.3.1-2: Carrier aggregation test parameters for K1 values

|  |  |  |  |
| --- | --- | --- | --- |
| The number of slots between PDSCH and corresponding HARQ-ACK information | | CCs with the same duplex mode and SCS with Pcell | CCs with different duplex mode and/or SCS with Pcell |
| FDD 15 kHz + | FDD PCell | {2} | N/A |
| FDD 15 kHz CA |
| FDD 15 kHz + | 15kHz PCell | {2} | {3} |
| FDD 30 kHz CA | 30kHz PCell | {2} | {2} |
| FDD 15 kHz + | FDD PCell | {2} | {2} |
| TDD 15 kHz CA | TDD PCell | {4,3,2} | {4,3,2,6,5} |
| FDD 15 kHz + | FDD PCell | {2} | {3} |
| TDD 30 kHz CA | TDD PCell | {8,7,6,5,4,3,2} | {8,6,4,2,10} |
| TDD 15 kHz + | TDD PCell | {4,3,2} | N/A |
| TDD 15 kHz CA |
| TDD 15 kHz + | 15kHz PCell | {4,3,2} | {4,4,3,3,2,7,6} |
| TDD 30 kHz CA | 30kHz PCell | {8,7,6,5,4,3,2} | {7,5,4} |
| FDD 30 kHz + | FDD PCell | {2} | N/A |
| FDD 30 kHz CA |
| FDD 30 kHz + | FDD PCell | {2} | {2} |
| TDD 15 kHz CA | TDD PCell | {4,3,2} | {4,4,3,3,7,7,6,6,5,5} |
| FDD 30 kHz + | FDD PCell | {2} | {2} |
| TDD 30 kHz CA | TDD PCell | {8,7,6,5,4,3,2} | {8,7,6,5,4,3,2,2,10,-} (NOTE 1) |
| TDD 30 kHz + | TDD PCell | {8,7,6,5,4,3,2} | N/A |
| TDD 30 kHz CA |
| NOTE 1: No PDSCH shall be scheduled in slots 9 and 19 to avoid HARQ conflicts and maximize Throughput. Hence no K1 value is applicable for them. | | | |

Table A.3.1-3: Carrier Aggregation test parameters for number of HARQ processes

|  |  |  |  |
| --- | --- | --- | --- |
| HARQ process number | | CCs with the same duplex mode and SCS with Pcell | CCs with different duplex mode and/or SCS with Pcell |
| FDD 15 kHz + | FDD PCell | 4 | N/A |
| FDD 15 kHz CA |
| FDD 15 kHz + | 15kHz PCell | 8 | 8 |
| FDD 30 kHz CA | 30kHz PCell | 8 | 8 |
| FDD 15 kHz + | FDD PCell | 4 | 8 |
| TDD 15 kHz CA | TDD PCell | 8 | 8 |
| FDD 15 kHz + | FDD PCell | 4 | 8 |
| TDD 30 kHz CA | TDD PCell | 10 | 8 |
| TDD 15 kHz + | TDD PCell | 8 | N/A |
| TDD 15 kHz CA |
| TDD 15 kHz + | 15kHz PCell | 8 | 12 |
| TDD 30 kHz CA | 30kHz PCell | 8 | 8 |
| FDD 30 kHz + | FDD PCell | 8 | N/A |
| FDD 30 kHz CA |
| FDD 30 kHz + | FDD PCell | 8 | 8 |
| TDD 15 kHz CA | TDD PCell | 8 | 16 |
| FDD 30 kHz + | FDD PCell | 8 | 8 |
| TDD 30 kHz CA | TDD PCell | 8 | 16 |
| TDD 30 kHz + | TDD PCell | 8 | N/A |
| TDD 30 kHz CA |

## A.3.2 DL reference measurement channels for FDD

### A.3.2.1 General

Table A.3.2.1-1: Additional reference channels parameters for FDD

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Value |
| Number of HARQ Processes |  | 4 |
| K1 value |  | 2 for all slots |

### A.3.2.2 FRC for receiver requirements for QPSK

Table A.3.2.2-1: Fixed reference channel for receiver requirements (SCS 15 kHz, FDD, QPSK 1/3)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Subcarrier spacing configuration |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Allocated resource blocks |  | 25 | 52 | 79 | 106 | 133 | 160 | 216 | 270 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| MCS Index |  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | |
| Modulation |  | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Target Coding Rate |  | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | Bits | 1672 | 3368 | 5120 | 6912 | 8712 | 10504 | 14088 | 17424 |
| Transport block CRC | Bits | 16 | 16 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | CBs | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | Bits | 5400 | 11232 | 17064 | 22896 | 28728 | 34560 | 46656 | 58320 |
| Max. Throughput averaged over 1 frame | Mbps | 1.338 | 2.694 | 4.096 | 5.530 | 6.970 | 8.403 | 11.270 | 13.9392 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  Note 3: SS/PBCH block is transmitted in slot #0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | |

Table A.3.2.2-2: Fixed reference channel for receiver requirements (SCS 30 kHz, FDD, QPSK 1/3)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |
| Subcarrier spacing configuration |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Allocated resource blocks |  | 11 | 24 | 38 | 51 | 65 | 78 | 106 | 133 | 162 | 217 | 245 | 273 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| MCS Index |  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | | | | | |
| Modulation |  | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Target Coding Rate |  | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | Bits | 736 | 1608 | 2472 | 3368 | 4224 | 4992 | 6912 | 8712 | 10504 | 14088 | 15880 | 17928 |
| Transport block CRC | Bits | 16 | 16 | 16 | 16 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | CBs | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | Bits | 2376 | 5184 | 8208 | 11016 | 14040 | 16848 | 22896 | 28728 | 34992 | 46872 | 52920 | 58968 |
| Max. Throughput averaged over 1 frame | Mbps | 1.251 | 2.734 | 4.202 | 5.726 | 7.181 | 8.486 | 11.750 | 14.810 | 17.857 | 23.950 | 26.996 | 30.478 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  Note 3: SS/PBCH block is transmitted in slot #0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | | | |

Table A.3.2.2-3: Fixed reference channel for receiver requirements (SCS 60 kHz, FDD, QPSK 1/3)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | |
| Channel bandwidth | MHz | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 90 | 100 |
| Subcarrier spacing configuration |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Allocated resource blocks |  | 11 | 18 | 24 | 31 | 38 | 51 | 65 | 79 | 107 | 121 | 135 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| MCS Index |  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MCS Table for TBS Determination |  | 64QAM | | | | | | | | | | |
| Modulation |  | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Target Coding Rate |  | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | Bits | 736 | 1192 | 1608 | 2024 | 2472 | 3368 | 4224 | 5120 | 6912 | 7808 | 8712 |
| Transport block CRC | Bits | 16 | 16 | 16 | 16 | 16 | 16 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | CBs | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | Bits | 2376 | 3888 | 5184 | 6696 | 8208 | 11016 | 14040 | 17064 | 23112 | 26136 | 29160 |
| Max. Throughput averaged over 1 frame | Mbps | 2.650 | 4.291 | 5.789 | 7.286 | 8.899 | 12.125 | 15.206 | 18.432 | 24.883 | 28.109 | 31.363 |
| NOTE 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  NOTE 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 3: SS/PBCH block is transmitted in slot #0 of each frame.  NOTE 4: Slot i is slot index per frame. | | | | | | | | | | | | |

### A.3.2.3 FRC for maximum input level for 64QAM

Table A.3.2.3-1: Fixed reference channel for maximum input level receiver requirements (SCS 15 kHz, FDD, 64QAM)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Subcarrier spacing configuration |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Allocated resource blocks |  | 25 | 52 | 79 | 106 | 133 | 160 | 216 | 270 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| MCS Index |  | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | |
| Modulation |  | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM |
| Target Coding Rate |  | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | Bits | 12296 | 25608 | 38936 | 52224 | 64552 | 77896 | 106576 | 131176 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | CBs | 2 | 4 | 5 | 7 | 8 | 10 | 13 | 16 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | Bits | 16200 | 33696 | 51192 | 68688 | 86184 | 103680 | 139968 | 174960 |
| Max. Throughput averaged over 1 frame | Mbps | 9.837 | 20.486 | 31.149 | 41.779 | 51.642 | 62.317 | 85.261 | 104.941 |
| NOTE 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  NOTE 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 3: SS/PBCH block is transmitted in slot 0 of each frame  NOTE 4: Slot i is slot index per frame | | | | | | | | | |

Table A.3.2.3-2: Fixed reference channel for maximum input level receiver requirements (SCS 30 kHz, FDD, 64QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Allocated resource blocks |  | 11 | 24 | 38 | 51 | 65 | 78 | 106 | 133 | 162 | 217 | 273 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| MCS Index |  | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | | | | |
| Modulation |  | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM |
| Target Coding Rate |  | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | Bits | 5376 | 11784 | 18432 | 25104 | 31752 | 37896 | 52224 | 64552 | 79896 | 106576 | 135296 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | CBs | 1 | 2 | 3 | 3 | 4 | 5 | 7 | 8 | 10 | 13 | 17 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | Bits | 7128 | 15552 | 24624 | 33048 | 42120 | 50544 | 68688 | 86184 | 104976 | 140616 | 176904 |
| Max. Throughput averaged over 1 frame | Mbps | 9.139 | 20.033 | 31.334 | 42.677 | 53.978 | 64.423 | 88.781 | 109.738 | 135.823 | 181.179 | 230.003 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot 0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | | |

Table A.3.2.3-3: Fixed Reference Channel for Maximum input level receiver requirements (SCS 60 kHz, FDD, 64QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | |
| Channel bandwidth | MHz | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Allocated resource blocks |  | 11 | 18 | 24 | 31 | 38 | 51 | 65 | 79 | 107 | 135 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| MCS Index |  | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | | | |
| Modulation |  | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM |
| Target Coding Rate |  | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | Bits | 5376 | 8712 | 11784 | 15112 | 18432 | 25104 | 31752 | 38936 | 52224 | 65576 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | CBs | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 7 | 8 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,12,3 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | Bits | 7128 | 11664 | 15552 | 20088 | 24624 | 33048 | 42120 | 51192 | 69336 | 87480 |
| Max. Throughput averaged over 1 frame | Mbps | 19.354 | 31.363 | 42.422 | 54.403 | 66.355 | 90.374 | 114.307 | 140.170 | 188.006 | 236.074 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot #0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | |

### A.3.2.4 FRC for maximum input level for 256 QAM

Table A.3.2.4-1: Fixed reference channel for maximum input level receiver requirements (SCS 15 kHz, FDD, 256QAM)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Subcarrier spacing configuration |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Allocated resource blocks |  | 25 | 52 | 79 | 106 | 133 | 160 | 216 | 270 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 256QAM | | | | | | | |
| Modulation |  | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM |
| Target Coding Rate |  | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | Bits | 16896 | 34816 | 53288 | 71688 | 90176 | 108552 | 143400 | 180376 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | CBs | 3 | 5 | 7 | 9 | 12 | 14 | 18 | 22 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | Bits | 21600 | 44928 | 68256 | 91584 | 114912 | 138240 | 186624 | 233280 |
| Max. Throughput averaged over 1 frame | Mbps | 13.517 | 27.853 | 42.630 | 57.350 | 72.141 | 86.842 | 114.720 | 144.310 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot 0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | |

Table A.3.2.4-2: Fixed reference channel for maximum input level receiver requirements (SCS 30 kHz, FDD, 256QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Allocated resource blocks |  | 11 | 24 | 38 | 51 | 65 | 78 | 106 | 133 | 162 | 217 | 273 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 256QAM | | | | | | | | | | |
| Modulation |  | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM |
| Target Coding Rate |  | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | Bits | 7424 | 16136 | 25608 | 33816 | 44040 | 52224 | 71688 | 90176 | 108552 | 147576 | 184424 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | CBs | 1 | 3 | 4 | 5 | 6 | 7 | 9 | 12 | 14 | 19 | 23 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | Bits | 9504 | 20736 | 32832 | 44064 | 56160 | 67392 | 91584 | 114912 | 139968 | 187488 | 235872 |
| Max. Throughput averaged over 1 frame | Mbps | 12.621 | 27.431 | 43.534 | 57.487 | 74.868 | 88.781 | 121.870 | 153.299 | 184.538 | 250.879 | 313.521 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot 0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | | |

Table A.3.2.4-3: Fixed reference channel for maximum input level receiver requirements (SCS 60 kHz, FDD, 256QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | |
| Channel bandwidth | MHz | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Allocated resource blocks |  | 11 | 18 | 24 | 31 | 38 | 51 | 65 | 79 | 107 | 135 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 256QAM | | | | | | | | | |
| Modulation |  | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM |
| Target Coding Rate |  | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | Bits | 7424 | 12040 | 16136 | 21000 | 25608 | 33816 | 44040 | 53288 | 71688 | 90176 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | CBs | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 9 | 12 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | Bits | 9504 | 15552 | 20736 | 26784 | 32832 | 44064 | 56160 | 68256 | 92448 | 116640 |
| Max. Throughput averaged over 1 frame | Mbps | 26.726 | 43.344 | 58.090 | 75.600 | 92.189 | 121.738 | 158.544 | 191.837 | 258.077 | 324.634 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot #0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | |

### A.3.2.5 FRC for maximum input level for 1024 QAM

Table A.3.2.5-1 Fixed reference channel for maximum input level receiver requirements (SCS 15 kHz, FDD, 1024QAM)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Subcarrier spacing configuration |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Allocated resource blocks |  | 25 | 52 | 79 | 106 | 133 | 160 | 216 | 270 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 1024QAM | | | | | | | |
| Modulation |  | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM |
| Target Coding Rate |  | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | Bits | 21000 | 44040 | 67584 | 90176 | 112648 | 135296 | 184424 | 229576 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |
| For Slot 0,1 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | CBs | 3 | 6 | 9 | 11 | 14 | 17 | 22 | 28 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,3,4,5,6,7,8,9 | Bits | 27000 | 56160 | 85320 | 114480 | 143640 | 172800 | 233280 | 291600 |
| Max. Throughput averaged over 1 frame | Mbps | 16.800 | 35.232 | 54.067 | 72.141 | 90.118 | 108.237 | 147.539 | 183.661 |
| NOTE 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  NOTE 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 3: SS/PBCH block is transmitted in slot 0 of each frame  NOTE 4: Slot i is slot index per frame | | | | | | | | | |

Table A.3.2.5-2 Fixed reference channel for maximum input level receiver requirements (SCS 30 kHz, FDD, 1024QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Allocated resource blocks |  | 11 | 24 | 38 | 51 | 65 | 78 | 106 | 133 | 162 | 217 | 273 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 1024QAM | | | | | | | | | | |
| Modulation |  | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM |
| Target Coding Rate |  | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | Bits | 9224 | 20496 | 32264 | 43032 | 55304 | 65576 | 90176 | 112648 | 139376 | 184424 | 233608 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | CBs | 2 | 3 | 4 | 6 | 7 | 8 | 11 | 14 | 17 | 22 | 28 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 3,…,19 | Bits | 11880 | 25920 | 41040 | 55080 | 70200 | 84240 | 114480 | 143640 | 174960 | 234360 | 294840 |
| Max. Throughput averaged over 1 frame | Mbps | 15.681 | 34.843 | 54.849 | 73.154 | 94.017 | 111.479 | 153.299 | 191.502 | 236.939 | 313.521 | 397.134 |
| NOTE 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  NOTE 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 3: SS/PBCH block is transmitted in slot 0 of each frame  NOTE 4: Slot i is slot index per frame | | | | | | | | | | | | |

Table A.3.2.5-3 Fixed reference channel for maximum input level receiver requirements (SCS 60 kHz, FDD, 1024QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | |
| Channel bandwidth | MHz | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Allocated resource blocks |  | 11 | 18 | 24 | 31 | 38 | 51 | 65 | 79 | 107 | 135 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 1024QAM | | | | | | | | | |
| Modulation |  | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM |
| Target Coding Rate |  | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | Bits | 9224 | 15368 | 20496 | 26120 | 32264 | 43032 | 55304 | 67584 | 90176 | 114776 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | CBs | 2 | 2 | 3 | 4 | 4 | 6 | 7 | 9 | 11 | 14 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slot 0,1,2,3 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 4,…,39 | Bits | 11880 | 19440 | 25920 | 33480 | 41040 | 55080 | 70200 | 85320 | 115560 | 145800 |
| Max. Throughput averaged over 1 frame | Mbps | 33.206 | 55.325 | 73.786 | 94.032 | 116.150 | 154.915 | 199.094 | 243.302 | 324.634 | 413.194 |
| NOTE 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.2.1-1.  NOTE 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 3: SS/PBCH block is transmitted in slot #0 of each frame  NOTE 4: Slot i is slot index per frame | | | | | | | | | | | |

## A.3.3 DL reference measurement channels for TDD

### A.3.3.1 General

Table A.3.3.1-1: Additional reference channels parameters for TDD

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Value | | |
| SCS 15 kHz (µ=0) | SCS 30 kHz (µ=1) | SCS 60 kHz (µ=2) |
| TDD Slot Configuration pattern (Note 1) | | DDDSU | 7DS2U | 14DS1S24U |
| Special Slot Configuration (Note 2) | | 10D+2G+2U | 6D+4G+4U | S1=12D+2G, S2=6G+8U |
| referenceSubcarrierSpacing | | 15 kHz | 30 kHz | 60 kHz |
| UL-DL configuration | dl-UL-TransmissionPeriodicity | 5 ms | 5 ms | 5 ms |
| nrofDownlinkSlots | 3 | 7 | 14 |
| nrofDownlinkSymbols | 10 | 6 | 12 |
| nrofUplinkSlot | 1 | 2 | 4 |
| nrofUplinkSymbols | 2 | 4 | 8 |
| Number of HARQ Processes | | 8 | 8 | 16 |
| The number of slots between PDSCH and corresponding HARQ-ACK information (Note 3) | | K1 = 4 if mod(i,5) = 0 K1 = 3 if mod(i,5) = 1 K1 = 2 if mod(i,5) = 2 where i is slot index per frame; i = {0,…,9} | K1 = 8 if mod(i,10) = 0 K1 = 7 if mod(i,10) = 1 K1 = 6 if mod(i,10) = 2 K1 = 5 if mod(i,10) = 3 K1 = 4 if mod(i,10) = 4 K1 = 3 if mod(i,10) = 5 K1 = 2 if mod(i,10) = 6 where i is slot index per frame; i = {0,…,19} | K1 = 13 if mod(i,20) = 2  K1 = 12 if mod(i,20) = 3  K1 = 11 if mod(i,20) = 4  K1 = 10 if mod(i,20) = 5  K1 = 9 if mod(i,20) = 6  K1 = 8 if mod(i,20) = 7  K1 = 7 if mod(i,20) = 8  K1 = 6 if mod(i,20) = 9 K1 = 6 if mod(i,20) = 10  K1 = 6 if mod(i,20) = 11  K1 = 6 if mod(i,20) = 12 K1 = 6 if mod(i,20) = 13 where i is slot index per frame; i = {0,…,39} |
| NOTE 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  NOTE 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  NOTE 3: i is the slot index per frame.  NOTE 4: A -2ms or +3ms time offset to the NR configuration pattern relative to the E-UTRA UL-DL configuration must be applied in the TDD intra-band EN-DC. | | | | |

### A.3.3.2 FRC for receiver requirements for QPSK

Table A.3.3.2-1: Fixed reference channel for receiver requirements (SCS 15 kHz, TDD, QPSK 1/3)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Subcarrier spacing configuration |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Allocated resource blocks |  | 25 | 52 | 79 | 106 | 133 | 160 | 216 | 270 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MCS Index |  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | |
| Modulation |  | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Target Coding Rate |  | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | Bits | 1672 | 3368 | 5120 | 6912 | 8712 | 10504 | 14088 | 17424 |
| Transport block CRC | Bits | 16 | 16 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | CBs | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | Bits | 5400 | 11232 | 17064 | 22896 | 28728 | 34560 | 46656 | 58320 |
| Max. Throughput averaged over 1 frame | Mbps | 0.669 | 1.347 | 2.048 | 2.765 | 3.485 | 4.202 | 5.635 | 6.970 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot 0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | |

Table A.3.3.2-2: Fixed reference channel for receiver requirements (SCS 30 kHz, TDD, QPSK 1/3)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Allocated resource blocks |  | 11 | 24 | 38 | 51 | 65 | 78 | 106 | 133 | 162 | 217 | 273 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| MCS Index |  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | | | | |
| Modulation |  | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Target Coding Rate |  | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | Bits | 736 | 1608 | 2472 | 3368 | 4224 | 4992 | 6912 | 8712 | 10504 | 14088 | 17928 |
| Transport block CRC | Bits | 16 | 16 | 16 | 16 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | CBs | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | Bits | 2376 | 5184 | 8208 | 11016 | 14040 | 16848 | 22896 | 28728 | 34992 | 46872 | 58968 |
| Max. Throughput averaged over 1 frame | Mbps | 0.810 | 2.1.769 | 2.719 | 3.705 | 4.646 | 5.491 | 7.603 | 9.583 | 11.554 | 15.497 | 19.721 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot #0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | | |

Table A.3.3.2-3: Fixed reference channel for receiver requirements (SCS 60 kHz, TDD, QPSK 1/3)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | |
| Channel bandwidth | MHz | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Allocated resource blocks |  | 11 | 18 | 24 | 31 | 38 | 51 | 65 | 79 | 107 | 135 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| MCS Index |  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | | | |
| Modulation |  | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Target Coding Rate |  | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14, 15, 16, 17, 18, 19} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 20) = {0,…,13} for i from {4,…,39} | Bits | 736 | 1192 | 1608 | 2024 | 2472 | 3368 | 4224 | 5120 | 6912 | 8712 |
| Transport block CRC | Bits | 16 | 16 | 16 | 16 | 16 | 16 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14, 15, 16, 17, 18, 19} for i from {0,…,39} | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 20) = {0,…,13} for i from {4,…,39} | CBs | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14, 15, 16, 17, 18, 19} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 20) = {0,…,13} for i from {4,…,39} | Bits | 2376 | 3888 | 5184 | 6696 | 8208 | 11016 | 14040 | 17064 | 23112 | 29160 |
| Max. Throughput averaged over 1 frame | Mbps | 1.766 | 3.2.861 | 3.859 | 4.858 | 5.933 | 8.083 | 10.138 | 12.288 | 16.589 | 20.909 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot #0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | |

### A.3.3.3 FRC for maximum input level for 64QAM

Table A.3.3.3-1: Fixed reference channel for maximum input level receiver requirements (SCS 15 kHz, TDD, 64QAM)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Subcarrier spacing configuration |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Allocated resource blocks |  | 25 | 52 | 79 | 106 | 133 | 160 | 216 | 270 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MCS Index |  | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | |
| Modulation |  | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM |
| Target Coding Rate |  | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | Bits | 12296 | 25608 | 38936 | 52224 | 64552 | 77896 | 106576 | 131176 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | CBs | 2 | 4 | 5 | 7 | 8 | 10 | 13 | 16 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | Bits | 16200 | 33696 | 51192 | 68688 | 86184 | 103680 | 139968 | 174960 |
| Max. Throughput averaged over 1 frame | Mbps | 4.918 | 10.243 | 15.574 | 20.890 | 20.890 | 31.158 | 42.630 | 52.470 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot 0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | |

Table A.3.3.3-2: Fixed reference channel for maximum input level receiver requirements (SCS 30 kHz, TDD, 64QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Allocated resource blocks |  | 11 | 24 | 38 | 51 | 65 | 78 | 106 | 133 | 162 | 217 | 273 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| MCS Index |  | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | | | | |
| Modulation |  | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM |
| Target Coding Rate |  | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | Bits | 5376 | 11784 | 18432 | 25104 | 31752 | 37896 | 52224 | 64552 | 79896 | 106576 | 135296 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | CBs | 1 | 2 | 3 | 3 | 4 | 5 | 7 | 8 | 10 | 13 | 17 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | Bits | 7128 | 15552 | 24624 | 33048 | 42120 | 50544 | 68688 | 86184 | 104976 | 140616 | 176904 |
| Max. Throughput averaged over 1 frame | Mbps | 5.914 | 12.962 | 20.275 | 27.614 | 34.927 | 41.686 | 57.446 | 71.007 | 87.886 | 117.234 | 148.826 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot #0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | | |

Table A.3.3.3-3: Fixed reference channel for maximum input level receiver requirements (SCS 60 kHz, TDD, 64QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | |
| Channel bandwidth | MHz | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Allocated resource blocks |  | 11 | 18 | 24 | 31 | 38 | 51 | 65 | 79 | 107 | 135 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| MCS Index |  | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| MCS Table for TBS determination |  | 64QAM | | | | | | | | | |
| Modulation |  | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM | 64 QAM |
| Target Coding Rate |  | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14, 15, 16, 17, 18, 19} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 5) = {0,…,13} for i from {4,…,39} | Bits | 5376 | 8712 | 11784 | 15112 | 18432 | 25104 | 31752 | 38936 | 52224 | 65576 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14, 15, 16, 17, 18, 19} for i from {0,…,39} | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 5) = {0, …,13} for i from {4,…,39} | CBs | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 7 | 8 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14, 15, 16, 17, 18, 19} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 20) = {0, …,13} for i from {4,…,39} | Bits | 7128 | 11664 | 15552 | 20088 | 24624 | 33048 | 42120 | 51192 | 69336 | 87480 |
| Max. Throughput averaged over 1 frame | Mbps | 12.902 | 20.909 | 28.282 | 36.269 | 44.237 | 60.250 | 76.205 | 93.446 | 125.338 | 157.382 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot #0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | |

### A.3.3.4 FRC for maximum input level for 256 QAM

Table A.3.3.4-1: Fixed reference channel for maximum input level receiver requirements (SCS 15 kHz, TDD, 256QAM)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Subcarrier spacing configuration |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Allocated resource blocks |  | 25 | 52 | 79 | 106 | 133 | 160 | 216 | 270 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 256QAM | | | | | | | |
| Modulation |  | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM |
| Target Coding Rate |  | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | Bits | 16896 | 34816 | 53288 | 71688 | 90176 | 108552 | 143400 | 180376 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | CBs | 3 | 5 | 7 | 9 | 12 | 14 | 18 | 23 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | Bits | 21600 | 44928 | 68256 | 91584 | 114912 | 138240 | 186624 | 233280 |
| Max. Throughput averaged over 1 frame | Mbps | 6.758 | 13.926 | 21.315 | 28.675 | 36.070 | 43.421 | 57.360 | 72.150 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot 0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | |

Table A.3.3.4-2: Fixed Reference channel for maximum input level receiver requirements (SCS 30 kHz, TDD, 256QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Allocated resource blocks |  | 11 | 24 | 38 | 51 | 65 | 78 | 106 | 133 | 162 | 217 | 273 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 256QAM | | | | | | | | | | |
| Modulation |  | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM |
| Target Coding Rate |  | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 01,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | Bits | 7424 | 16136 | 25608 | 33816 | 44040 | 52224 | 71688 | 90176 | 108552 | 147576 | 184424 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | CBs | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | Bits | 9504 | 20736 | 32832 | 44064 | 56160 | 67392 | 91584 | 114912 | 139968 | 187488 | 235872 |
| Max. Throughput averaged over 1 frame | Mbps | 8.166 | 17.750 | 28.169 | 37.198 | 48.444 | 57.446 | 78.857 | 99.194 | 119.407 | 162.334 | 202.866 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot #0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | | |

Table A.3.3.4-3: Fixed reference channel for maximum input level receiver requirements (SCS 60 kHz, TDD, 256QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | |
| Channel bandwidth | MHz | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 80 | 100 |
| Subcarrier spacing configuration |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Allocated resource blocks |  | 11 | 18 | 24 | 31 | 38 | 51 | 65 | 79 | 107 | 135 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 256QAM | | | | | | | | | |
| Modulation |  | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM | 256 QAM |
| Target Coding Rate |  | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 | 4/5 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14, 15, 16, 17, 18, 19} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 20) = {0,…,13 } for i from {4,…,39} | Bits | 7424 | 12040 | 16136 | 21000 | 25608 | 33816 | 44040 | 53288 | 71688 | 90176 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14, 15, 16, 17, 18, 19} for i from {0,…,39} | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 5) = {0, …,13} for i from {4,…,39} | CBs | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 9 | 12 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14, 15, 16, 17, 18, 19} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 20) = {0, …,13} for i from {4,…,39} | Bits | 9504 | 15552 | 20736 | 26784 | 32832 | 44064 | 56160 | 68256 | 92448 | 116640 |
| Max. Throughput averaged over 1 frame | Mbps | 17.818 | 28.896 | 38.726 | 50.400 | 61.459 | 81.158 | 105.696 | 127.891 | 172.051 | 216.422 |
| Note 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  Note 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit)  Note 3: SS/PBCH block is transmitted in slot #0 of each frame.  Note 4: Slot i is slot index per frame. | | | | | | | | | | | |

### A.3.3.5 FRC for maximum input level for 1024 QAM

Table A.3.3.5-1 Fixed reference channel for maximum input level receiver requirements (SCS 15 kHz, TDD, 1024QAM)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | | | | | | |
| **Channel bandwidth** | **MHz** | **5** | **10** | **15** | **20** | **25** | **30** | **40** | **50** |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Subcarrier spacing configuration |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Allocated resource blocks |  | 25 | 52 | 79 | 106 | 133 | 160 | 216 | 270 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS table for TBS determination |  | 1024QAM | | | | | | | |
| Modulation |  | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM |
| Target Coding Rate |  | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | Bits | 21000 | 44040 | 67584 | 90176 | 112648 | 135296 | 184424 | 229576 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | CBs | 3 | 6 | 9 | 11 | 14 | 17 | 22 | 28 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,3,4,8,9 | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slots 2,5,6,7 | Bits | 27000 | 56160 | 85320 | 114480 | 143640 | 172800 | 233280 | 291600 |
| Max. Throughput averaged over 1 frame | Mbps | 8.400 | 17.616 | 27.034 | 36.070 | 45.059 | 54.118 | 73.770 | 91.830 |
| NOTE 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  NOTE 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 3: SS/PBCH block is transmitted in slot 0 of each frame  NOTE 4: Slot i is slot index per frame | | | | | | | | | |

Table A.3.3.5-2 Fixed Reference channel for maximum input level receiver requirements (SCS 30 kHz, TDD, 1024QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | | | | | | | | | | |
| Channel bandwidth | MHz | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 100 |
| Subcarrier spacing configuration |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Allocated resource blocks |  | 11 | 24 | 38 | 51 | 65 | 78 | 106 | 133 | 162 | 189 | 217 | 273 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 13 | 11 | 11 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 1024QAM | | | | | | | | | | | |
| Modulation |  | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM |
| Target Coding Rate |  | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | Bits | 9224 | 20496 | 32264 | 43032 | 55304 | 65576 | 90176 | 112648 | 139376 | 159800 | 184424 | 233608 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | CBs | 2 | 3 | 4 | 6 | 7 | 8 | 11 | 14 | 17 | 19 | 22 | 28 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,19} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {3,…,19} | Bits | 11880 | 25920 | 41040 | 55080 | 70200 | 84240 | 114480 | 143640 | 174960 | 204120 | 234360 | 294840 |
| Max. Throughput averaged over 1 frame | Mbps | 10.146 | 22.546 | 35.490 | 47.335 | 60.834 | 72.134 | 99.194 | 123.913 | 153.314 | 175.868 | 202.866 | 256.969 |
| NOTE 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  NOTE 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 3: SS/PBCH block is transmitted in slot #0 of each frame  NOTE 4: Slot i is slot index per frame | | | | | | | | | | | | | |

Table A.3.3.5-3 Fixed reference channel for maximum input level receiver requirements (SCS 60 kHz, TDD, 1024QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | | | | | | | | | |
| Channel bandwidth | MHz | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 100 |
| Subcarrier spacing configuration |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Allocated resource blocks |  | 11 | 18 | 24 | 31 | 38 | 51 | 65 | 79 | 93 | 107 | 135 |
| Subcarriers per resource block |  | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per Frame |  | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 26 | 24 | 24 |
| MCS Index |  | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination |  | 1024QAM | | | | | | | | | | |
| Modulation |  | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM | 1024 QAM |
| Target Coding Rate |  | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Information Bit Payload per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14,15,16,17,18,19} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 20) = {0,…, 13} for i from {4,…,39} | Bits | 9224 | 15368 | 20496 | 26120 | 32264 | 43032 | 55304 | 67584 | 79896 | 90176 | 114776 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14,15,16,17,18,19} for i from {0,…,39} | CBs | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 20) = {0,…, 13} for i from {4,…,39} | CBs | 2 | 2 | 3 | 4 | 4 | 6 | 7 | 9 | 10 | 11 | 14 |
| Binary Channel Bits per Slot |  |  |  |  |  |  |  |  |  |  |  |  |
| For Slots 0,1,2,3 and Slot i, if mod(i, 20) = {14,15,16,17,18,19} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| For Slot i, if mod(i, 20) = {0,…, 13} for i from {4,…,39} | Bits | 11880 | 19440 | 25920 | 33480 | 41040 | 55080 | 70200 | 85320 | 100440 | 115560 | 145800 |
| Max. Throughput averaged over 1 frame | Mbps | 22.138 | 36.883 | 49.190 | 62.688 | 77.434 | 103.277 | 132.730 | 162.202 | 191.750 | 216.422 | 275.462 |
| NOTE 1: Additional parameters are specified in Table A.3.1-1 and Table A.3.3.1-1.  NOTE 2: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 3: SS/PBCH block is transmitted in slot #0 of each frame  NOTE 4: Slot i is slot index per frame | | | | | | | | | | | | |

# A.4 CSI reference measurement channels

TBD

# A.5 OFDMA Channel Noise Generator (OCNG)

## A.5.1 OCNG Patterns for FDD

### A.5.1.1 OCNG FDD pattern 1: Generic OCNG FDD Pattern for all unused REs

Table A.5.1.1-1: OP.1 FDD: Generic OCNG FDD Pattern for all unused REs

|  |  |  |
| --- | --- | --- |
| OCNG Distribution  OCNG Parameters | Control Region  (Core Set) | Data Region |
| Resources allocated | All unused REs (Note 1) | All unused REs (Note 2) |
| Structure | PDCCH | PDSCH |
| Content | Uncorrelated pseudo random QPSK modulated data | Uncorrelated pseudo random QPSK modulated data |
| Transmission scheme for multiple  antennas ports transmission | Single Tx port transmission | Spatial multiplexing using any precoding matrix with dimensions same as the precoding matrix for PDSCH |
| Subcarrier Spacing | Same as for RMC PDCCH in the active BWP | Same as for RMC PDSCH in the active BWP |
| Power Level | Same as for RMC PDCCH | Same as for RMC PDSCH |
| Note 1: All unused REs in the active CORESETS appointed by the search spaces in use.  Note 2: Unused available REs refer to REs in PRBs not allocated for any physical channels, CORESETs, synchronization signals or reference signals in channel bandwidth. | | |

## A.5.2 OCNG Patterns for TDD

### A.5.2.1 OCNG TDD pattern 1: Generic OCNG TDD Pattern for all unused REs

Table A.5.2.1-1: OP.1 TDD: Generic OCNG TDD Pattern for all unused REs

|  |  |  |
| --- | --- | --- |
| OCNG Distribution  OCNG Parameters | Control Region  (Core Set) | Data Region |
| Resources allocated | All unused REs (Note 1) | All unused REs (Note 2) |
| Structure | PDCCH | PDSCH |
| Content | Uncorrelated pseudo random QPSK modulated data | Uncorrelated pseudo random QPSK modulated data |
| Transmission scheme for multiple  antennas ports transmission | Single Tx port transmission | Spatial multiplexing using any precoding matrix with dimensions same as the precoding matrix for PDSCH |
| Subcarrier Spacing | Same as for RMC PDCCH in the active BWP | Same as for RMC PDSCH in the active BWP |
| Power Level | Same as for RMC PDCCH | Same as for RMC PDSCH |
| Note 1: All unused REs in the active CORESETS appointed by the search spaces in use.  Note 2: Unused available REs refer to REs in PRBs not allocated for any physical channels, CORESETs, synchronization signals or reference signals in channel bandwidth. | | |

# A.6

# A.7 V2X reference measurement channels

## A.7.1 General

The algorithm for determining the payload size A is as follows; given a desired coding rate R and radio block allocation NRB

1. Calculate the RE number of 2nd stage SCI Q\_SCI2^' that can be transmitted in a given sub-frame, where in order to make sure that the code-rate of 2-A is approximate to SCI 1-A, a beta offset is selected based on MCS, and vacant resource elements γ value is determined based on NRB and DMRS frequency density.

2. Transport Block Size is determined according to clause 8.1.3.2 of TS 38.214 [12] based on Table A.7.1-1.

3. Calculate Binary Channel Bits per Slot for PSSCH as below.

Binary Channel Bits per Slot = (NRB\* Subcarriers per resource block\*CP-OFDM symbols per slot – DMRS resource REs – PSCCH resource Res - Q\_SCI2^') \* Qm

Where Qm is the modulation order corresponding to MCS.

In Table A.7.1-1 Common reference channel parameters are listed the Sidelink reference measurement channels specified in annexes A.7.2 to A.7.4.

Table A.7.1-1: Common reference channel parameters

|  |  |  |
| --- | --- | --- |
| Parameter | Value | remark |
| Number of HARQ Processes | 1 |  |
| Channel state | AWGN |  |
| Subcarriers per resource block | 12 |  |
| sl-PSSCH-DMRS-TimePatternList | 2 | symbol4 and symbol 10 in each slot  FDMed with PSSCH within DMRS symbol  Frequency density is ½ |
| CP-OFDM symbols per slot (Note1) | 12 for all slots | Excluding the first OFDM symbol in one SL slot used for AGC |
| PSCCH resource | 10 PRBs, 3 symbols in time domain |  |
| Slot number in 10ms |  | for 15kHz, 30kHz, 60kHz |
| PT-RS | disable |  |
| CSI-RS | disable |  |
| x-overhead | 0 |  |
| PSFCH period | 0 |  |
| 2nd stage SCI payload size | 59 | 35bits SCI-2A + 24bits CRC |
| Redundancy Version | RV0 | For channel coding |
| Alpha value for SCI-2 | 1 |  |

## A.7.2 FRC for V2X receiver requirements for QPSK

For V2X transmission over PC5, Table A.7.2-1, Table A.7.2-2 and Table A.7.2-3 are applicable for measurements on the Receiver Characteristics with the exception of Maximum input level.

Table A.7.2-1: Fixed reference channel for V2X receiver requirements (SCS 15 kHz, QPSK)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | |
| Channel bandwidth | MHz | 10 | 20 | 30 | 40 |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 |
| Subchannel size |  | 10 | 15 | 10 | 12 |
| Allocated resource blocks |  | 50 | 105 | 160 | 216 |
| MCS Index |  | 4 | 4 | 4 | 4 |
| MCS Table for TBS determination | 64QAM | | | | |
| Modulation |  | QPSK | QPSK | QPSK | QPSK |
| Transport Block Size |  | 3624 | 7936 | 12296 | 16896 |
| Transport block CRC | Bits | 16 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 1 | 1 | 2 | 3 |
| Beta offset for 2nd stage SCI |  | 2.25 | 2.25 | 2.25 | 2.25 |
| value when 2nd stage SCI rate match |  | 1 | 1 | 1 | 1 |
| Binary Channel Bits per Slot |  | 12036 | 26556 | 41076 | 55860 |
| Max. Throughput averaged over 100ms | Mbps | 0.3624 | 0.7936 | 1.2296 | 1.6896 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | |

Table A.7.2-2: Fixed reference channel for V2X receiver requirements (SCS 30 kHz, QPSK)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | |
| Channel bandwidth | MHz | 10 | 20 | 30 | 40 |
| Subcarrier spacing | kHz | 30 | 30 | 30 | 30 |
| Subchannel size |  | 12 | 10 | 15 | 15 |
| Allocated resource blocks |  | 24 | 50 | 75 | 105 |
| MCS Index |  | 4 | 4 | 4 | 4 |
| MCS Table for TBS determination | 64QAM | | | | |
| Modulation |  | QPSK | QPSK | QPSK | QPSK |
| Transport Block Size |  | 1608 | 3624 | 5632 | 7936 |
| Transport block CRC | Bits | 16 | 16 | 24 | 24 |
| LDPC base graph |  | 2 | 2 | 1 | 1 |
| Number of Code Blocks per Slot |  | 1 | 1 | 1 | 1 |
| Beta offset for 2nd stage SCI |  | 2.25 | 2.25 | 2.25 | 2.25 |
| value when 2nd stage SCI rate match |  | 7 | 1 | 1 | 1 |
| Binary Channel Bits per Slot |  | 5160 | 12036 | 18636 | 26556 |
| Max. Throughput averaged over 100ms | Mbps | 0.3216 | 0.7248 | 1.1264 | 1.5872 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | |

Table A.7.2-3: Fixed reference channel for V2X receiver requirements (SCS 60 kHz, QPSK)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | |
| Channel bandwidth | MHz | 10 | 20 | 30 | 40 |
| Subcarrier spacing | kHz | 60 | 60 | 60 | 60 |
| Subchannel size |  | 10 | 12 | 12 | 10 |
| Allocated resource blocks |  | 10 | 24 | 36 | 50 |
| MCS Index |  | 4 | 4 | 4 | 4 |
| MCS Table for TBS determination | 64QAM | | | | |
| Modulation |  | QPSK | QPSK | QPSK | QPSK |
| Transport Block Size |  | 456 | 1608 | 2536 | 3624 |
| Transport block CRC | Bits | 16 | 16 | 16 | 16 |
| LDPC base graph |  | 2 | 2 | 2 | 2 |
| Number of Code Blocks per Slot |  | 1 | 1 | 1 | 1 |
| Beta offset for 2nd stage SCI |  | 2.25 | 2.25 | 2.25 | 2.25 |
| value when 2nd stage SCI rate match |  | 7 | 7 | 7 | 1 |
| Binary Channel Bits per Slot |  | 1464 | 5160 | 8328 | 12036 |
| Max. Throughput averaged over 100ms | Mbps | 0.1824 | 0.6432 | 1.0144 | 1.4496 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | |

## A.7.3 FRC for maximum input level for 64QAM

For V2X transmission over PC5, Table A.7.3-1, Table A.7.3-2 and TableA.7.3-3 are applicable for Maximum input level when the maximum modulation order is 64QAM.

Table A.7.3-1: Fixed reference channel for V2X receiver requirements (SCS 15 kHz, 64QAM)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | |
| Channel bandwidth | MHz | 10 | 20 | 30 | 40 |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 |
| Subchannel size |  | 10 | 15 | 10 | 12 |
| Allocated resource blocks |  | 50 | 105 | 160 | 216 |
| MCS Index |  | 24 | 24 | 24 | 24 |
| MCS Table for TBS determination | 64QAM | | | | |
| Modulation |  | 64QAM | 64QAM | 64QAM | 64QAM |
| Transport Block Size |  | 27144 | 60456 | 92200 | 127080 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 4 | 8 | 11 | 16 |
| Beta offset for 2nd stage SCI |  | 6.25 | 6.25 | 6.25 | 6.25 |
| value when 2nd stage SCI rate match |  | 1 | 1 | 1 | 1 |
| Binary Channel Bits per Slot |  | 35964 | 79524 | 123084 | 167436 |
| Max. Throughput averaged over 100ms | Mbps | 2.7144 | 6.0456 | 9.22 | 12.708 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | |

Table A.7.3-2: Fixed reference channel for V2X receiver requirements (SCS 30 kHz, 64QAM)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | |
| Channel bandwidth | MHz | 10 | 20 | 30 | 40 |
| Subcarrier spacing | kHz | 30 | 30 | 30 | 30 |
| Subchannel size |  | 12 | 10 | 15 | 15 |
| Allocated resource blocks |  | 24 | 50 | 75 | 105 |
| MCS Index |  | 24 | 24 | 24 | 24 |
| MCS Table for TBS determination | 64QAM | | | | |
| Modulation |  | 64QAM | 64QAM | 64QAM | 64QAM |
| Transport Block Size |  | 11528 | 27144 | 42016 | 60456 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 2 | 4 | 5 | 8 |
| Beta offset for 2nd stage SCI |  | 6.25 | 6.25 | 6.25 | 6.25 |
| value when 2nd stage SCI rate match |  | 7 | 1 | 1 | 1 |
| Binary Channel Bits per Slot |  | 15336 | 35964 | 55764 | 79524 |
| Max. Throughput averaged over 100ms | Mbps | 2.3056 | 5.4288 | 8.4032 | 12.091 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | |

TableA.7.3-3: Fixed reference channel for V2X receiver requirements (SCS 60 kHz, 64QAM)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | |
| Channel bandwidth | MHz | 10 | 20 | 30 | 40 |
| Subcarrier spacing | kHz | 60 | 60 | 60 | 60 |
| Subchannel size |  | 10 | 12 | 12 | 10 |
| Allocated resource blocks |  | 10 | 24 | 36 | 50 |
| MCS Index |  | 24 | 24 | 24 | 24 |
| MCS Table for TBS determination | 64QAM | | | | |
| Modulation |  | 64QAM | 64QAM | 64QAM | 64QAM |
| Transport Block Size |  | 3240 | 11528 | 18960 | 27144 |
| Transport block CRC | Bits | 16 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 1 | 2 | 3 | 4 |
| Beta offset for 2nd stage SCI |  | 6.25 | 6.25 | 6.25 | 6.25 |
| value when 2nd stage SCI rate match |  | 7 | 7 | 7 | 1 |
| Binary Channel Bits per Slot |  | 4248 | 15336 | 24840 | 35964 |
| Max. Throughput averaged over 100ms | Mbps | 1.296 | 4.6112 | 7.584 | 10.858 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | |

## A.7.4 FRC for maximum input level for 256QAM

For V2X transmission over PC5, Table A.7.4-1, Table A.7.4-2 and Table A.7.4-3 are applicable for Maximum input level when the 256QAM is supported.

Table A.7.4-1: Fixed reference channel for V2X receiver requirements (SCS 15 kHz, 256QAM)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | |
| Channel bandwidth | MHz | 10 | 20 | 30 | 40 |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 |
| Subchannel size |  | 10 | 15 | 10 | 12 |
| Allocated resource blocks |  | 50 | 105 | 160 | 216 |
| MCS Index |  | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination | 256QAM | | | | |
| Modulation |  | 256QAM | 256QAM | 256QAM | 256QAM |
| Transport Block Size |  | 36896 | 81976 | 127080 | 172176 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 5 | 10 | 16 | 21 |
| Beta offset for 2nd stage SCI |  | 6.25 | 6.25 | 6.25 | 6.25 |
| value when 2nd stage SCI rate match |  | 3 | 3 | 3 | 3 |
| Binary Channel Bits per Slot |  | 48000 | 106080 | 164160 | 223296 |
| Max. Throughput averaged over 100ms | Mbps | 3.6896 | 8.1976 | 12.708 | 17.218 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | |

Table A.7.4-2: Fixed reference channel for V2X receiver requirements (SCS 30 kHz, 256QAM)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | |
| Channel bandwidth | MHz | 10 | 20 | 30 | 40 |
| Subcarrier spacing | kHz | 30 | 30 | 30 | 30 |
| Subchannel size |  | 12 | 10 | 15 | 15 |
| Allocated resource blocks |  | 24 | 50 | 75 | 105 |
| MCS Index |  | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination | 256QAM | | | | |
| Modulation |  | 256QAM | 256QAM | 256QAM | 256QAM |
| Transport Block Size |  | 15880 | 36896 | 58384 | 81976 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 2 | 5 | 7 | 10 |
| Beta offset for 2nd stage SCI |  | 6.25 | 6.25 | 6.25 | 6.25 |
| value when 2nd stage SCI rate match |  | 3 | 3 | 3 | 3 |
| Binary Channel Bits per Slot |  | 20544 | 48000 | 74400 | 106080 |
| Max. Throughput averaged over 100ms | Mbps | 3.176 | 7.3792 | 11.677 | 16.395 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | |

Table A.7.4-3: Fixed reference channel for V2X receiver requirements (SCS 60kHz, 256QAM)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | |
| Channel bandwidth | MHz | 10 | 20 | 30 | 40 |
| Subcarrier spacing | kHz | 60 | 60 | 60 | 60 |
| Subchannel size |  | 10 | 12 | 12 | 10 |
| Allocated resource blocks |  | 10 | 24 | 36 | 50 |
| MCS Index |  | 23 | 23 | 23 | 23 |
| MCS Table for TBS determination | 256QAM | | | | |
| Modulation |  | 256QAM | 256QAM | 256QAM | 256QAM |
| Transport Block Size |  | 4480 | 15880 | 25608 | 36896 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 1 | 2 | 4 | 5 |
| Beta offset for 2nd stage SCI |  | 6.25 | 6.25 | 6.25 | 6.25 |
| value when 2nd stage SCI rate match |  | 3 | 3 | 3 | 3 |
| Binary Channel Bits per Slot |  | 5760 | 20544 | 33216 | 48000 |
| Max. Throughput averaged over 100ms | Mbps | 1.792 | 6.352 | 10.243 | 14.758 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | |

## A.7.5 FRC for transmitter requirements

For V2X transmission over PC5, FRC specified in clause A.7.5-1, A.7.5-2, A.7.5-3 and A.7.5-4 are applicable for measurements on the Transmitter Characteristics.

Table A.7.5-1: Fixed reference channel for V2X transmitter requirements (QPSK)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | | |
| Allocated resource blocks |  | 10 | 12 | 15 | 24 | 25 | 36 | 50 | 75 | 80 | 105 | 160 | 216 |
| MCS Index |  | 4 | | | | | | | | | | | |
| MCS Table for TBS determination |  | 64QAM | | | | | | | | | | | |
| Modulation |  | QPSK | | | | | | | | | | | |
| Transport Block Size |  | 456 | 608 | 848 | 1608 | 1672 | 2536 | 3624 | 5632 | 6016 | 7936 | 12296 | 16896 |
| Transport block CRC | Bits | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 |
| Beta offset for 2nd stage SCI |  | 2.25 | | | | | | | | | | | |
| value when 2nd stage SCI rate match |  | 7 | 7 | 1 | 7 | 1 | 7 | 1 | 1 | 1 | 1 | 1 | 1 |
| Binary Channel Bits per Slot |  | 1464 | 1992 | 2796 | 5160 | 5436 | 8328 | 12036 | 18636 | 19956 | 26556 | 41076 | 55860 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: γ is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | | | | | | | | | |

Table A.7.5-2: Fixed reference channel for V2X transmitter requirements (16QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | | |
| Allocated resource blocks |  | 10 | 12 | 15 | 24 | 25 | 36 | 50 | 75 | 80 | 105 | 160 | 216 |
| MCS Index |  | 13 | | | | | | | | | | | |
| MCS Table for TBS determination |  | 64QAM | | | | | | | | | | | |
| Modulation |  | 16QAM | | | | | | | | | | | |
| Transport Block Size |  | 1480 | 1928 | 2664 | 4992 | 5248 | 7936 | 11528 | 17928 | 18960 | 25608 | 38936 | 53288 |
| Transport block CRC | Bits | 16 | 16 | 16 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 7 |
| Beta offset for 2nd stage SCI |  | 3.5 | | | | | | | | | | | |
| value when 2nd stage SCI rate match |  | 0 | 0 | 6 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Binary Channel Bits per Slot |  | 2976 | 4032 | 5592 | 10368 | 10872 | 16704 | 24096 | 37296 | 39936 | 53136 | 82176 | 111744 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: γ is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | | | | | | | | | |

Table A.7.5-3: Fixed reference channel for V2X transmitter requirements (64QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | | |
| Allocated resource blocks |  | 10 | 12 | 15 | 24 | 25 | 36 | 50 | 75 | 80 | 105 | 160 | 216 |
| MCS Index |  | 24 | | | | | | | | | | | |
| MCS Table for TBS determination |  | 64QAM | | | | | | | | | | | |
| Modulation |  | 64QAM | | | | | | | | | | | |
| Transport Block Size |  | 3240 | 4352 | 6144 | 11528 | 12296 | 18960 | 27144 | 42016 | 45096 | 60456 | 92200 | 127080 |
| Transport block CRC | Bits | 16 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 8 | 11 | 16 |
| Beta offset for 2nd stage SCI |  | 6.25 | | | | | | | | | | | |
| value when 2nd stage SCI rate match |  | 7 | 7 | 1 | 7 | 1 | 7 | 1 | 1 | 1 | 1 | 1 | 1 |
| Binary Channel Bits per Slot |  | 4248 | 5832 | 8244 | 15336 | 16164 | 24840 | 35964 | 55764 | 59724 | 79524 | 123084 | 167436 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: γ is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | | | | | | | | | |

Table A.7.5-4: Fixed reference channel for V2X transmitter requirements (256QAM)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | | | | | | |
| Allocated resource blocks |  | 10 | 12 | 15 | 24 | 25 | 36 | 50 | 75 | 80 | 105 | 160 | 216 |
| MCS Index |  | 23 | | | | | | | | | | | |
| MCS Table for TBS determination |  | 256QAM | | | | | | | | | | | |
| Modulation |  | 256QAM | | | | | | | | | | | |
| Transport Block Size |  | 4480 | 6144 | 8712 | 15880 | 16896 | 25608 | 36896 | 58384 | 62504 | 81976 | 127080 | 172176 |
| Transport block CRC | Bits | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| LDPC base graph |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of Code Blocks per Slot |  | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 7 | 8 | 10 | 16 | 21 |
| Beta offset for 2nd stage SCI |  | 6.25 | | | | | | | | | | | |
| value when 2nd stage SCI rate match |  | 3 | 3 | 9 | 3 | 9 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Binary Channel Bits per Slot |  | 5760 | 7872 | 10992 | 20544 | 21552 | 33216 | 48000 | 74400 | 79680 | 106080 | 164160 | 223296 |
| NOTE 1: If more than one Code Block is present, an additional CRC sequence of L = 24 Bits is attached to each Code Block (otherwise L = 0 Bit).  NOTE 2: γ is the number of vacant resource elements in the resource block to which the last coded symbol of the 2nd-stage SCI belongs. | | | | | | | | | | | | | |

Annex B (normative):  
Propagation Conditions

The propagation conditions and channel models for various environments are specified. For each environment a propagation model is used to evaluate the propagation pathless due to the distance. Channel models are formed by combining delay profiles with a Doppler spectrum, with the addition of correlation properties in the case of a multi-antenna scenario.

# B.0 No interference

The downlink connection between the System Simulator and the UE is without Additive White Gaussian Noise, and has no fading or multipath effects.

Annex C (normative):  
Downlink physical channels

This annex specifies the downlink physical channels that are needed for setting a connection and channels that are needed during a connection.

# C.0 Downlink signal levels

The downlink power settings in Table C.0-1 is used unless otherwise specified in a test case.

If the UE has more than one Rx antenna, the downlink signal is applied to each one. All UE Rx antennas shall be connected.

If the UE has one Rx antenna, the downlink signal is applied to it.

Table C.0-1: Default Downlink power levels for NR

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SCS (kHz) |  | | Unit |  | Channel bandwidth | | | | | | | | | | | |
|  | |  | 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz | 40 MHz | 50 MHz | 60 MHz | 70 MHz | 80 MHz | 90 MHz | 100 MHz |
| 15 | Number of RBs | |  | 25 | 52 | 79 | 106 | 133 | 160 | 216 | 270 | N/A | N/A | N/A | N/A | N/A |
| Channel BW power | | dBm | -60 | -57 | -55 | -54 | -53 | -52 | -51 | -50 | N/A | N/A | N/A | N/A | N/A |
| 30 | Number of RBs | |  | 11 | 24 | 38 | 51 | 65 | 78 | 106 | 133 | 162 | 189 | 217 | 245 | 273 |
| Channel BW power | | dBm | -61 | -57 | -55 | -54 | -53 | -52 | -51 | -50 | -49 | -48 | -48 | -47 | -47 |
| 60 | Number of RBs | |  | N/A | 11 | 18 | 24 | 31 | 38 | 51 | 65 | 79 | 93 | 107 | 121 | 135 |
| Channel BW power | | dBm | N/A | -58 | -56 | -54 | -53 | -52 | -51 | -50 | -49 | -48 | -48 | -47 | -47 |
|  | RS EPRE | | dBm/ 15kHz | -85 | -85 | -85 | -85 | -85 | -85 | -85 | -85 | -85 | -85 | -85 | -85 | -85 |
|  |  | Note 1: The channel bandwidth powers are informative, based on -85dBm/15kHz SS/PBCH SSS EPRE, then scaled according to the number of RBs and rounded to the nearest integer dBm value. Full RE allocation with no boost or deboost is assumed.  Note 2: The power level is specified at each UE Rx antenna.  Note 3: DL level is applied for any of the Subcarrier Spacing configuration ( ) with the same power spectrum density of -85dBm/15kHz. | | | | | | | | | | | | | | |

The default signal level uncertainty is +/-3dB at each test port, for any level specified. If the uncertainty value is critical for the test purpose, a tighter uncertainty is specified for the related test case in Annex F

# C.1 General

The following clauses, describes the downlink Physical Channels that are transmitted during a connection i.e., when measurements are done.

# C.2 Setup

Table C.2-1 describes the downlink Physical Channels that are required for connection set up.

Table C.2-1: Downlink Physical Channels required for connection set-up

|  |
| --- |
| Physical Channel |
| PBCH |
| SSS |
| PSS |
| PDCCH |
| PDSCH |
| PBCH DMRS |
| PDCCH DMRS |
| PDSCH DMRS |
| CSI-RS |

As common PDSCH and PDCCH configuration parameters the parameters in Table A.3.1-1, A.3.2.1-1, C.2-2, C.2-3, and C.2-4 shall be used to bring up the connection setup for FR1 NR cell.

Table C.2-2: PDSCH and PDCCH configuration

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Value |
| Number of HARQ processes |  | 8 (TDD)  4 (FDD) |
| Aggregation level | CCE | 4 |

Table C.2-3: TDD UL-DL pattern for SCS 15 KHz

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | UL-DL pattern |
| TDD Slot Configuration pattern (Note 1) | |  | DDDSU |
| Special Slot Configuration (Note 2) | |  | 10D+2G+2U |
| UL-DL configuration (tdd-UL-DL-ConfigurationCommon) | referenceSubcarrierSpacing | kHz | 15 |
| dl-UL-TransmissionPeriodicity | ms | 5 |
| nrofDownlinkSlots |  | 3 |
| nrofDownlinkSymbols |  | 10 |
| nrofUplinkSlot |  | 1 |
| nrofUplinkSymbols |  | 2 |
| K1 value  (PDSCH-to-HARQ-timing-indicator) | |  | [4] if mod(I,5) = 0 [3] if mod(i,5) = 1 [2] if mod(i,5) = 2 [6] if mod(i,5) = 3 |
| Note 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  Note 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  Note 3: i is the slot index per frame; i = {0,…,9} | | | |

Table C.2-4: TDD UL-DL pattern for SCS 30 KHz

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | UL-DL Pattern |
| TDD Slot Configuration pattern (Note 1) | |  | 7DS2U |
| Special Slot Configuration (Note 2) | |  | 6D+4G+4U |
| UL-DL configuration (tdd-UL-DL-ConfigurationCommon) | referenceSubcarrierSpacing | 30 | kHz |
| dl-UL-TransmissionPeriodicity | 5 |  |
| nrofDownlinkSlots | 7 |  |
| nrofDownlinkSymbols | 6 |  |
| nrofUplinkSlot | 2 |  |
| nrofUplinkSymbols | 4 |  |
| UL-DL configuration2 (tdd-UL-DL-ConfigurationCommon2) | referenceSubcarrierSpacing | N/A |  |
| dl-UL-TransmissionPeriodicity | N/A |  |
| nrofDownlinkSlots | N/A |  |
| nrofDownlinkSymbols | N/A |  |
| nrofUplinkSlot | N/A |  |
| nrofUplinkSymbols | N/A |  |
| K1 value  (PDSCH-to-HARQ-timing-indicator) | |  | 8 if mod(i,10) = 0 7 if mod(i,10) = 1 6 if mod(i,10) = 2 5 if mod(i,10) = 3 5 if mod(i,10) = 4 4 if mod(i,10) = 5 3 if mod(i,10) = 6 2 if mod(i,10) = 7 |
| Note 1: D denotes a slot with all DL symbols; S denotes a slot with a mix of DL, UL and guard symbols; U denotes a slot with all UL symbols. The field is for information.  Note 2: D, G, U denote DL, guard and UL symbols, respectively. The field is for information.  Note 3: i is the slot index per frame; i = {0,…,19} | | | |

# C.3 Connection

## C.3.0 Measurement of Transmitter Characteristics

Unless otherwise stated, Table C.3.0-1 is applicable for measurements on the Transmitter Characteristics (clause 6).

Table C.3.0-1: Downlink Physical Channels transmitted during a connection (FDD and TDD)

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Value |
| SSS transmit power | W | Test specific |
| EPRE ratio of PSS to SSS | dB | 0 |
| EPRE ratio of PBCH to SSS | dB | 0 |
| EPRE ratio of PBCH to PBCH DMRS | dB | 0 |
| EPRE ratio of PDCCH to SSS | dB | 0 |
| EPRE ratio of PDCCH to PDCCH DMRS | dB | 0 |
| EPRE ratio of PDSCH to SSS | dB | 0 |
| EPRE ratio of PDSCH to PDSCH DMRS (Note 1) | dB | -3 |
| EPRE ratio of CSI-RS to SSS | dB | 0 |
| EPRE ratio of PTRS to PDSCH | dB | Test specific |
| EPRE ratio of OCNG DMRS to SSS | dB | 0 |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | dB | 0 |
| Note 1: No boosting is applied to any of the channels except PDSCH DMRS. For PDSCH DMRS, 3 dB power boosting is applied assuming DMRS Type 1 configuration when DMRS and PDSCH are TDM’ed and only half of the DMRS REs are occupied.  Note 2: Number of DMRS CDM groups without data for PDSCH DMRS configuration for OCNG is set to 1. | | |

## C.3.1 Measurement of Receiver Characteristics

Unless otherwise stated, Table C.3.1-1 is applicable for measurements on the Receiver Characteristics (clause 7). For Adjacent channel selectivity testing, Table C.3.1-2 is applied.

Table C.3.1-1: Downlink Physical Channels transmitted during a connection (FDD and TDD)

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Value |
| SSS transmit power | W | Test specific |
| EPRE ratio of PSS to SSS | dB | 0 |
| EPRE ratio of PBCH to SSS | dB | 0 |
| EPRE ratio of PBCH to PBCH DMRS | dB | 0 |
| EPRE ratio of PDCCH to SSS | dB | 0 |
| EPRE ratio of PDCCH to PDCCH DMRS | dB | 0 |
| EPRE ratio of PDSCH to SSS | dB | 0 |
| EPRE ratio of PDSCH to PDSCH DMRS (Note 1) | dB | -3 |
| EPRE ratio of CSI-RS to SSS | dB | 0 |
| EPRE ratio of PTRS to PDSCH | dB | Test specific |
| EPRE ratio of OCNG DMRS to SSS | dB | 0 |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | dB | 0 |
| Note 1: No boosting is applied to any of the channels except PDSCH DMRS. For PDSCH DMRS, 3 dB power boosting is applied assuming DMRS Type 1 configuration when DMRS and PDSCH are TDM’ed and only half of the DMRS REs are occupied.  Note 2: Number of DMRS CDM groups without data for PDSCH DMRS configuration for OCNG is set to 1. | | |

Table C.3.1-2: PDCCH Aggregation Level for ACS testing

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| Aggregation level | CCE | 1 | CBW=10MHz when SCS=60kHz |
| 2 | CBW=15MHz when SCS=60kHz |
| 4 | CBW=5MHz when SCS=15kHz  CBW=10,15MHz when SCS=30kHz  CBW=20,25,30MHz when SCS=60kHz |
| 8 | CBW=10,15MHz when SCS=15kHz  CBW=20,25,30MHz when SCS=30kHz  CBW=40,50,60,70MHz when SCS=60kHz |
| 16 | CBW>15 MHz when SCS=15kHz  CBW>30 MHz when SCS=30kHz CBW>70 MHz when SCS=60kHz |

Annex D (normative):  
Characteristics of the Interfering Signal

# D.1 General

Some RF performance requirements for the NR UE receiver are defined with interfering signals present in addition to the wanted signal.

For NR bands with FDL\_high< 2700 MHz and FUL\_high< 2700 MHz, a modulated 5MHz full bandwidth NR down link signal, and in some cases an additional CW signal, are used as interfering signal.

For NR bands with FDL\_low≥ 3300 MHz and FUL\_low≥ 3300 MHz, a modulated NR downlink signal which equals to channel bandwidth of the wanted signal for Single Carrier case and Inter-band CA case is used as interfering. For intra-band contiguous CA Bandwidth Class C case, a modulated NR downlink signal which equals to the aggregated channel bandwidth of the wanted signal is used. For intra-band contiguous CA Bandwidth Class D and E case, a modulated 50MHz NR downlink signal is used. And in some cases, an additional CW signal is used.

# D.2 Interference signals

Table D.2-1 and Table D.2-4 describes the modulated interferer for different channel bandwidth options for NR band lower than 2700MHz.

Table D.2-1: Description of modulated NR interferer for NR bands with FDL\_high< 2700 MHz and FUL\_high< 2700 MHz

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Channel bandwidth | | | | | | |
| 5 MHz | 10MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz | 40 MHz |
| RB | NOTE1 | | | | | | |
| BWInterferer | 5 MHz | | | | | | |
|  | Channel bandwidth | | | | | | |
| 50 MHz | 60 MHz | 70 MHz | 80 MHz | 90 MHz | 100 MHz |  |
| RB | NOTE1 | | | | | | |
| BWInterferer | 5 MHz | | | | | | |
| NOTE 1: The RB configured for interfering signal is the same as maximum RB number defined in Table 5.3.2-1 for each sub-carrier spacing. | | | | | | | |

Table D.2-2 and Table D.2-3 describe the modulated interferer for different channel bandwidth options for NR band higher than 3300MHz.

Table D.2-2: Description of modulated NR interferer for NR bands with FDL\_low≥ 3300 MHz and FUL\_low≥ 3300 MHz

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Channel bandwidth | | | | | | | | | | |
| 10 MHz | 15 MHz | 20 MHz | 30 MHz | 40 MHz | 50 MHz | 60 MHz | 70 MHz | 80 MHz | 90 MHz | 100 MHz |
| RB | NOTE1 | | | | | | | | | | |
| BWInterferer | 10 MHz | 15 MHz | 20 MHz | 30 MHz | 40 MHz | 50 MHz | 60 MHz | 70 MHz | 80 MHz | 90 MHz | 100 MHz |
| NOTE 1: The RB configured for interfering signal is the same as maximum RB number defined in Table 5.3.2-1 for each sub-carrier spacing. | | | | | | | | | | | |

Table D.2-3: Description of modulated NR interferer for NR bands with FDL\_low≥ 3300 MHz and FUL\_low≥ 3300 MHz for Intra-band contiguous CA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Aggregated Channel bandwidth of Bandwidth Class C | | | | | | | | Bandwidth Class D/E |
| 110 MHz | 120 MHz | 130 MHz | 140 MHz | 150 MHz | 160 MHz | 180 MHz | 200 MHz |
| RB(SCS=30 kHz) | Note 1 | | | | | | | | 133 |
| RB(SCS=60 kHz) | Note 1 | | | | | | | | 65 |
| BWInterferer | 110 MHz | 120 MHz | 130 MHz | 140 MHz | 150 MHz | 160 MHz | 180 MHz | 200 MHz | 50MHz |
| NOTE 1: The interfering signal shall be configured in the same way as the aggregated bandwidth of the wanted signal. The RB configurations for each component carrier are defined in Table 5.3.2-1 for each sub-carrier spacing. | | | | | | | | | |

Table D.2-4: Description of modulated NR interferer for NR bands with FDL\_low < 2700 MHz and FUL\_low < 2700 MHz for Intra-band contiguous CA

|  |  |  |
| --- | --- | --- |
|  | Bandwidth Class B | Bandwidth Class C |
| RB | NOTE 1 | NOTE 1 |
| BWInterferer | 5 MHz | 5 MHz |
| NOTE 1: The RB configured for interfering signal is the same as maximum RB number defined in Table 5.3.2-1 for each sub-carrier spacing. | | |

Annex E (normative):  
Global In-Channel TX-Test

NOTE: Clauses E.2.2 to E.5.9.3 are descriptions, which assume no power ramping adjacent to the measurement period.

# E.1 General

The global in-channel TX test enables the measurement of all relevant parameters that describe the in-channel quality of the output signal of the TX under test in a single measurement process.

The parameters describing the in-channel quality of a transmitter, however, are not necessarily independent. The algorithm chosen for description inside this annex places particular emphasis on the exclusion of all interdependencies among the parameters.

# E.2 Signals and results

## E.2.1 Basic principle

The process is based on the comparison of the actual **output signal of the TX under test**, received by an ideal receiver, with a **reference signal**, that is generated by the measuring equipment and represents an ideal error free received signal. All signals are represented as equivalent (generally complex) baseband signals.

The description below uses numbers as examples. These numbers are taken from FDD with normal CP length and 100 MHz bandwidth with 30 kHz SCS. The application of the text below, however, is not restricted to this frame structure and bandwidth.

## E.2.2 Output signal of the TX under test

The output signal of the TX under test is acquired by the measuring equipment and stored for further processing. It is sampled at a sampling rate of 122.88 Mbps. In the time domain it comprises at least n uplink slots, where for basic EVM measurement,

;

For Error Vector Magnitude including symbols with transient periods

The measurement period is derived by concatenating the correct number of individual uplink slots until the correct measurement period is reached. The output signal is named z(ν). Each slot is modelled as a signal with the following parameters: demodulated data content, carrier frequency, amplitude and phase for each subcarrier, timing, carrier leakage.

NOTE 1: TDD

Since the uplink subframes are not continuous, *n* slots should be extracted from more than 1 continuous radio frame.

## E.2.3 Reference signal

Two types of reference signal are defined:

The reference signal i1(ν) is constructed by the measuring equipment according to the relevant TX specifications, using the following parameters: demodulated data content, nominal carrier frequency, nominal amplitude and phase for each subcarrier, nominal timing, no carrier leakage. It is represented as a sequence of samples at a sampling rate of 122.88 Msps in the time domain.

The reference signal i2(ν) is constructed by the measuring equipment according to the relevant TX specifications, using the following parameters: restricted data content: nominal reference symbols, (all modulation symbols for user data symbols are set to 0V), nominal carrier frequency, nominal amplitude and phase for each applicable subcarrier, nominal timing, no carrier leakage. It is represented as a sequence of samples at a sampling rate of 122.88 Msps in the time domain.

NOTE: The PUCCH is off during the time under test.

## E.2.4 Measurement results

The measurement results, achieved by the global in channel TX test are the following:

- Carrier Frequency error

- EVM (Error Vector Magnitude)

- Carrier leakage

- Unwanted emissions, falling into non allocated resource blocks.

- EVM equalizer spectrum flatness

## E.2.5 Measurement points

The unwanted emission falling into non-allocated RB(s) is calculated directly after the FFT as described below. In contrast to this, the EVM for the allocated RB(s) is calculated after the IDFT for DFT-s-OFDM or after the Tx-Rx chain equalizer for CP-OFDM. The samples after the TX-RX chain equalizer are used to calculate EVM equalizer spectrum flatness. Carrier frequency error and carrier leakage is calculated in the block “RF correction”.

In case the parameter 3300 or 3301 is reported from UE via *txDirectCurrentLocation* IE (as defined in TS 38.331 [6]), carrier leakage measurement in the RF correction block shall be omitted. All statements from Annex E.3 onwards shall be read assuming that no carrier leakage has been measured.

Figure E.2.5-1: EVM measurement points

# E.3 Signal processing

## E.3.1 Pre FFT minimization process

Before applying the pre-FFT minimization process, z(ν) and i(ν) are portioned into *n* pieces, comprising one slot each, where *n* is as defined in Annex E.2.2.

Each slot is processed separately. Sample timing, Carrier frequency and carrier leakage in z(ν) are jointly varied in order to minimise the difference between z(ν) and i(ν). Best fit (minimum difference) is achieved when the RMS difference value between z(ν) and i(ν) is an absolute minimum.

The carrier frequency variation and the IQ variation are the measurement results: Carrier Frequency Error and Carrier leakage.

From the acquired samples 10 carrier frequencies can be derived by averaging frequency errors for every 1, 2 or 4 slots for 15, 30 and 60 kHz SCS.

From the acquired samples *n* carrier frequencies and *n* carrier leakages can be derived.

NOTE 1: The minimisation process, to derive carrier leakage and RF error can be supported by Post FFT operations. However the minimisation process defined in the pre FFT domain comprises all acquired samples (i.e. it does not exclude the samples in between the FFT widths and it does not exclude the bandwidth outside the transmission bandwidth configuration

NOTE 2: The algorithm would allow deriving Carrier Frequency error and Sample Frequency error of the TX under test separately. However there are no requirements for Sample Frequency error. Hence the algorithm models the RF and the sample frequency commonly (not independently). It returns one error and does not distinguish between both.

After this process the samples z(ν) are called z0(ν).

## E.3.2 Timing of the FFT window

The FFT window length is 4096 samples per OFDM symbol. 14 FFTs (57344 samples) cover less than the acquired number of samples (61440 samples). The position in time for FFT must be determined.

In an ideal signal, the FFT may start at any instant within the cyclic prefix without causing an error. The TX filter, however, reduces the window. The EVM requirements shall be met within a window W<CP. There are three different instants for FFT:

Centre of the reduced window, called ,  –W/2 and  +W/2.

The timing of the measured signal is determined in the pre FFT domain as follows, using z0(ν) and i2(ν) :

1. The measured signal is delay spread by the TX filter. Hence the distinct boarders between the OFDM symbols and between Data and CP are also spread and the timing is not obvious.

2. In the Reference Signal i2(ν) the timing is known.

3. Correlation between (1.) and (2.) will result in a correlation peak. The meaning of the correlation peak is approx. the “impulse response” of the TX filter. The meaning of “impulse response” assumes that the autocorrelation of the reference signal i2(ν) is a Dirac peak and that the correlation between the reference signal i2(ν) and the data in the measured signal is 0. The correlation peak, (the highest, or in case of more than one, the earliest) indicates the timing in the measured signal.

From the acquired samples, *n* timings can be derived, where *n* is as defined in Annex E.2.2.

For all calculations, except EVM, the number of samples in z0(ν) is reduced to 14 blocks of samples, comprising 4096 samples (FFT width) and starting with  in each OFDM symbol including the demodulation reference signal.

For the EVM calculation the output signal under test is reduced to 28 blocks of samples, comprising 4096 samples (FFT width) and starting with  –W/2 and  +W/2 in each OFDM symbol including the demodulation reference signal.

The number of samples, used for FFT is reduced compared to z0(ν). This subset of samples is called z’(ν).

The timing of the centre  with respect to the different CP length in a slot is as follows: (FDD, normal CP length)

 is on Tf=144 (=CP/2) within the CP of length 288 FFT samples (in OFDM symbols except 0 and 14 (=), where symbol 0 is the first symbol of each subframe) for 100 MHz channel bandwidth and SCS = 30 kHz.

 is on Tf=208 (=352-144) within the CP of length 352 FFT samples (in OFDM symbol 0 and 14 (=), where symbol 0 is the first symbol of each subframe) for 100 MHz channel bandwidth and SCS = 30 kHz.

## E.3.3 Post FFT equalisation

Perform 14 FFTs on z’(ν), one for each OFDM symbol in a slot using the timing , including the demodulation reference symbol. The result is an array of samples, 14 in the time axis t times 4096 in the frequency axis f. The samples represent the data symbols (in OFDM-symbol 0,1,3,4,5,6,8,9,10,12,13 in each slot) and demodulation reference symbols (OFDM symbol 2, 7, 11 in each slot) in the allocated RBs and inband emissions in the non-allocated RBs within the transmission BW.

Only the allocated resource blocks in the frequency domain are used for equalisation.

The nominal demodulation reference symbols and nominal data symbols are used to equalize the measured data symbols. (Location for equalization see Figure E.2.5-1)

NOTE: The nomenclature inside this note is local and not valid outside.

The nominal data symbols are created by a demodulation process. The location to gain the demodulated data symbols is “EVM” in Figure E.2.5-1. For CP-OFDM, the process described in Annex E.5 can be applied. A demodulation process as follows is recommended for DFT-s-OFDM:

1. Equalize the measured data symbols using the reference symbols for equalisation. Result: Equalized data symbols

2. Only for DFT-s-OFDM, iDFT transform the equalized data symbols: Result: Equalized data symbols

3. Decide for the nearest constellation point: Result: Nominal data symbols

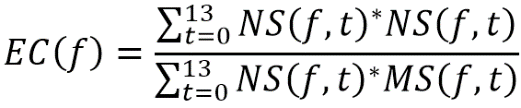
4. Only for DFT-s-OFDM, DFT transform the nominal data symbols: Result: Nominal data symbols

At this stage we have an array of Measured data-Symbols and reference-Symbols (MS(f,t))

versus an array of Nominal data-Symbols and reference Symbols (NS(f,t))

(complex, the arrays comprise 11 data symbols and 3 demodulation reference symbol in the time axis and the number of allocated subcarriers in the frequency axis.)

MS(f,t) and NS(f,t) are processed with a least square (LS) estimator, to derive one equalizer coefficient per time slot and per allocated subcarrier. EC(f) is defined as

.

With \* denoting complex conjugation.

EC(f) are used to equalize the DFT-coded data symbols. The measured DFT-coded data and the references symbols are equalized by:

Z’(f,t) = MS(f,t) **.** EC(f)

With **.** denoting multiplication.

Z’(f,t), restricted to the data symbol (excluding t=2,7,11) is used to calculate EVM, as described in E.4.1.

EC(f) is used in E.4.4.1 to calculate EVM equalizer spectral flatness.

NOTE: The post FFT minimisation process is done over 14 symbols (11 DFT-coded data symbols and 3 reference symbols).

The samples of the non-allocated resource blocks within the transmission bandwidth configuration in the post FFT domain are called Y(f,t) (f covering the non-allocated subcarriers within the transmission bandwidth configuration, t covering the OFDM symbols during 1 slot).

# E.4 Derivation of the results

## E.4.1 EVM

For EVM create two sets of Z’(f,t)., according to the timing ”  –W/2 and  +W/2” using the equalizer coefficients from E.3.3.

Perform the iDFTs on Z’(f,t) in the case of DFT-s-OFDM waveform. The IDFT-decoding preserves the meaning of t but transforms the variable f (representing the allocated sub carriers) into another variable g, covering the same count and representing the demodulated symbols. The samples in the post IDFT domain are called iZ’(g, t). The equivalent ideal samples are called iI(g,t). Those samples of Z’(f,t), carrying the reference symbols (=symbol 2,7,11) are not iDFT processed.

The EVM is the difference between the ideal waveform and the measured and equalized waveform for the allocated RB(s)

,

where

t covers the count of demodulated symbols with the considered modulation scheme being active within the measurement period, (i.e. symbol 0,1,3,4,5,6,8,9,10,12,13 in each slot, 🡪|T|=11)

g covers the count of demodulated symbols with the considered modulation scheme being active within the allocated bandwidth. (|G|=12\* (with: number of allocated resource blocks)).

 are the samples of the signal evaluated for the EVM.

is the ideal signal reconstructed by the measurement equipment, and

 is the average power of the ideal signal. For normalized modulation symbols  is equal to 1.

From the acquired samples *2n* EVM values can be derived, *n* values for the timing  –W/2 and *n* values for the timing  +W/2 where *n* is as defined in Annex E.2.2.

## E.4.2 Averaged EVM

EVM is averaged over all basic EVM measurements.

The averaging comprises *n* UL slots

where *n* is as defined in Annex E.2.2for PUCCH, PUSCH.

The averaging is done separately for timing¦  –W/2 and  +W/2 leading to and 

 is compared against the test requirements.

## E.4.3 In-band emissions measurement

The in-band emissions are a measure of the interference falling into the non-allocated resources blocks.

Explanatory Note:

The inband emission measurement is only meaningful with allocated RB(s) next to non-allocated RB. The allocated RB(s) are necessary but not under test. The non-allocated RBs are under test. The RB allocation for this test is as follows: The allocated RB(s) are at one end of the channel BW, leaving the other end unallocated. The number of allocated RB(s) is smaller than half of the number of RBs, available in the channel BW. This means that the vicinity of the carrier in the centre is unallocated.

There are 3 types of inband emissions:

1. General

2. IQ image

3. Carrier leakage

*Carrier leakage* are inband emissions next to the carrier.

*IQ image* are inband emissions symmetrically (with respect to the carrier) on the other side of the allocated RBs.

*General* are applied to all unallocated RBs.

For each evaluated RB, the minimum requirement is calculated as the higher of *PRB* - 30 dB and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply.

In specific the following combinations:

- Power (General)

- Power (General + Carrier leakage)

- Power (General + IQ Image)

1 and 2 is expressed in terms of power in one non allocated RB under test, normalized to the average power of an allocated RB (unit dB).

3 is expressed in terms of power in one non allocated RB, normalized to the power of all allocated RBs. (unit dBc).

This is the reason for two formulas *Emissions relative*.

Create one set of Y(t,f) per slot according to the timing “”

For the non-allocated RBs below the in-band emissions are calculated as follows

,

where

the upper formula represents the in band emissions below the allocated frequency block and the lower one the in band emissions above the allocated frequency block.

is a set of  DFT-s-OFDM symbols with the considered modulation scheme being active within the measurement period,

 is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g.  for the first upper or  for the first lower adjacent RB),

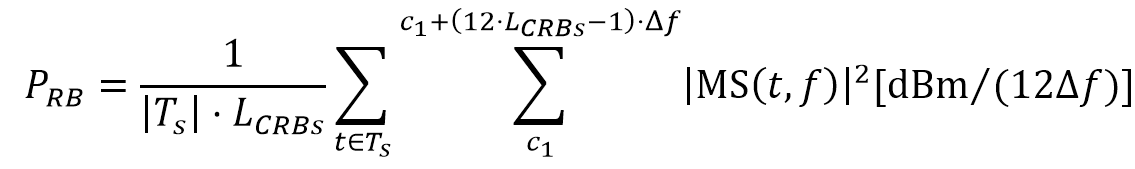
and are the lower and upper edge of the UL transmission BW configuration,

 and  are the lower and upper edge of the allocated BW,

is the SCS, and

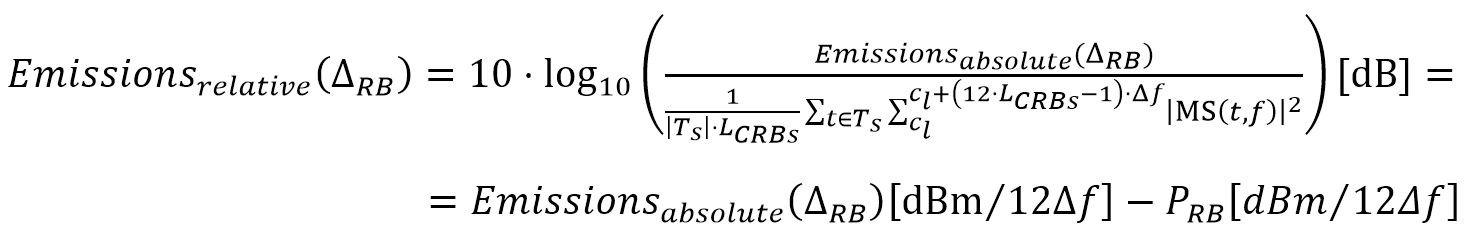
 is the frequency domain signal evaluated for in-band emissions as defined in the clause E.3.3

The allocated RB power per RB and the total allocated RB power are given by:





The relative in-band emissions, applicable for General and IQ image, are given by:



where

 is the number of allocated resource blocks,

and

 is the frequency domain samples for the allocated bandwidth, as defined in the clause E.3.3.

The relative in-band emissions, applicable for carrier leakage, is given by:



where DCRB is one RB or one pair of RBs, depending whether the DC carrier is inside an RB or in-between two RBs.

Although an exclusion period may be applicable in the time domain, when evaluating EVM, the inband emissions measurement interval is defined over one complete slot in the time domain.

From the acquired samples *n* functions for general in band emissions and IQ image inband emissions can be derived, where *n* is as defined in Annex E.2.2. *n* values or *n* pairs of carrier leakage inband emissions can be derived. They are compared against different limits after the final averaging:

The in-band emissions are averaged over the *n* samples (equivalent to 10 UL subframes):







## E.4.4 EVM equalizer

## E.4.4.1 EVM equalizer spectrum flatness

For EVM equalizer spectrum flatness use EC(f) as defined in E.3.3. Note, EC(f) represents equalizer coefficient ，f is the allocated subcarriers within the transmission bandwidth ((|*F*|=12\*)

From the acquired samples *n* functions EC(f) can be derived, where *n* is as defined in Annex E.2.2.

EC(f) is broken down to 2 functions:





Where Range 1 and Range 2 are as defined for Clause 6.4.2.4 in Table 6.4.2.4.5-1 for normal condition and Table 6.4.2.4.5-2 for extreme condition and for Clause 6.4.2.5 as in Table 6.4.2.5.5-1.

The following peak to peak ripple is calculated:

 ,which denote the maximum ripple in Range 1

,which denote the maximum ripple in Range 2

,which denote the maximum ripple between the upper side of Range 1 and lower side of Range 2

 ,which denote the maximum ripple between the upper side of Range 2 and lower side of Range 1

### E.4.4.2 EVM equalizer spectral shaping filter

The calculation of the impulse response of the spectral shaping filter is based on EC(f) as defined in E.3.3. Note that EC(f) represents complex valued equalizer coefficient with ，where f is the allocated subcarriers within the transmission bandwidth (|*F*|=12\*).

EC’(f) is the corrected version of EC(f) by shifting by Tf. Tf is as defined in Clause E.3.2.

The impulse responses are the IDFT transformed equalizer coefficients:  
, where *f* is the frequency of the *M* allocated subcarriers.

The impulse response is normalized to its first value.



This is equivalent to defining the 0dB as20*log*10│*ãt*(0)│.

From the acquired samples, *n* functions  can be derived, where *n* is as defined in Annex E.2.2.

Note, that this method provides reasonable results only in the case of full allocations.

## E.4.5 Frequency error and Carrier leakage

See E.3.1.

## E.4.6 EVM of Demodulation reference symbols (EVMDMRS)

For the purpose of EVM DMRS, the steps E.2.2 to E.4.2 are repeated 6 times, constituting 6 EVM DMRS sub-periods. The only purpose of the repetition is to cover the longer gross measurement period of EVM DMRS ( time slots) and to derive the FFT window timing per sub-period.

The bigger of the EVM results in one *n* TS period corresponding to the timing¦  –W/2 or  +W/2 is compared against the limit, where *n* is as defined in Annex E.2.2. (Clause E.4.2) This timing is re-used for EVM DMRS in the equivalent EVM DMRS sub-period.

For EVM the demodulation reference symbols are excluded, while the data symbols are used. For EVMDMRS the data symbols are excluded, while the demodulation references symbols are used. This is illustrated in figure E.4.6-1



Figure E.4.6-1: EVMDMRS measurement points

Re-use the following formula from E.3.3:

Z’(f,t) = MS(f,t) **.** EC(f)

To calculate EVMDMRS , the data symbol (t=0,1,3,4,5,6,8,9,10,12,13) in Z’(f,t) are excluded and only the reference symbols (t=2,7,11) are used.

The EVM DMRS is the difference between the ideal waveform and the measured and equalized waveform for the allocated RB(s)

,

where

t covers the count of demodulation reference symbols (i.e. symbols 2,7,11 in each slot, so count=3)

f covers the count of demodulation reference symbols within the allocated bandwidth. (|F|=12\* (with: number of allocated resource blocks)).

 are the samples of the signal evaluated for the EVM DMRS

is the ideal signal reconstructed by the measurement equipment, and

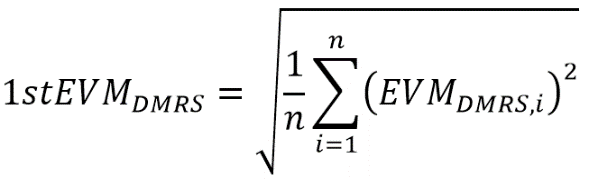
 is the average power of the ideal signal. For normalized modulation symbols  is equal to 1.

*n* such results are generated per measurement sub-period, where *n* is as defined in Annex E.2.2.

### E.4.6.1 1st average for EVM DMRS

EVM DMRS is averaged over all basic EVM DMRS measurements in one sub-period

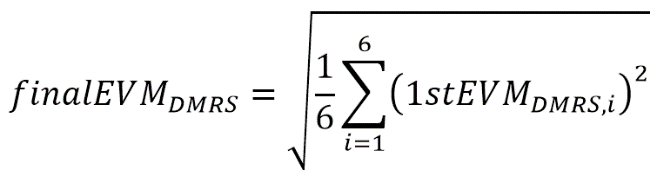
The averaging comprises *n* UL slots

,

where *n* is as defined in Annex E.2.2.

The timing is taken from the EVM for the data. 6 of those results are achieved from the samples. In general the timing is not the same for each result.

### E.4.6.2 Final average for EVM DMRS



## E.4.7 Modified signal under test

Implicit in the definition of EVM is an assumption that the receiver is able to compensate a number of transmitter impairments.

The DFT-s-OFDM modulated signals or PRACH signal under test is modified and, in the case of DFT-s-OFDM modulated signals, decoded according to:



where

 is the time domain samples of the signal under test.

The CP-OFDM modulated signals or PUSCH demodulation reference signal or PUCCH data signal under test is equalised and, in the case of CP-OFDM modulated signals decoded according to:



where

 is the time domain samples of the signal under test.

To minimize the error, the signal under test should be modified with respect to a set of parameters following the procedure explained below.

Notation:

 is the sample timing difference between the FFT processing window in relation to nominal timing of the ideal signal.

 is the RF frequency offset.

 is the phase response of the TX chain.

 is the amplitude response of the TX chain.

In the following  represents the middle sample of the EVM window of length  (defined in the next clauses) or the last sample of the first window half if is even.

The EVM analyser shall

- detect the start of each slot and estimate  and ,

- determine  so that the EVM window of length  is centred

- on the time interval determined by the measured cyclic prefix minus 16κ samples of the considered OFDM symbol for symbol l for subcarrier spacing configuration µ in a subframe, with l = 0 or l = 7\*2^µ for normal CP, i.e. the first 16κ samples of the CP should not be taken into account for this step. In the determination of the number of excluded samples, a sampling rate of 1/Tc is assumed. If a different sampling rate is used, the number of excluded samples is scaled linearly.

- on the measured cyclic prefix of the considered OFDM symbol for all other symbols for normal CP and for symbol 0 to 11 for extended CP.

- on the measured preamble cyclic prefix for the PRACH

To determine the other parameters a sample timing offset equal to  is corrected from the signal under test. The EVM analyser shall then

- correct the RF frequency offset for each time slot, and

- apply an FFT of appropriate size. The chosen FFT size shall ensure that in the case of an ideal signal under test, there is no measured inter-subcarrier interference.

The carrier leakage shall be removed from the evaluated signal before calculating the EVM and the in-band emissions; however, the removed relative carrier leakage power also has to satisfy the applicable requirement.

At this stage the allocated RBs shall be separated from the non-allocated RBs. In the case of PUCCH and PUSCH EVM, the signal on the non-allocated RB(s), , is used to evaluate the in-band emissions.

Moreover, the following procedure applies only to the signal on the allocated RB(s).

- In the case of PUCCH and PUSCH, the UL EVM analyzer shall estimate the TX chain equalizer coefficients and  used by the ZF equalizer for all subcarriers by time averaging at each signal subcarrier of the amplitude and phase of the reference and data symbols. The time-averaging length is 1 slot. This process creates an average amplitude and phase for each signal subcarrier used by the ZF equalizer. The knowledge of data modulation symbols may be required in this step because the determination of symbols by demodulation is not reliable before signal equalization.

- In the case of PRACH, the UL EVM analyzer shall estimate the TX chain coefficients and  used for phase and amplitude correction and are selected so as to minimize the resulting EVM. The TX chain coefficients are not dependent on frequency, i.e.  and . The TX chain coefficient are chosen independently for each preamble transmission and for each .

At this stage estimates of , ,  and  are available.  is one of the extremities of the window , i.e. can be  or , where  if  is odd and  if is even. The EVM analyser shall then

- calculate EVMl with  set to ,

- calculate EVMh with  set to .

For the EVM calculation on the symbols with a transient period when the UE signals a transient period capability (tp) of 2, 4 or 7usec, is given below.

- calculate EVMl\_tp with set to, where is 1/Tc the sampling rate

- calculate EVMh\_tp with set to, where 1/Tc is the sampling rate and the CP is the cyclic prefix of the symbol on which EVM is calculated (e.g. long CP for the first symbol of the slot) in seconds

A pictorial representation of the EVM measurement windows is given in Figure F.4-1.

Figure E.4.7-1: EVM measurement window

## E.4.8 EVM measurement for dual Tx

For UE with dual transmission antennas, if UE indicates IE [*txDiversity-r16*], EVM is measured at each antenna connector to get EVM1 and EVM2, and the total EVM is calculated by values of EVM1 and EVM2 with weighting factor of linear power at each antenna connector.

where P1 and P2 denote the linear power measured at each antenna connector respectively.

## E.4.9 Phase offset measurement for DMRS bundling

### E.4.9.1 Measurement point

The measurement point for phase offset measurement is defined in Figure F.9.1-1.



Figure E.4.9.1-1: Measurement point for phase offset for DMRS bundling

### E.4.9.2 Symbols used

Phase offset is determined based on DMRS REs (3 DMRS symbols per slot) with the option to use data symbols.

### E.4.9.3 Modified test signal

Same as described in Annex E.4.7.

### E.4.9.4 Phase offset measurement

The phase offset measurement is based on the phase response of the Tx chain  as derived based on Annex F.4.

The subcarrier at the carrier leakage frequency of the transmitted signal shall be excluded from the measured subcarriers.

The phase difference for each measured subcarrier between a reference timeslot tref and the measurement timeslot tmis then calculated as defined below.

The phase offset between the reference and measurement timeslots are then calculated as the maximum over the results for all measured subcarriers as shown below:

# E.5 EVM and inband emissions for PUCCH

For the purpose of worst case testing, the PUCCH shall be located on the edges of the Transmission Bandwidth Configuration.

The EVM for PUCCH (EVMPUCCH) is averaged over *n* slots, where *n* is as defined in Annex E.2.2.

At least *n* TSs shall be transmitted by the UE without power change. SRS multiplexing shall be avoided during this period. The following transition periods are applicable: One OFDM symbol on each side of the slot border (instant of band edge alternation).

The description below is generic in the sense that all 5 PUCCH formats are covered. Although the number of OFDM symbols in one slot can be different from 14 (depending on the format, configuration and cyclic prefix length), the text below uses 14 without excluding the others.

## E.5.1 Basic principle

The basic principle is the same as described in E.2.1

## E.5.2 Output signal of the TX under test

The output signal of the TX under test is processed same as described in E.2.2

## E.5.3 Reference signal

The reference signal is defined same as in E.2.3. Same as in E.2.3, i1(ν) is the ideal reference for EVMPUCCH and i2(ν) is used to estimate the FFT window timing.

Note PUSCH is off during the PUCCH measurement period.

## E.5.4 Measurement results

The measurement results are:

- EVMPUCCH

- Inband emissions with the sub-results: General in-band emission, IQ image (according to: 38.101. Annex F.4, Clause starting with: “At this stage the ….”)

## E.5.5 Measurement points

The measurement points are illustrated in Figure E.2.5-1.

## E.5.6 Pre FFT minimization process

The pre FFT minimisation process is the same as describes in clause E.3.1.

NOTE: although an exclusion period for EVMPUCCH is applicable in E.5.9.1, the pre FFT minimisation process is done over the complete slot.

RF error, and carrier leakage are necessary for best fit of the measured signal towards the ideal signal in the pre FFT domain. However they are not used to compare them against the limits.

## E.5.7 Timing of the FFT window

Timing of the FFT window is estimated with the same method as described in E.3.2.

## E.5.8 Post FFT equalisation

The post FFT equalisation is described separately without reference to E.3.3:

Perform 14 FFTs on z’(ν), one for each OFDM symbol in a slot using the timing , including the demodulation reference symbol. The result is an array of samples, 14 in the time axis t times 4096 in the frequency axis f. The samples represent the OFDM symbols (data and reference symbols) in the allocated RBs and inband emissions in the non-allocated RBs within the transmission BW.

Only the allocated resource blocks in the frequency domain are used for equalisation.

The nominal reference symbols and **nominal** OFDM data symbols are used to equalize the measured data symbols.

Note: (The nomenclature inside this note is local and not valid outside)

The nominal OFDM data symbols are created by a demodulation process. A demodulation process as follows is recommended:

1. Equalize the measured OFDM data symbols using the reference symbols for equalisation. Result: Equalized OFDM data symbols

2. Decide for the nearest constellation point, however not independent for each subcarrier in the RB. 12 constellation points are decided dependent, using the applicable CAZAC sequence. Result: Nominal OFDM data symbols

At this stage we have an array of Measured data-Symbols and reference-Symbols (MS(f,t))

versus an array of Nominal data-Symbols and reference Symbols (NS(f,t))

The arrays comprise in sum 14 data and reference symbols, depending on the PUCCH format, in the time axis and the number of allocated sub-carriers in the frequency axis.

MS(f,t) and NS(f,t) are processed with a least square (LS) estimator, to derive one equalizer coefficient per time slot and per allocated subcarrier. EC(f)



With \* denoting complex conjugation.

EC(f) are used to equalize the OFDM data together with the demodulation reference symbols by:

Z’(f,t) = MS(f,t) **.** EC(f)

With **.** denoting multiplication.

Z’(f,t) is used to calculate EVMPUCCH, as described in E.5.9 1

NOTE: although an exclusion period for EVMPUCCH is applicable in E.5.9.1, the post FFT minimisation process is done over 14 OFDM symbols.

The samples of the non-allocated resource blocks within the transmission bandwidth configuration in the post FFT domain are called Y(f,t) (f covering the non-allocated subcarriers within the transmission bandwidth configuration, t covering the OFDM symbols during 1 slot).

## E.5.9 Derivation of the results

### E.5.9.1 EVMPUCCH

For EVMPUCCH create two sets of Z’(f,t)., according to the timing ”  –W/2 and  +W/2” using the equalizer coefficients from E.5.8

The EVMPUCCH is the difference between the ideal waveform and the measured and equalized waveform for the allocated RB(s)

,

where

the OFDM symbols next to transition boarders (instant of PUCCH frequency hopping) are excluded:

t covers less than the count of demodulated symbols in the slot (|T|= 12)

f covers the count of subcarriers within the allocated bandwidth. (|F|=12)

 are the samples of the signal evaluated for the EVMPUCCH

is the ideal signal reconstructed by the measurement equipment, and

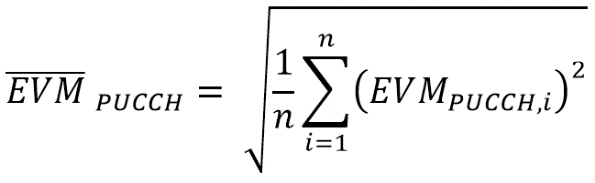
 is the average power of the ideal signal. For normalized modulation symbols  is equal to 1.

From the acquired samples 2*n* EVMPUCCH value can be derived, *n* values for the timing  –W/2 and *n* values for the timing  +W/2, where *n* is as defined in Annex E.2.2.

### E.5.9.2 Averaged EVMPUCCH

EVMPUCCH is averaged over all basic EVMPUCCH measurements

The averaging comprises *n* UL slots

,

where *n* is as defined in Annex E.2.2.

The averaging is done separately for timing¦  –W/2 and  +W/2 leading to and 

is compared against the test requirements.

### E.5.9.3 In-band emissions measurement

The in-band emissions are a measure of the interference falling into the non-allocated resources blocks

Create one set of Y(t,f) per slot according to the timing “”

For the non-allocated RBs the in-band emissions are calculated as follows

,

where

the upper formula represents the inband emissions below the allocated frequency block and the lower one the inband emissions above the allocated frequency block.

is a set of OFDM symbols in the measurement period,

 is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g.  for the first upper or  for the first lower adjacent RB),

and are the lower and upper edge of the UL UE channel bandwidth

 and  are the lower and upper edge of the allocated BW,

is the SCS, and

 is the frequency domain signal evaluated for in-band emissions as defined in the clause E.5.8.

The relative in-band emissions are, given by



where

is the number of allocated RBs,

and  is the frequency domain samples for the allocated bandwidth, as defined in the subsection E.5.8

Although an exclusion period for EVM is applicable in E.5.9.1, the inband emissions measurement interval is defined over one complete slot in the time domain.

From the acquired samples *n* functions for inband emissions can be derived, where *n* is as defined in Annex E.2.2.

The in-band emissions are averaged over the *n* samples (equivalent to 10 UL subframes) with the same PUCCH position to prevent averaging of allocated and non-allocated RBs due to PUCCH frequency hopping:





Since the PUCCH allocation is always on the upper or lower band-edge, the opposite of the allocated one represents the IQ image, and the remaining inner RBs represent the general inband emissions. They are compared against different limits.

### E.5.9.4 EVM measurement for dual Tx

For UE with dual transmission antennas, if UE indicates IE [*txDiversity-r16*], EVM is measured at each antenna connector to get EVM1 and EVM2, and the total EVM is calculated by values of EVM1 and EVM2 with weighting factor of linear power at each antenna connector.

where P1 and P2 denote the linear power measured at each antenna connector respectively.

# E.6 EVM for PRACH

The description below is generic in the sense that all PRACH formats are covered. The numbers, used in the text below are taken from PRACH format#0 without excluding the other formats. The sampling rate for PRACH is assumed as , 30.72 Msps in the time domain.

## E.6.1 Basic principle

The basic principle is the same as described in E.2.1

## E.6.2 Output signal of the TX under test

The output signal of the TX under test is processed same as described in E.2.2

The measurement period is different since 2 PRACH preambles are recorded for long preamble formats as defined in Table 6.3.3.1-1 in [8] and 10 preambles are recorded for short preamble formats as defined in Table 6.3.3.1-2 in [8].

## E.6.3 Reference signal

The test description in 6.4.2.1.4.1 is based on non-contention based access:

- PRACH configuration index (responsible for Preamble format, System frame number and subframe number)

- Preamble ID

- Preamble power

signalled to the UE, defines the reference signal unambiguously, such that no demodulation process is necessary to gain the reference signal.

The reference signal i(ν) is constructed by the measuring equipment according to the relevant TX specifications, using the following parameters: the applicable Zadoff Chu sequence, nominal carrier frequency, nominal amplitude and phase for each subcarrier, nominal timing, no carrier leakage. It is represented as a sequence of samples at a sampling rate of 122.88 Msps in the time domain.

## E.6.4 Measurement results

The measurement result is:

- EVMPRACH

## E.6.5 Measurement points

The measurement points are illustrated in the figure below:

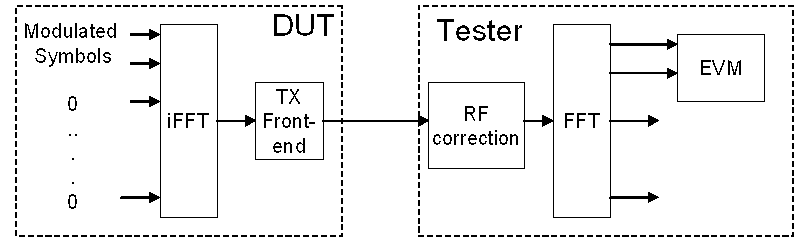


Figure E.6.5-1:Measurement points

## E.6.6 Pre FFT minimization process

The pre-FFT minimization process is applied to each PRACH preamble separately. The time period for the pre- FFT minimisation process includes the complete CP and Zadoff-Chu sequence (in other words, the power transition period is per definition outside of this time period) Sample timing, Carrier frequency and carrier leakage inz(ν) are jointly varied in order to minimise the difference between z(ν) and i(ν). Best fit (minimum difference) is achieved when the RMS difference value between z(ν) and i(ν) is an absolute minimum.

After this process the samples z(ν) are called z0(ν).

RF error, and carrier leakage are necessary for best fit of the measured signal towards the ideal signal in the pre FFT domain. However they are not used to compare them against the limits.

## E.6.7 Timing of the FFT window

The FFT window length is 24576 samples for preamble format 0, however in the measurement period at least 27744 samples are taken. The position in time for FFT must be determined.

In an ideal signal, the FFT may start at any instant within the cyclic prefix without causing an error. The TX filter, however, reduces the window. The EVM requirements shall be met within a window W<CP.

The reference instant for the FFT start is the centre of the reduced window, called ,

EVM is measured at the following two instants:  –W/2 and  +W/2.

The timing of the measured signal z0(ν) with respect to the ideal signal i(ν) is determined in the pre FFT domain as follows:

Correlation between z0(ν) and i(ν) will result in a correlation peak. The meaning of the correlation peak is approx. the “impulse response” of the TX filter. The correlation peak, (the highest, or in case of more than one, the earliest) indicates the timing in the measured signal with respect to the ideal signal.

W is different for different preamble formats and shown in Table E.6.7-1 for  and  in Table E.6.7-2 for  and  where.

Table E.6.7-1: EVM window length for PRACH formats for 

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Preamble format | Cyclic prefix length | Nominal FFT size1 | EVM window length *W* in FFT samples | Ratio of *W* to CP\* |
| 0 | 3168 | 24576 | 2307 | 72.8% |
| 1 | 21024 | 24576 | 20163 | 95.9% |
| 2 | 4688 | 24576 | 3827 | 81.6% |
| 3 | 3168 | 6144 | 2952 | 93.2% |
| Note 1: The use of other FFT sizes is possible as long as appropriate scaling of the window length is applied  Note 2: These percentages are informative | | | | |

Table E.6.7-2: EVM window length for PRACH formats for 

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Preamble format | Cyclic prefix length | Nominal FFT size1 | EVM window length *W* in FFT samples | Ratio of *W* to CP\* |
| A1 | 2882*-* | 20482*-* | 1442*-* | 50.0% |
| A2 | 5762*-* | 20482*-* | 4322*-* | 75.0% |
| A3 | 8642*-* | 20482*-* | 7202*-* | 83.3% |
| B1 | 2162*-* | 20482*-* | 722*-* | 33.3% |
| B2 | 3602*-* | 20482*-* | 2162*-* | 60.0% |
| B3 | 5042*-* | 20482*-* | 3602*-* | 71.4% |
| B4 | 9362*-* | 20482*-* | 7922*-* | 84.6% |
| C0 | 12402*-* | 20482*-* | 10962*-* | 88.4% |
| C2 | 20482*-* | 20482*-* | 19042*-* | 93.0% |
| Note 1: The use of other FFT sizes is possible as long as appropriate scaling of the window length is applied  Note 2: These percentages are informative | | | | |

The number of samples, used for FFT is reduced compared to z0(ν). This subset of samples is called z’ (ν).

EVM is based on Nominal FFT size samples per PRACH preamble and demodulated symbol.

## E.6.8 Post FFT equalisation

Equalisation is not applicable for the PRACH.

## E.6.9 Derivation of the results

### E.6.9.1 EVMPRACH

Perform FFT on z’(ν) and i(ν) using the FFT timing  –W/2 and  +W/2.

For format 2 and 3 the first and the repeated preamble sequence are FFT-converted separately. using the standard FFT length of 2048.

The EVMPRACH is the difference between the ideal waveform and the measured and equalized waveform for the allocated RB(s).



,

where

t covers the count of demodulated symbols in the slot.

f covers the count of demodulated symbols within the allocated bandwidth.

 are the samples of the signal evaluated for the EVMPRACH

is the ideal signal reconstructed by the measurement equipment, and

 is the average power of the ideal signal. For normalized modulation symbols  is equal to 1.

From the acquired samples 2*m* EVMPRACH values can be derived, *m* values for the timing  –W/2 and *m* values for the timing  +W/2, where *m* is the number of recorded preambles as defined in Annex E.6.2.

### E.6.9.2 Averaged EVMPRACH

The PRACH EVM, , is averaged over *m* preamble sequence measurements.

,

where *m* is the number of recorded preambles as defined in Annex E.6.2.The averaging is done separately for timing¦  –W/2 and  +W/2 leading to and 

is compared against the test requirements.

### E.6.9.3 EVM measurement for dual Tx

For UE with dual transmission antennas, if UE indicates IE [*txDiversity-r16*], EVM is measured at each antenna connector to get EVM1 and EVM2, and the total EVM is calculated by values of EVM1 and EVM2 with weighting factor of linear power at each antenna connector.

where P1 and P2 denote the linear power measured at each antenna connector respectively.

# E.7 reserved

Editor’s note: reserved for Phase offset measurement for DMRS bundling

# E.8 EVM for UL MIMO

## E.8.1 General

EVM for UL MIMO is measured per layer. A zero-forcing (ZF) MIMO receiver architecture is used so that dual layer transmissions by the UE can be demodulated by the test equipment receiver.

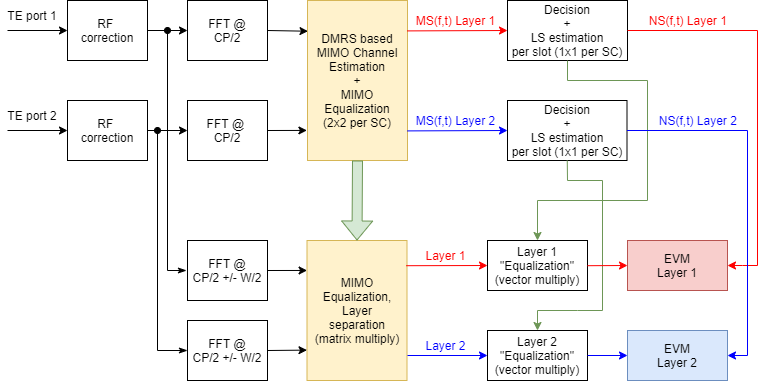


Figure E.8.1-1: EVM calculation block diagram for 2-Layer UL MIMO

The TE receives signals from 2 different ports which are connected to two antenna connectors in the test system.

For UL MIMO measurements a MIMO equalization step as described in section E.8.2 is performed to separate the layers.

Each layer is then processed as described in section E.8.3 to receive the measurement results for each individual layer.

## E.8.2 MIMO Equalization

The MIMO equalization is based only on reference signals (DMRS) without using any data symbols. For the equalization process all available DMRS symbols shall be used.

The effective 2x2 channel matrix is estimated using reference signals of different subcarriers, e.g. in case of DMRS antenna ports 0 and 2. In case that same subcarriers are used, e.g. DMRS antenna ports 0 and 1, a channel decomposition is necessary taking advantage of the orthogonal codes *wf* and *wt* and assuming identical channel coefficients for adjacent subcarriers of same CDM group.

Effective channel including the precoding matrix *P* is:

with

where *y* denotes the received symbol on port index *n* and *r* the reference signal for layer index *ν*.

Since reference signals of a specific layer are transmitted only on subcarriers of one CDM group channel, interpolation is needed in order to obtain channel coefficients for all subcarriers. Channel interpolation is done using the channel coefficients of active CDM group in all other CDM groups.

The channel coefficients used to calculate the equalizer coefficients are obtained after channel smoothing in frequency domain by computing the moving average of interpolated channel coefficients. The moving average window size is 7. For subcarriers at or near the edge of allocation the window size is reduced accordingly.

The ZF equalizer coefficients are calculated as the inverse of the effective channel matrix, in general:

## E.8.3 Layer processing

After performing the MIMO equalization as described in section E.8.2 each layer is processed using the existing procedure as defined in Annex E.

Since the channel estimation is calculated only on the DMRS symbols, an averaging including all 14 symbols of one slot, i.e. data and reference signals, is needed in order to minimize EVM. The averaging is achieved by the least square (LS) equalization method described for single layer in Annex E.3.

*MS(f,t)* and *NS(f,t)* are processed with a LS estimator, to derive one equalizer coefficient per time slot and per allocated subcarrier. *EC(f)* is defined for each layer as:

With \* denoting complex conjugation. *EC(f)* are used to equalize layer data symbols.

EVM equalizer spectral flatness is derived from equalizer coefficients for each layer as follows:

Annex F (normative):  
Measurement uncertainties and Test Tolerances

# F.1 Acceptable uncertainty of Test System (normative)

## F.1.0 General

The maximum acceptable uncertainty of the Test System is specified below for each test, where appropriate. The Test System shall enable the stimulus signals in the test case to be adjusted to within the specified range, and the equipment under test to be measured with an uncertainty not exceeding the specified values. All ranges and uncertainties are absolute values, and are valid for a confidence level of 95 %, unless otherwise stated.

A confidence level of 95 % is the measurement uncertainty tolerance interval for a specific measurement that contains 95 % of the performance of a population of test equipment.

For RF tests it should be noted that the uncertainties in clause F.1 apply to the Test System operating into a nominal 50 ohm load and do not include system effects due to mismatch between the DUT and the Test System.

The downlink signal uncertainties apply at each receiver antenna connector.

## F.1.1 Measurement of test environments

The measurement accuracy of the UE test environments defined in TS 38.508-1 [5] subclause 4.1, Test environments shall be

- Pressure 5 kPa.

- Temperature 2 degrees.

- Relative Humidity 5 %.

- DC Voltage 1,0 %.

- AC Voltage 1,5 %.

- Vibration 10 %.

- Vibration frequency 0,1 Hz.

The above values shall apply unless the test environment is otherwise controlled and the specification for the control of the test environment specifies the uncertainty for the parameter.

## F.1.2 Measurement of transmitter

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

- 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 ≤ 6.0GHz  ±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 ≤ 6.0GHz  ±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 ≤ 6.0GHz  ±1.3 dB, BW ≤ 20MHz  ±1.5 dB, 20MHz < BW ≤ 40MHz  ±1.6 dB, 40MHz < BW ≤ 100MHz |  |
| 6.2.4 Configured transmitted 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 ≤ 6.0GHz  ±1.3 dB, BW ≤ 20MHz  ±1.5 dB, 20MHz < BW ≤ 40MHz  ±1.6 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 6.2.2 for sum of powers of all CCs  Aggregated BW > 100M: TBD | MUCCX is MU of each UL CC specified in single UL case 6.2.3. |
| 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 6.2.2 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.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.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 |
| 6.2F.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 | FFS |  |
| 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.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.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 |  |
| 6.2I.1 UE maximum output power for RedCap | Same as 6.2.1 for BW ≤ 20MHz |  |
| 6.2J.1 UE maximum output power for ATG | FFS | FFS |
| 6.2J.2 Configured transmitted power for ATG | FFS | FFS |
| 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 ≤ 6.0GHz  ±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 |  |
| 6.3.3.2 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 |  |
| 6.3.3.4 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 |  |
| 6.3.3.6 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 |  |
| 6.3.4.2 Absolute power tolerance | 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 ≤ 6.0GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 40MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz | Test System uncertainty = SQRT (UL Meas Uncer2 + DL Meas Uncer2) |
| 6.3.4.3 Relative power tolerance | ±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. |  |
| 6.3F.4.3 Relative power tolerance for shared spectrum channel access | Same as 6.3.4.3 |  |
| 6.3.4.4 Aggregate power tolerance | ±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.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. |  |
| 6.3D.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.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.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.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 |
| 6.3F.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 ≤ 7.125GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz |  |
| 6.3F.3.2 General ON/OFF time mask for shared spectrum channel access | 4.2GHz < f ≤ 5.925GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 80MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz  5.925GHz < f ≤ 7.125GHz  TBD |  |
| 6.3F.4.2 Absolute power tolerance for shared spectrum access | 4.2GHz < f ≤ 7.125GHz  ±2.0 dB, BW ≤ 20MHz  ±2.1 dB, 20MHz < BW ≤ 40MHz  ±2.2 dB, 80MHz < BW ≤ 100MHz | Test System uncertainty = SQRT (UL Meas Uncer2 + DL Meas Uncer2) |
| 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.2 Transmit OFF power for Tx Diversity | Same as 6.3.2 for each antenna |  |
| 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.3.2 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 | FFS |  |
| 6.3J.2 Transmit OFF power for ATG | FFS |  |
| 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 ≤ 6.0GHz |  |
| 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 %  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 | FFS |  |
| 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 ≤ 6.0GHz  ±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 ≤ 6.0GHz  ±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 | ±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.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 |  |
| 6.4F.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 for f ≤ 5.925GHz  TBD for f > 5.925GHz |  |
| 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.2.1 Error Vector Magnitude for Tx Diversity | FFS |  |
| 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 |  |
| 6.5.1 Occupied bandwidth | 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 ≤ 6.0GHz |  |
| 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 ≤ 6.0GHz |  |
| 6.5.2.4.1 NR ACLR | ±0.8 dB, f ≤ 4.0GHz  ±1.0 dB, 4.0GHz < f ≤ 6.0GHz |  |
| 6.5.2.4.2 UTRA ACLR | ±0.8 dB, f ≤ 4.0GHz  ±1.0 dB, 4.0GHz < f ≤ 6.0GHz |  |
| 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 ≤ 6.0GHz  ±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.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 each antenna |  |
| 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.2.4.2 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 each antenna |  |
| 6.5D.3.2 Spurious emissions for UE co-existence for UL MIMO | Same as 6.5.3.2 for each antenna |  |
| 6.5D.3.3 Additional spurious emissions for UL MIMO | Same as 6.5.3.3 for each antenna |  |
| 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.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 |  |
| 6.5F.1 Occupied bandwidth for shared spectrum channel access | Same as 6.5.1 for f ≤ 5.925GHz  TBD for f > 5.925GHz |  |
| 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.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.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.2.2 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.2.3.2 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.3.3 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 |  |
| 6.5H.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 |  |
| 6.5J.1 Occupied bandwidth for ATG | FFS | FFS |
| 6.5J.3.1 General spurious emissions for ATG | FFS |  |
| 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 |  |

## F.1.3 Measurement of receiver

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

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 ≤ 6GHz |  |
| 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 |  |
| 7.3F.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 |  |
| 7.3I.2 Reference sensitivity power level for RedCap | Same as 7.3.2 |  |
| 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 ≤ 6GHz  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 |
| 7.4J Maximum input level for ATG | FFS | FFS |
| 7.5 Adjacent channel selectivity | ACS value  ±1.6 dB, f ≤ 3.0GHz  ±2.3 dB, 3.0GHz < f ≤ 4.2GHz  ±3.0 dB, 4.2GHz < f ≤ 6.0GHz  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. |
| 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 |
| 7.5F.1 Adjacent channel selectivity for shared spectrum channel access | ACS value  ±3.0 dB, 4.2GHz < f ≤ 7.125GHz  Uplink power measurement same as 6.2F.1 | Same as 7.5 |
| 7.5J Adjacent channel selectivity for ATG | FFS | FFS |
| 7.6.2 Inband Blocking | Blocking  ±1.6 dB, f ≤ 3.0GHz  ±2.3 dB, 3.0GHz < f ≤ 4.2GHz  ±3.0 dB, 4.2GHz < f ≤ 6.0GHz  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:  Broadband noise not applicable |
| 7.6.3 Out-of-band blocking | 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 ≤ 6GHz  ±2.6 dB, Blocking, 1MHz < finterferer ≤ 3GHz  ±4.2 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 0.8dB  Figures are combined to give Test System uncertainty, using formula given for 7.6.2 |
| 7.6.4 Narrow band blocking | Blocking  ± 2.0dB, f ≤ 3.0GHz  ± 2.4dB, 3.0GHz < f ≤ 4.2GHz  ± 3.1dB, 4.2GHz < f ≤ 6.0GHz  Uplink power measurement same as 6.2.1 | Narrow band blocking, using CW interferer:  Interferer ACLR not applicable  Impact of interferer Broadband noise 0.8dB  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 |
| 7.6D.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.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.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 |
| 7.6F.2.1 In-band blocking for shared spectrum channel access | Blocking  ±3.0 dB, 4.2GHz < f ≤ 7.125GHz  Uplink power measurement same as 6.2F.1 | Same as 7.6.2 |
| 7.6J.2 In-band blocking for ATG | FFS | FFS |
| 7.6J.3 Out-of-band blocking for ATG | FFS | FFS |
| 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 |
| 7.7F.1 Spurious response for shared spectrum channel access | Same as 7.6.3 | Same as 7.6.3 |
| 7.7J Spurious response for ATG | FFS | FFS |
| 7.8.2 Wide band Intermodulation | Intermodulation  ± 2.3dB, f ≤ 3.0GHz  ± 3.1dB, 3.0GHz < f ≤ 4.2GHz  ± 4.3dB, 4.2GHz < f ≤ 6.0GHz  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 |
| 7.8F.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 | FFS | FFS |
| 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 | FFS |  |

# F.2 Interpretation of measurement results (normative)

The measurement results returned by the Test System are compared – without any modification – against the Test Requirements. The Test Requirement is defined as a threshold considered in a test to assess compliance of the device; it might be either equal (“Shared Risk” principle) or relaxed (“Never fail a good DUT” principle) compared to the corresponding core specification value by an amount defined in Annex F.3 as Test Tolerance.

The “Shared Risk” and the “Never fail a good DUT” principles are defined in Rec. ITU-R M.1545.

The actual measurement uncertainty of the Test System for the measurement of each parameter shall be included in the test report.

The recorded value for the Test System uncertainty shall be, for each measurement, equal to or lower than the appropriate figure in clause F.1 of the present document.

If the Test System for a test is known to have a measurement uncertainty greater than that specified in clause F.1, it is still permitted to use this apparatus provided that an adjustment is made value as follows:

Any additional uncertainty in the Test System over and above that specified in clause F.1 shall be used to tighten the Test Requirement, making the test harder to pass. For some tests, for example receiver tests, this may require modification of stimulus signals. This procedure will ensure that a Test System not compliant with clause F.1does not increase the chance of passing a device under test where that device would otherwise have failed the test if a Test System compliant with clause F.1 had been used.

# F.3 Test Tolerance and Derivation of Test Requirements (informative)

The Test Requirements in the present document have been calculated by relaxing the Minimum Requirements of the core specification using the Test Tolerances defined in this clause. When the Test Tolerance is zero, the Test Requirement will be the same as the Minimum Requirement. When the Test Tolerance is non-zero, the Test Requirements will differ from the Minimum Requirements, and the formula used for the relaxation is given in this clause.

The Test Tolerances are derived from Test System uncertainties, regulatory requirements and criticality to system performance. As a result, the Test Tolerances may sometimes be set to zero.

The test tolerances should not be modified for any reason e.g. to take account of commonly known test system errors (such as mismatch, cable loss, etc.).

The downlink Test Tolerances apply at each receiver antenna connector.

## F.3.1 Measurement of test environments

The UE test environments are set to the values defined in TS 38.508-1 subclause 4.1, without any relaxation. The applied Test Tolerance is therefore zero.

## F.3.2 Measurement of transmitter

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

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 ≤ 6.0GHz  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 ≤ 6.0GHz  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 ≤ 6.0GHz  1.0 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit - TT |
| 6.2.4 Configured transmitted power | f ≤ 3.0GHz  0.7 dB, BW ≤ 40MHz  1.0 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 6.0GHz  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 6.2.2 for sum of powers of all CCs  Aggregated BW > 100M: TBD | TTCCX is TT of each UL CC specified in single UL case 6.2.3. |
| 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.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.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 |
| 6.2F.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 | FFS | FFS |
| 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.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.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 |
| 6.2I.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 | FFS | FFS |
| 6.2J.2 Configured transmitted power for ATG | FFS | FFS |
| 6.3.1 Minimum output power | f ≤ 3.0GHz  1.0 dB, BW ≤ 40MHz  1.3 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 6.0GHz  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 | 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 | 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 | 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 | OFF Power:  Minimum requirement + TT  ON Power:  Upper limit + TT, Lower limit - TT |
| 6.3.4.2 Absolute power tolerance | UL Power ≥ 0dBm  f ≤ 3.0GHz  1.0 dB, BW ≤ 40MHz  1.4 dB, 40MHz < BW ≤ 100MHz  3.0GHz < f ≤ 6.0GHz  1.4 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit – TT |
| 6.3.4.3 Relative power tolerance | 0.7 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 | Same as 6.3.4.3 |
| 6.3.4.4 Aggregate power tolerance | 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.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.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.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.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.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 |
| 6.3F.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 ≤ 7.125GHz  1.8 dB, BW ≤ 100MHz | Minimum requirement + TT |
| 6.3F.3.2 General ON/OFF time mask | 3.0GHz < f ≤ 7.125GHz  1.8 dB, 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 | UL Power ≥ 0dBm  4.2GHz < f ≤ 7.125GHz  1.4 dB, BW ≤ 100MHz | Upper limit + TT, Lower limit – TT |
| 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.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.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.3.2 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 | FFS | FFS |
| 6.3J.2 Transmit OFF power for ATG | FFS | FFS |
| 6.4.1 Frequency Error | 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  0%  For 256QAM  f ≤ 6.0GHz, BW ≤ 100MHz  0.3%, 15dBm < PUL  0.8%, -25dBm < PUL ≤ 15dBm,  1.1%, -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 | FFS | Same as 6.4.2.1 |
| 6.4.2.2 Carrier Leakage | 0.8 dB, BW ≤ 100MHz | Minimum requirement + TT |
| 6.4.2.3 In-band emissions | 0.8 dB, BW ≤ 100MHz | Minimum requirement + TT |
| 6.4.2.4 EVM equalizer spectrum flatness | 1.4 dB, 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.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 |
| 6.4F.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 for f ≤ 5.925GHz  TBD for f > 5.925GHz | 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.2.1 Error Vector Magnitude for Tx Diversity | FFS | FFS |
| 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 |
| 6.5.1 Occupied bandwidth | 0 kHz | Minimum requirement + TT |
| 6.5.2.2 Spectrum Emission Mask | 1.5 dB, f ≤ 3.0GHz  1.8 dB, 3.0GHz < f ≤ 6.0GHz | Minimum requirement + TT |
| 6.5.2.3 Additional spectrum emission mask | 1.5 dB, f ≤ 3.0GHz  1.8 dB, 3.0GHz < f ≤ 6.0GHz | Minimum requirement + TT |
| 6.5.2.4.1 NR ACLR | Absolute requirement  0 dB  Relative requirement  0.8 dB | Absolute requirement  ACLR Minimum Requirement + TT  Relative requirement  ACLR Minimum Requirement - TT |
| 6.5.2.4.2 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 | 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.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.2.3 Additional spectrum emission mask for UL MIMO | Same as 6.5.2.3 for each antenna | Same as 6.5.2.3 |
| 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.2.4.2 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 each antenna | Same as 6.5.3.1 |
| 6.5D.3.2 Spurious emissions for UE co-existence for UL MIMO | Same as 6.5.3.2 for each antenna | Same as 6.5.3.2 |
| 6.5D.3.3 Additional spurious emissions for UL MIMO | Same as 6.5.3.3 for each antenna | Same as 6.5.3.3 |
| 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.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 |
| 6.5F.1 Occupied bandwidth for shared spectrum channel access | Same as 6.5.1 for f ≤ 5.925GHz  TBD for f > 5.925GHz | Same as 6.5.1 for f ≤ 5.925GHz  TBD for f > 5.925GHz |
| 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.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.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.2.2 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.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.4 Transmit intermodulation for Tx Diversity | Same as 6.5.4 for each antenna | Same as 6.5.4 |
| 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 |
| 6.5J.1 Occupied bandwidth for ATG | FFS | FFS |
| 6.5J.3.1 General spurious emissions for ATG | FFS | FFS |
| 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 |

## F.3.3 Measurement of receiver

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

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 ≤ 6.0GHz | Reference sensitivity power level + TT  T-put limit unchanged |
| 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 |
| 7.3F Reference sensitivity for shared spectrum channel access | 1.0 dB, 3.0GHz < f ≤ 7.125GHz | Same as 7.3.2 |
| 7.3I.2 Reference sensitivity power level for RedCap | Same as 7.3.2 | Same as 7.3.2 |
| 7.4 Maximum input level | 0.7 dB, f ≤ 3.0GHz  1.0 dB, 3.0GHz < f ≤ 6.0GHz | 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 |
| 7.4J Maximum input level for ATG | FFS | FFS |
| 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 |
| 7.5F.1 Adjacent channel selectivity for shared spectrum channel access | Same as 7.5 | Same as 7.5 |
| 7.5J Adjacent channel selectivity for ATG | FFS | FFS |
| 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.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.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 |
| 7.6F.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 |
| 7.6J.2 In-band blocking for ATG | FFS | FFS |
| 7.6J.3 Out-of-band blocking for ATG | FFS | FFS |
| 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 |
| 7.7F.1 Spurious response for shared spectrum channel access | Same as 7.7 | Same as 7.7 |
| 7.7J Spurious response for ATG | FFS | FFS |
| 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 |
| 7.8F Intermodulation characteristics for shared spectrum channel access | Same as 7.8.2 | Same as 7.8.2 |
| 7.8J.2 Wide band intermodulation for ATG | FFS | FFS |
| 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 | FFS | FFS |

# F.4 Uplink power window

## F.4.1 Introduction

A number of Tx and Rx Test cases set the UE uplink power to be within a defined window to ensure the test is carried out in the intended conditions. This clause gives the method for calculating the uplink power window used in Tx test cases and Rx Test cases.

## F.4.2 Setting the power window above a requirement

### F.4.2.1 NR FR1

The method used to derive the uplink power window is defined in TS 38.521-3 [14] clause F.4.2.1.

## F.4.3 Setting the power window below a requirement

### F.4.3.1 NR FR1

The method used to derive the uplink power window is defined in TS 38.521-3 [14] clause F.4.3.1.

## F.4.4 Setting the power window centred on a target value

### F.4.4.1 NR FR1

The method used to derive the uplink power window is defined in TS 38.521-3 [14] clause F.4.4.1.

Annex G (normative):  
Uplink Physical Channels

# G.0 Uplink Signal Levels

Uplink signal power is a UE figure, which is configured by the Test System by means of:

RRC messages (IE-s), such as:

- PUSCH-PowerControl

- PUCCH-PowerControl

- RACH-ConfigGeneric

- SRS-Config

and L1/2 Power control commands (TPC).

The uplink power settings are specified in the test case.

Otherwise, the uplink power settings result from the default RRC messages described in TS 38.508 [5], and appropriate TPC-s, which are sent to the UE to transmit with an UL power level necessary for maintaining the call during the test.

# G.1 General

This annex specifies the uplink physical channels that are needed for setting a connection and channels that are needed during a connection. Table G.1-1 describes the mapping of uplink physical channels and signals to physical resources

Table G.1-1: Mapping of uplink physical channels and signals to physical resources

|  |  |  |  |
| --- | --- | --- | --- |
| Physical channel | Time Domain Location | Frequency Domain Location | Note |
| PRACH | Allowed by the parameter prach-ConfigurationIndex provided by higher layers | Allowed by the parameter msg1-FrequencyStart provided by higher layers | Mapping rule is specified in TS 38.211 [8] Section 6.3.3 |
| DMRS | For DMRS on PUCCH format 1: Every other symbols i.e., 0, 2, 4...  For DMRS on PUCCH format 2: All the PUCCH symbols  For DMRS on PUCCH format 3,4: PUCCH length dependent  For One symbol DMRS on PUSCH: Symbol 2,7 and 11 of each slot | DMRS on CP-OFDM PUSCH: Specified by the parameters *dmrs-Type* provided by higher layers.  DMRS on DFT-OFDM PUSCH: Allowed for DMRS configuration type1  DMRS on PUCCH: PUCCH bandwidth dependent. | Mapping rule of DMRS for PUCCH is specified in TS 38.211 [8] Section 6.4.1.3  Mapping rule of DMRS for PUSCH is specified in TS 38.211 [8] Sections 6.4.1.1, 6.4.1.2 |
| PUCCH | For PUCCH Format 0:  1 ~ 2 symbols each slot, specified by the parameters of nrofSymbols and startingSymbolIndex in PUCCH-format0 provided by the higher layer.  For PUCCH Format 1:  4 ~ 14 symbols each slot, specified by the parameters of nrofSymbols and those of startingSymbolIndex of PUCCH-format1 provided by the higher layer.  For PUCCH Format 2,  1 ~ 2 symbols each slot, specified by the parameters of nrofSymbols and startingSymbolIndex in PUCCH-format2 provided by the higher layer.  For PUCCH Format 3:  4 ~ 14 symbols each slot, allowed by the parameters of nrofSymbols and startingSymbolIndex in PUCCH-format3, provided by the higher layer.  For PUCCH Format 4:  4 ~ 14 symbols each slot, specified by the parameters of nrofSymbols and startingSymbolIndex in PUCCH-format4, provided by higher layer. | For PUCCH Format 0, 1  1 RB, the position specified by the parameters of startingPRB and intraSlotFrequencyHopping in the corresponding PUCCH-Resource provided by the higher layer.  For PUCCH Format 2, 3:  1~16 RBs, specified by the parameter of nrofPRBs in PUCCH-format2 and PUCCH-format3 respectively; additionally the position specified by the parameters of startingPRB and intraSlotFrequencyHopping in the corresponding PUCCH-Resource provided by the higher layer.  For PUCCH Format 4  1 RB, the position specified by the parameters of startingPRB and intraSlotFrequencyHopping in the corresponding PUCCH-Resource provided by the higher layer | Mapping rule is specified in TS 38.211 [8] Section 6.3.2 and 38.213 [9] Section 9.2 |
| PUSCH | All remaining uplink symbols of each slot not allocated to DMRS | RBs allocated according to Reference Measurement channel in Annex A.2 | Mapping rule is specified in TS 38.211 [8] Section 6.3 and 38.214 [12] Section 6.1 |
| SRS | 1, 2, or 4 symbols among the last 6 symbols in each SRS transmission slot specified by the parameters of resourceMapping, and resourceType in SRS-Config provided by the higher layer. | RBs specified by the ue-specific parameters of freqDomainPosition, freqDomainShift and freqHopping in SRS-Config provided by the higher layer. | Mapping rule is specified in TS 38.211 [8] Section 6.4.1.4.3 |

# G.2 Set-up

Table G.2-1 describes the uplink physical channels that are required for connection set up.

Table G.2-1: Uplink Physical Channels required for connection set-up

|  |
| --- |
| Physical Channel |
| PRACH |
| PUCCH |
| PUSCH |
| PUCCH DMRS |
| PUSCH DMRS |
| SRS |

In case of supplementary test, Table G.2-2 describes the supplementary uplink physical channels that are required for connection set-up, and unless stated otherwise, there is no other uplink physical channels configured on the NON-SUL carrier except PRACH.

Table G.2-2: Supplementary Uplink Physical Channels required for connection set-up

|  |
| --- |
| Physical Channel |
| PRACH |
| DMRS |
| PUCCH |
| PUSCH |

# G.3 Connection

The following clauses describes the uplink physical channels that are transmitted during a connection i.e., when measurements are done.

## G.3.0 Measurement of Transmitter Characteristics

As specified in the test case. Otherwise:

- PUSCH + DMRS for PUSCH (and DMRS) measurements.

- PUCCH + DMRS for PUCCH (and DMRS) measurements.

- PRACH for PRACH measurements.

SRS for SRS measurements.

## G.3.1 Measurement of Receiver Characteristics

As specified in the test case. Otherwise:

- PUSCH + DMRS for measurements with uplink interference configured.

- PUCCH + DMRS for measurements without uplink interference configured.

## G.3.2 Measurement of Performance Requirements

As specified in the test case. Otherwise:

PUCCH + DMRS for measurements without CSI feedback, or with CSI feedback in PUCCH mode.

PUSCH + DMRS for measurements with CSI feedback in PUSCH mode.

Annex H (normative):  
Statistical Testing

# H.1 General

This annex specifies mapping throughput to error ratio, pass fail limits and pass fail decision rules that are needed for measuring average throughput for a duration sufficient to achieve statistical significance for testing receiver characteristics.

# H.2 Statistical testing of receiver characteristics

## H.2.1 General

The test of receiver characteristics is twofold.

1. A signal or a combination of signals is offered to the RX port(s) of the receiver.

2. The ability of the receiver to demodulate /decode this signal is verified by measuring the throughput.

In (2) is the statistical aspect of the test and is treated here.

The minimum requirement for all receiver tests is >95% of the maximum throughput.

All receiver tests are performed in static propagation conditions. No fading conditions are applied.

## H.2.2 Mapping throughput to error ratio

a) The measured information bit throughput R is defined as the sum (in kilobits) of the information bit payloads successfully received during the test interval, divided by the duration of the test interval (in seconds).

b) In measurement practice the UE indicates successfully received information bit payload by signalling an ACK to the SS.  
If payload is received, but damaged and cannot be decoded, the UE signals a NACK.

c) Only the ACK and NACK signals, not the data bits received, are accessible to the SS.  
The number of bits is known in the SS from knowledge of what payload was sent.

d) For the reference measurement channel, applied for testing, the number of bits is different in different slots, however in a radio frame it is fixed during one test.

e) The time in the measurement interval is composed of successfully received slots (ACK), unsuccessfully received slots (NACK) and no reception at all (DTX-slots).

f) DTX-slots may occur regularly according the applicable reference measurement channel (regDTX).  
In real live networks this is the time when other UEs are served. In TDD these are the UL and special slots.  
regDTX vary from test to test but are fixed within the test.

g) Additional DTX-slots occur statistically when the UE is not responding ACK or NACK where it should. (statDTX)  
This may happen when the UE was not expecting data or decided that the data were not intended for it.

The pass / fail decision is done by observing the:

- number of NACKs

- number of ACKs and

- number of statDTXs (regDTX is implicitly known to the SS)

The ratio (NACK + statDTX)/(NACK+ statDTX + ACK)is the Error Ratio (ER). Taking into account the time consumed by the ACK, NACK, and DTX-TTIs (regular and statistical), ER can be mapped unambiguously to throughput for any single reference measurement channel test.

## H.2.3 Design of the test

The test is defined by the following design principles (see clause H.2.6, Theory….):

1. The early decision concept is applied.

2. A second limit is introduced: Bad DUT factor M>1

3. To decide the test pass:

Supplier risk is applied based on the Bad DUT quality

To decide the test fail

Customer Risk is applied based on the specified DUT quality

The test is defined by the following parameters:

1. Limit ER = 0.05 (Throughput limit = 95%)

2. Bad DUT factor M=1.5 (selectivity)

3. Confidence level CL = 95% (for specified DUT and Bad DUT-quality)

## H.2.4 Numerical definition of the pass fail limits

Table H.2.4-1: pass fail limits

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ne | nsp | nsf | ne | nsp | nsf | ne | nsp | nsf | ne | nsp | nsf |
| 0 | 67 | NA | 37 | 715 | 477 | 74 | 1290 | 1093 | 111 | 1847 | 1739 |
| 1 | 67 | NA | 38 | 731 | 493 | 75 | 1306 | 1110 | 112 | 1862 | 1756 |
| 2 | 95 | NA | 39 | 747 | 509 | 76 | 1321 | 1128 | 113 | 1877 | 1774 |
| 3 | 119 | NA | 40 | 763 | 525 | 77 | 1336 | 1145 | 114 | 1891 | 1792 |
| 4 | 141 | NA | 41 | 779 | 541 | 78 | 1351 | 1162 | 115 | 1906 | 1809 |
| 5 | 162 | NA | 42 | 795 | 557 | 79 | 1366 | 1179 | 116 | 1921 | 1827 |
| 6 | 183 | NA | 43 | 810 | 573 | 80 | 1382 | 1197 | 117 | 1936 | 1845 |
| 7 | 203 | NA | 44 | 826 | 590 | 81 | 1397 | 1214 | 118 | 1951 | 1863 |
| 8 | 222 | NA | 45 | 842 | 606 | 82 | 1412 | 1231 | 119 | 1966 | 1880 |
| 9 | 241 | 67 | 46 | 858 | 622 | 83 | 1427 | 1248 | 120 | 1981 | 1898 |
| 10 | 259 | 80 | 47 | 873 | 639 | 84 | 1442 | 1266 | 121 | 1995 | 1916 |
| 11 | 278 | 92 | 48 | 889 | 655 | 85 | 1457 | 1283 | 122 | 2010 | 1934 |
| 12 | 296 | 105 | 49 | 905 | 672 | 86 | 1472 | 1300 | 123 | 2025 | 1951 |
| 13 | 314 | 118 | 50 | 920 | 688 | 87 | 1487 | 1318 | 124 | 2040 | 1969 |
| 14 | 332 | 131 | 51 | 936 | 705 | 88 | 1503 | 1335 | 125 | 2055 | 1987 |
| 15 | 349 | 145 | 52 | 952 | 721 | 89 | 1518 | 1353 | 126 | 2069 | 2005 |
| 16 | 367 | 159 | 53 | 967 | 738 | 90 | 1533 | 1370 | 127 | 2084 | 2023 |
| 17 | 384 | 173 | 54 | 983 | 755 | 91 | 1548 | 1387 | 128 | 2099 | 2041 |
| 18 | 401 | 187 | 55 | 998 | 771 | 92 | 1563 | 1405 | 129 | 2114 | 2058 |
| 19 | 419 | 201 | 56 | 1014 | 788 | 93 | 1578 | 1422 | 130 | 2128 | 2076 |
| 20 | 436 | 216 | 57 | 1029 | 805 | 94 | 1593 | 1440 | 131 | 2143 | 2094 |
| 21 | 453 | 230 | 58 | 1045 | 822 | 95 | 1608 | 1457 | 132 | 2158 | 2112 |
| 22 | 469 | 245 | 59 | 1060 | 838 | 96 | 1623 | 1475 | 133 | 2173 | 2130 |
| 23 | 486 | 260 | 60 | 1076 | 855 | 97 | 1638 | 1492 | 134 | 2187 | 2148 |
| 24 | 503 | 275 | 61 | 1091 | 872 | 98 | 1653 | 1510 | 135 | 2202 | 2166 |
| 25 | 520 | 290 | 62 | 1107 | 889 | 99 | 1668 | 1527 | 136 | 2217 | 2183 |
| 26 | 536 | 305 | 63 | 1122 | 906 | 100 | 1683 | 1545 | 137 | 2232 | 2201 |
| 27 | 553 | 320 | 64 | 1137 | 923 | 101 | 1698 | 1562 | 138 | 2246 | 2219 |
| 28 | 569 | 335 | 65 | 1153 | 940 | 102 | 1713 | 1580 | 139 | 2261 | 2237 |
| 29 | 585 | 351 | 66 | 1168 | 957 | 103 | 1728 | 1598 | 140 | 2276 | 2255 |
| 30 | 602 | 366 | 67 | 1184 | 974 | 104 | 1742 | 1615 | 141 | 2291 | 2273 |
| 31 | 618 | 382 | 68 | 1199 | 991 | 105 | 1757 | 1633 | 142 | 2305 | 2291 |
| 32 | 634 | 398 | 69 | 1214 | 1008 | 106 | 1772 | 1650 | 143 | 2320 | 2309 |
| 33 | 651 | 413 | 70 | 1229 | 1025 | 107 | 1787 | 1668 | 144 | 2335 | 2327 |
| 34 | 667 | 429 | 71 | 1245 | 1042 | 108 | 1802 | 1686 | 145 | 2349 | 2345 |
| 35 | 683 | 445 | 72 | 1260 | 1059 | 109 | 1817 | 1703 | 146 | 2364 | 2363 |
| 36 | 699 | 461 | 73 | 1275 | 1076 | 110 | 1832 | 1721 | \*) note 2 in H.2.5 | | |

NOTE 1: The first column is the number of errors (ne = number of NACK + statDTX)

NOTE 2: The second column is the number of samples for the pass limit (nsp, ns=Number of Samples= number of NACK + statDTX + ACK)

NOTE 3: The third column is the number of samples for the fail limit (nsf)

NOTE 4: The UE could be decided as early pass/fail when at least 67 samples are receieved. The nsf is set to NA for ne less than 9.

## H.2.5 Pass fail decision rules

The pass fail decision rules apply for a single measurement. A test case is passed only when all the measurements in the test case are passed.

Having observed 0 errors, pass the test at 67+ samples, otherwise continue

Having observed 1 error, pass the test at 95+ otherwise continue

Having observed 2 errors, pass the test at 119+ samples, otherwise continue

Etc. etc.

Having observed 14645 errors, pass the test at 23642349+ samples, fail the test at 2345- samples, otherwise continue

Having observed 152 errors, pass the test at + samples, fail the test at 2363- samples.

Where x+ means: x or more, x- means x or less

NOTE 1: an ideal DUT passes after 67 samples. The maximum test time is 2364 samples.

NOTE 2: It is allowed to deviate from the early decision concept by postponing the decision (pass/fail or continue). Postponing the decision to or beyond the end of Table H.2.4-1 requires a pass fail decision against the test limit: pass the DUT for ER<0.0618, otherwise fail.

## H.2.6 Theory to derive the pass fail limits (Informative)

Editor's note: This clause of the Annex H is for information only and it describes the background theory and information for statistical testing.

### H.2.6.1 Numerical definition of the pass-fail limits

A statistical test is characterized by test time, selectivity and confidence level. The outcome of the statistical test is a decision. This decision may be correct, i.e., DUTs whose throughput is less than 95% maximum throughput being declared to fail, and DUTs whose throughput is higher or equal to 95% being declared to pass, or in-correct with opposite decision. The Confidence Level (CL) describes the probability that the decision is a correct one. The complement is the wrong decision probability (risk) D = 1-CL.

As described in H.2.2, the measurement of throughput could be mapped to ER (Error Ratio). When testing ER, transport blocks or "samples" are observed and the number of correctly and erroneously received blocks are recorded. For a "standard" test, a pre-defined number of samples are observed, and a pass/fail decision is made based on the number of observed errors being above/below a threshold. This threshold is based on the targeted throughput or BLER and the design target CL. There is always some risk of a statistical variation leading to an incorrect pass/fail decision. The greater the number of samples that are recorded, the lower is the risk of such an error. The number of samples that are observed in a standard test is dimensioned to achieve an acceptable low risk of error (i.e., an acceptable high confidence level) for DUTs that just meet the specified limit.

The standard test works well where the target ER level is relatively high and confidence level relatively low (both are chosen to be on a comparable order of magnitude). However, for relatively low ER testing the length of time required for observing sufficient samples to achieve a 95% confidence level is excessive. In many cases, the DUTs will in fact have a much lower true ER level than the target ER level, (in which case, the number of samples needed to achieve high confidence that the true ER level is lower than the limit is much smaller). On the other hand, a bad DUT which is expected to fail the requirement might have a much higher true ER level (in which case, errors occur more frequently and it can be demonstrated that the DUT is above the target ER limit with fewer samples).

To avoid long test time, an alternative test method called early pass/fail is adopted. With the early pass/fail, each time a block error is encountered, a decision is made on whether the DUT can be passed/failed with 95% CL or the test needs to continue until another error is encountered. In the case of very good DUTs, the test can also be passed, when the number of samples permissible for one error event is reached and no error event is recorded. Pass/Fail is decided based on the total number of observed samples and errors, and a statistical calculation based on an inverse binomial cumulative distribution. The calculation involves one parameter, one variable and the result:

- Parameter: d (per step decision probability).

- Variable: ne (number of observed errors).

- Result: ns (number of expected samples for pass/fail, depending on which one is calculated).

The per step decision probability risk, d, expresses the probability of making an incorrect pass/fail decision in the current step (i.e., for the current decision coordinate). d is determined by simulation such that the overall risk of making a wrong decision over all steps of each test of a large number of tests on a large number of DUTs that exactly meet the target ER limit is D=5% (and hence the CL 95%).

It should be noted that d is determined separately considering early pass and early fail testing.

For a marginal DUT (i.e., a DUT almost exactly meeting the target ER level), the unmodified early pass/early fail approach is unable to distinguish whether the DUT has just passed or just failed the BLER (ε→0), and can thus terminate with an "undecided" result. To avoid this undecided result and provide selectivity, a so-called "bad device factor" (M) is introduced into the early pass calculation. This factor biases the decision towards avoiding failing good DUT.

### H.2.6.2 Simulation to derive the pass-fail limits for testing 95% throughput

As per the description in H.2.2, the 95% throughput measurement is mapped to ER=0.05, where ER is (NACK + statDTX)/(NACK+ statDTX + ACK).

The binomial distribution and its inverse are used to design the pass and fail limits. Note that this method is not unique and that other methods exist.



Where

- fail(..) is the error ratio for the fail limit.

- pass(..) is the error ratio for the pass limit.

- ER is the specified error ratio 5%.

- ne is the number of bad results. This is the variable in both equations.

- M is the Bad DUT factor M=1.5.

- df is the wrong decision probability of a single (ne, ns) co-ordinate for the fail limit.  
It is found by simulation to be df = 0.006.

- clp is the confidence level of a single (ne, ns) co-ordinate for the pass limit.  
It is found by simulation to be clp = 0.9945.

- qnbinom(..): The inverse cumulative function of the negative binomial distribution.

The simulation works as follows:

- A large population of limit DUTs with true ER = 0.05 is decided against the pass and fail limits.

- clp and df are tuned such that CL (95 %) of the population passes and D (5 %) of the population fails.

- A population of Bad DUTs with true ER = M\*0.05 is decided against the same pass and fail limits.

- clp and df are tuned such that CL (95 %) of the population fails and D (5 %) of the population passes.

- The number of DUTs decrease during the simulation, as the decided DUTs leave the population. That number decreases with an approximately exponential characteristics. After 146 bad results all DUTs of the population are decided.

NOTE: The exponential decrease of the population is an optimal design goal for the decision co-ordinates (ne, ns), which can be achieved with other formulas or methods as well.

# H.2A Statistical testing of receiver characteristics with CA

## H.2A.1 General

H.2.1 applies.

## H.2A.2 Mapping throughput to error ratio

H.2.2 applies for each component carrier.

## H.2A.3 Design of the test

The test is defined by the following design principles (see clause H.2.6, Theory….):

1. The standard concept is applied. (not the early decision concept).

2. A second limit is introduced, defining the Bad DUT.

3. To decide the test pass:

- Supplier risk is applied based on the Bad DUT quality.

- To decide the test fail.

- Customer Risk is applied based on the specified DUT quality.

The test is defined by the following parameters:

1) Limit Error Ratio = 0.05 (95% throughput is tested).

2) Bad DUT factor M=1.5 (selectivity).

3) Confidence level CL = 95% (for specified DUT and Bad DUT-quality).

## H.2A.4 Pass fail decision rules

Apply 1003 samples to the DUT per CC.

Decide pass per CC in case of ≤ 62 errors, otherwise fail.

NOTE 1: The pass fail decision is done individually for each CC. The pass fail decision for one measurement is as follows: pass if all CCs or SCC only according to the test cases pass, otherwise fail. A test case is passed only when all the measurements in the test case are passed.

NOTE 2: It is allowed to apply more samples to the DUT, common for all CCs, (e.g. up to an integer number of frames). Use the ratio (62/1003) for the pass fail decision.

NOTE 3: 62/1003 = 0.0618, the same test limit is used at the end of Table H.2.4-1.

# Annex I (normative): ModifiedMPR-Behaviour

# I.1 Indication of modified MPR behaviour

This annex contains the definitions of the bits in the field *modifiedMPR-Behavior* indicated per supported NR band in the IE *RF-Parameters* [6] by a UE supporting an MPR or A-MPR modified in a given version of this specification. A modified MPR or A-MPR behaviour can apply to a supported NR band in stand-alone operation (including CA and NN-DC operation) or in non-standalone operation with the said NR band as part of an EN-DC or NE-DC band combination.

NOTE 1: In the present release, the *modifiedMPR-Behavior* is indicated [6] by an 8-bit bitmap per supported NR band.

Table I.1-1: Definitions of the bits in the field *modifiedMPR-Behavior*

|  |  |  |  |
| --- | --- | --- | --- |
| NR Band | Index of field  (bit number) | Definition  (description of the supported functionality if indicator set to one) | Notes |
| n30 | 0 (leftmost bit) | Requirements for network signalling value NS\_21 as defined in Clause 6.5.2.3.y of 38.101-1 v17.6.0 and A-MPR as defined in Clause 6.2.3.14 of 38.101-1 v17.6.0. | This bit shall be set to 1 by a UE supporting the Rel-17 version of the specification.  If the bit is not set, then requirements for NS\_21 as defined in Clause 6.5.2.3.3 of 38.101-1 v16.11.0 and A-MPR as defined in Clause 6.2.3.14 of 38.101-1 v16.11.0 apply. |
| n34 | 0 (leftmost bit) | PC 1.5 MPR as defined in Table 6.2D.2.3-3 | This bit may be set to 1 by a UE of any release supporting power class 1.5. This bit is intended to be set by larger form factor FWA devices. If the bit is not set for a Rel-17 and later UE, PC 1.5 MPR as defined in Table 6.2D.2.3-2 applies. If the bit is not set for a Rel-16 and earlier UE, MPR in Table 6.2.2-4 of 38.101-1 v16.5.0 applies. |
| n39 | 0 (leftmost bit) | PC 1.5 MPR as defined in Table 6.2D.2.3-3 | This bit may be set to 1 by a UE of any release supporting power class 1.5. This bit is intended to be set by larger form factor FWA devices. If the bit is not set for a Rel-17 and later UE, PC 1.5 MPR as defined in Table 6.2D.2.3-2 applies. If the bit is not set for a Rel-16 and earlier UE, MPR in Table 6.2.2-4 of 38.101-1 v16.5.0 applies. |
| n40 | 0 (leftmost bit) | PC 1.5 MPR as defined in Table 6.2D.2.3-3 | This bit may be set to 1 by a UE of any release supporting power class 1.5. This bit is intended to be set by larger form factor FWA devices. If the bit is not set for a Rel-17 and later UE, PC 1.5 MPR as defined in Table 6.2D.2.3-2 applies. If the bit is not set for a Rel-16 and earlier UE, MPR in Table 6.2.2-4 of 38.101-1 v16.5.0 applies. |
| n41 | 0 (leftmost bit) | EN-DC contiguous intraband MPR as defined in clause 6.2B.2.1 of 38.101-3 v15.5.0 | - This bit shall be set to 1 by a UE supporting DC\_(n)41AA UE EN-DC |
|  | 1 | EN-DC non-contiguous intraband MPR as defined in clause 6.2B.2.2 of 38.101-3 v15.5.0 | - This bit shall be set to 1 by a UE supporting DC\_41A\_n41A EN-DC |
|  | 2 | EN-DC contiguous and non-contiguous intraband MPR and A-MPR as defined in 38.101-3 v16.4.0. If this bit is not set the UE uses Rel-15 MPR or A-MPR for EN-DC contiguous and non-contiguous intraband MPR and A-MPR | -This bit may be set to 1 by a UE supporting DC\_(n)41AA or DC\_41A\_n41A EN-DC |
|  | 3 | PC 1.5 MPR as defined in Table 6.2D.2.3-3 | This bit may be set to 1 by a UE of any release supporting power class 1.5. This bit is intended to be set by larger form factor FWA devices. If the bit is not set for a Rel-17 and later UE, PC 1.5 MPR as defined in Table 6.2D.2.3-2 applies. If the bit is not set for a Rel-16 and earlier UE, MPR in Table 6.2.2-4 of 38.101-1 v16.5.0 applies. |
| n71 | 0 (leftmost bit) | EN-DC contiguous intraband MPR as defined in clause 6.2B.2.1 of 38.101-3 v15.5.0 | - This bit shall be set to 1 by a UE supporting DC\_(n)71AA UE EN-DC |
| n77 | 0 (leftmost bit) | PC 1.5 MPR as defined in Table 6.2D.2.3-3 | This bit may be set to 1 by a UE of any release supporting power class 1.5. This bit is intended to be set by larger form factor FWA devices. If the bit is not set for a Rel-17 and later UE, PC 1.5 MPR as defined in Table 6.2D.2-2.3-2 applies. If the bit is not set for a Rel-16 and earlier UE, MPR in Table 6.2.2-4 of 38.101-1 v16.5.0 applies. |
| n78 | 0 (leftmost bit) | PC 1.5 MPR as defined in Table 6.2D.2.3-3 | This bit may be set to 1 by a UE of any release supporting power class 1.5. This bit is intended to be set by larger form factor FWA devices. If the bit is not set for a Rel-17 and later UE, PC 1.5 MPR as defined in Table 6.2D.2.3-2. If the bit is not set for a Rel-16 and earlier UE, MPR in Table 6.2.2-4 of 38.101-1 v16.5.0 applies. |
| n79 | 0 (leftmost bit) | PC 1.5 MPR as defined in Table 6.2D.2.3-3 | This bit may be set to 1 by a UE of any release supporting power class 1.5. This bit is intended to be set by larger form factor FWA devices. If the bit is not set for a Rel-17 and later UE, PC 1.5 MPR as defined in Table 6.2D.2.3-2 applies. If the bit is not set for a Rel-16 and earlier UE, MPR in Table 6.2.2-4 of 38.101-1 v16.5.0 applies. |

Annex J (normative):

Difference of relative phase and power errors

# J.0 General

This annex gives further information needed for understanding and implementing 6.4D.4. The following terms should be understood as follows:

- Relative phase error: refers to the phase difference between signals at different antenna connectors, which should be ideally 0. It should be understood as for a slot i.e. (slot) relative phase. It is calculated based on DMRS symbols of that slot or on SRS symbols.

- Difference of relative phase error: refers to the difference between the relative phase error determined per slot and the relative phase error determined based on the SRS transmitted.

# J.1 Measurement Point

Figure J.1-1 shows the measurement point for the difference of relative phase and power errors.

Figure J.1-1 - Measurement point for difference of relative phase/power error for UL coherent MIMO

# J.2 Relative Phase Error Measurement

Here are listed the different aspects that may lead to different interpretations.

## J.2.1 Symbols and subcarriers used

Phase error is determined based on DMRS REs (DMRS mapping type A with 3 DMRS symbols per slot, the REs corresponding to the odd subcarriers and DMRS symbols are non-allocated for data or DMRS.) and SRS REs (with 4 SRS symbols in the SRS slot, same SRS resource mapping is used for non-codebook-based and codebook-based precoding).

For the DMRS and SRS to occupy identical SCs and maximize their frequency density, DMRS configuration type 1 and SRS comb2 configuration are used.

UL RMC described in Annex A.2 is used.

## J.2.2 CFO (carrier frequency offset) correction

The TE performs a CFO correction on a slot-by-slot basis using a common frequency correction at the two uplink antenna connectors.

## J.2.3 Steps of the measurement method

Below are detailed the steps necessary to obtain the maximum difference of relative phase error during the 20ms time window.

1. Determination for each subcarrier and at each antenna, the SRS relative phase error based on the last SRS transmitted on Ant1 and Ant2, that relative phase error serves as a reference for the calculation of the difference of relative phase error for each slot inside the 20 ms time window.

- The output is the “SRS relative phase error” vector for the last SRS transmitted: .

2. Calculation for the last SRS transmitted, for each RB of the SRS relative phase errors based on the arithmetic mean of the subcarrier SRS relative phase errors determined in previous step.

- The output is the “SRS relative phase error” vector for the last SRS transmitted: .

3. CFO correction on slot-by-slot basis using a common frequency correction for both antenna outputs.

4. Determination for each subcarrier and at each antenna, the phase over the slot being analyzed. The phase is extracted from the channel estimate derived from the 3 DMRS symbols of the slot using the LSE technique.

- The output is one vector of dimension for each antenna.

5. Calculation for a slot for each subcarrier of the relative phase error (difference between the vectors determined in the previous step).

- The output is subcarrier relative phase errors of a slot: .

6. Calculation for a slot, for each RB of the relative phase errors based on the arithmetic mean of the subcarrier relative phase errors determined in previous step.

- The output is a “slot relative phase error” vector for a slot:.

7. Calculation for a slot of the difference of relative phase errors based on the “SRS relative phase error” (reference) determined in step 2 and the “slot relative phase error” determined in previous step.

- The output is a “difference of relative phase error” vector for a slot:.

8. Calculation for a slot of the arithmetic mean value of the “difference of relative phase error” vector determined in previous step; this value corresponds to an RB.

- The output is a “difference of relative phase error” value for a slot:

9. Perform for each slot of the 20ms time window, steps 3 to 8.

- The output is a “difference of relative phase error” vector: .

10. Calculation of the maximum value of the “difference of relative phase error”.

- The output is the “difference of relative phase error” that should be verified as complying with the 40° maximum allowable difference of relative phase error requirement: .

Annex K (informative): Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Change history | | | | | | | |
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2017-08 | RAN5#76 | R5-175705 | - | - | - | Draft skeleton | 0.0.1 |
| 2018-01 | RAN5#1-5G-NR Adhoc | R5-180068  R5-180069  R5-180070  R5-180071  R5-180072  R5-180073  R5-180075  R5-180076  R5-180077  R5-180078  R5-180079 | - | - | - | Implementation of pCRs to TS 38.521-1 V0.1.0 | 0.1.0 |
| 2018-01 | RAN5#78 | R5-181506  R5-181507  R5-181670  R5-181671  R5-181672  R5-181676  R5-181677  R5-181678  R5-181679 R5-181685  R5-181686  R5-181698  R5-181699  R5-181700 | - | - | - | Implementation of pCRs to TS 38.521-1 V0.2.0 | 0.2.0 |
| 2018-03 | RAN5#2-5G-NR Adhoc | R5-181759 | - | - | - | Update TS 38.521-1 to align with new structure of TS 38.101-1 based on endorsed CR R4-1802403 | 0.3.0 |
| 2018-04 | RAN5#2-5G-NR Adhoc | R5-81976 | - | - | - | 3GU mismatch | 0.3.1 |
| 2018-04 | RAN5#2-5G-NR Adhoc | R5-181771  R5-181833  R5-181842  R5-182000  R5-182002  R5-182003  R5-182004  R5-182005  R5-182020  R5-182021  R5-182026 | - | - | - | Implementation of pCRs to TS 38.521-1 V0.4.0  Add clause 4.4 Test point analysis | 0.4.0 |
| 2018-07 | RAN5#79 | R5-182768  R5-182973  R5-183702  R5-183703  R5-183704  R5-183705  R5-183906  R5-183936  R5-183280  R5-183923  R5-183953  R5-183954  R5-183955  R5-183956  R5-183957  R5-183958  R5-183959  R5-183960 | - | - | - | Implementation of pCRs to TS 38.521-1 V0.5.0 | 0.5.0 |
| 2018-07 | RAN5#79 | R5-183960  R5-183279 | - | - | - | Corrected Table numbering issues in subclause 6.5.2.4.1.4.2 Test procedure to capture R5-183960 changes into draft TS 38.521-1 v0.5.1 | 0.5.1 |
| 2018-07 | RAN5#79 | R5-182363 | - | - | - | withdrawn | 1.0.0 |
| 2018-08 | RAN5#80 | R5-185321R5-184298R5-185305R5-185322R5-185323R5-185495R5-185444R5-185565R5-185445R5-185524  R5-184572R5-185390  R5-184574R5-185521  R5-185408R5-184822R5-185446R5-185324R5-185447R5-185411R5-185413R5-185496R5-185414R5-185415R5-185325R5-185500R5-185501R5-185312  R5-185326  R5-185315  R5-185317  R5-185327  R5-185320 | - | - | - | Implementation of pCRs to TS 38.521-1 V1.0.1 | 1.0.1 |
| 2018-09 | RAN#81 | - | - | - | - | raised to v15.0.0 with editorial changes only | 15.0.0 |
| 2018-12 | RAN#82 | R5-186604 | 0072 | - | F | 5G\_FR1 Text update for 7.3 Reference sensitivity | 15.1.0 |
| 2018-12 | RAN#82 | R5-186605 | 0073 | - | F | 5R\_FR1 Text Update for 6.5.3.1\_General spurious emissions | 15.1.0 |
| 2018-12 | RAN#82 | R5-186606 | 0074 | - | F | 5R FR1 Text Update for 6.5.3.2 Spurious emission for UE co-existence | 15.1.0 |
| 2018-12 | RAN#82 | R5-186670 | 0078 | - | F | Updating test case 6.2.3 UE additional maximum output power reduction | 15.1.0 |
| 2018-12 | RAN#82 | R5-186671 | 0079 | - | F | Updating test case 6.5.2.3 Additional spectrum emission mask | 15.1.0 |
| 2018-12 | RAN#82 | R5-186680 | 0080 | - | F | Update of test case 6.5.2.4.2, UTRA ACLR in 38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-186736 | 0084 | - | F | Update of FR1 Transmit OFF power | 15.1.0 |
| 2018-12 | RAN#82 | R5-186774 | 0088 | - | F | Addition of 6.3D.1 Minimum output power for UL-MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-186776 | 0089 | - | F | Addition of 6.3D.2 Transmit OFF power for UL-MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-186781 | 0090 | - | F | Addition of 6.3D.3 Transmit ON/OFF time mask for UL-MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-186901 | 0091 | - | F | Update SEM requirements to TS 38.101-1 v15.3.0 | 15.1.0 |
| 2018-12 | RAN#82 | R5-186902 | 0092 | - | F | Update ACS and inband blocking test cases in TS 38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187034 | 0107 | - | F | Adding edge allocation into common uplink configuration in 6.1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187038 | 0109 | - | F | Update test points for multiple FR1 test cases | 15.1.0 |
| 2018-12 | RAN#82 | R5-187149 | 0111 | - | F | Updated to Annexes for FR1 tests | 15.1.0 |
| 2018-12 | RAN#82 | R5-187150 | 0112 | - | F | General clauses updated for TS38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187376 | 0120 | - | F | Update of 6.2.1 MOP | 15.1.0 |
| 2018-12 | RAN#82 | R5-187378 | 0122 | - | F | Update of 6.3.1 Minimum Output Power | 15.1.0 |
| 2018-12 | RAN#82 | R5-187379 | 0123 | - | F | Update of 6.3.3.2 General ON/OFF time mask | 15.1.0 |
| 2018-12 | RAN#82 | R5-187380 | 0124 | - | F | Addition of 6.2D.1 MOP for MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187381 | 0125 | - | F | Addition of 6.2D.2 MPR for MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187382 | 0126 | - | F | Addition of 6.2D.4 Configured Output Power for MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187383 | 0127 | - | F | Addition of 6.4D.1 Frequency error for MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187384 | 0128 | - | F | Addition of 6.4D.2.1 EVM for MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187385 | 0129 | - | F | Addition of 6.4D.2.2 Carrier Leakage for MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187386 | 0130 | - | F | Addition of 6.4D.2.3 In-band emissions for MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187387 | 0131 | - | F | Addition of 6.4D.2.4 EVM equalizer spectrum flatness for MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187395 | 0132 | - | F | Update of test case 6.2.3 UE A-MPR, general | 15.1.0 |
| 2018-12 | RAN#82 | R5-187397 | 0133 | - | F | Update of test case 6.2.3 UE A-MPR, NS\_04 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187399 | 0134 | - | F | Update of test case test case 6.5.2.3 Additional spectrum emission mask, NS\_04 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187421 | 0136 | - | F | Introduction of TC 6.5D.1 Occupied bandwidth for UL MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187422 | 0137 | - | F | Introduction of TC 6.5D.2.2 Spectrum Emission Mask for UL MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187423 | 0138 | - | F | Introduction of TC 6.5D.2.3 Additional Spectrum Emission Mask for UL MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187424 | 0139 | - | F | Introduction of TC 6.5D.2.4.1 NR ACLR for UL MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187425 | 0140 | - | F | Introduction of TC 6.5D.2.4.2 UTRA ACLR for UL MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187429 | 0144 | - | F | Introduction of TC 6.5D.4 Transmit intermodulation for UL MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187431 | 0146 | - | F | Introduction of TC 7.4D Maximum input level for UL-MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187432 | 0147 | - | F | Updating of 6.2C.1 Configured transmitted power for SUL | 15.1.0 |
| 2018-12 | RAN#82 | R5-187433 | 0148 | - | F | Introduction of TC 6.5C.1 Occupied bandwidth for SUL | 15.1.0 |
| 2018-12 | RAN#82 | R5-187434 | 0149 | - | F | Introduction of TC 6.5C.2.2 Spectrum Emission Mask for SUL | 15.1.0 |
| 2018-12 | RAN#82 | R5-187435 | 0150 | - | F | Introduction of TC 6.5C.2.3 Additional Spectrum Emission Mask for SUL | 15.1.0 |
| 2018-12 | RAN#82 | R5-187436 | 0151 | - | F | Introduction of TC 6.5C.2.4.1 NR ACLR for SUL | 15.1.0 |
| 2018-12 | RAN#82 | R5-187437 | 0152 | - | F | Introduction of TC 6.5C.2.4.2 UTRA ACLR for SUL | 15.1.0 |
| 2018-12 | RAN#82 | R5-187438 | 0153 | - | F | Introduction of TC 6.5C.3.2 General spurious emissions for SUL | 15.1.0 |
| 2018-12 | RAN#82 | R5-187439 | 0154 | - | F | Introduction of TC 6.5C.3.3 Spurious Emission for UE co-existence for SUL | 15.1.0 |
| 2018-12 | RAN#82 | R5-187440 | 0155 | - | F | Introduction of TC 6.5C.3.4 Additional Spurious Emission for SUL | 15.1.0 |
| 2018-12 | RAN#82 | R5-187455 | 0158 | - | F | Updating test case 6.3.4.2 Absolute Power Tolerance | 15.1.0 |
| 2018-12 | RAN#82 | R5-187456 | 0159 | - | F | Updating test case 6.3.4.4 Aggregate Power Tolerance | 15.1.0 |
| 2018-12 | RAN#82 | R5-187560 | 0162 | - | F | Update to Table 5.3.5-1 in TS 38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187585 | 0164 | - | F | Update of transmit signal quality test cases in 38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187615 | 0167 | - | F | Introduction of TC 6.5D.3.1 General spurious emissions for UL MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187616 | 0168 | - | F | Introduction of TC 6.5D.3.2 Spurious Emission for UE co-existence for UL MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187617 | 0169 | - | F | Introduction of TC 6.5D.3.3 Additional Spurious Emission for UL MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187618 | 0170 | - | F | Updating of Uplink channel for SUL in Annex G | 15.1.0 |
| 2018-12 | RAN#82 | R5-187804 | 0069 | 1 | F | Editorial Cleaning up for description of test requirement in clause 6 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187805 | 0063 | 1 | F | Introduction of TC 7.7D Spurious response for UL-MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187807 | 0113 | 1 | F | Introduction of receiver spurious emission tests for FR1 SA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187810 | 0114 | 1 | F | Introduction of wideband intermodulation tests for FR1 SA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187811 | 0145 | 1 | F | Introduction of TC 7.3D Reference sensitivity for UL-MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-187812 | 0085 | 1 | F | Update of operating bands and channel arrangement to TS 38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187888 | 0121 | 1 | F | Update of 6.2.4 Configured Output Power | 15.1.0 |
| 2018-12 | RAN#82 | R5-187890 | 0156 | 1 | F | Introduction of TC 6.5C.4 Transmit intermodulation for SUL | 15.1.0 |
| 2018-12 | RAN#82 | R5-187892 | 0108 | 1 | F | Removing the Editor's notes of SA messages and procedures for all FR1 test cases | 15.1.0 |
| 2018-12 | RAN#82 | R5-187893 | 0083 | 1 | F | Update of FR1 6.2.2 MPR | 15.1.0 |
| 2018-12 | RAN#82 | R5-187894 | 0086 | 1 | F | Addition of Time alignment error for UL-MIMO to TS38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187895 | 0115 | 1 | F | Introduction of New FR1 test case 6.3.3.6 SRS time mask | 15.1.0 |
| 2018-12 | RAN#82 | R5-187896 | 0116 | 1 | F | 5G\_FR1 Text update for 6.5.3.3 Additional Spurious emission | 15.1.0 |
| 2018-12 | RAN#82 | R5-187897 | 0161 | 1 | F | Update of test case 6.3.4.3, Power Control Relative power tolerance in 38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187898 | 0165 | 1 | F | Addition of EVM equalizer spectral flatness test case 6.4.2.5 to TS 38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187899 | 0099 | 1 | F | Introduction of test case for Frequency error for CA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187900 | 0100 | 1 | F | Introduction of test cases for Transmit modulation quality for CA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187901 | 0101 | 1 | F | Introduction of test case for Spectrum emission mask for Inter-band CA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187902 | 0102 | 1 | F | Introduction of test case for NR ACLR for Inter-band CA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187903 | 0103 | 1 | F | Introduction of test case for UTRA ACLR for Inter-band CA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187904 | 0104 | 1 | F | Introduction of test case for General spurious emissions for Inter-band CA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187905 | 0105 | 1 | F | Introduction of test case for Spurious emission for UE co-existence for CA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187906 | 0106 | 1 | F | Introduction of test case for Transmit intermodulation for Inter-band CA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187911 | 0118 | 1 | F | Addition of notes to clarify test point selection into general section of TS 38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187914 | 0163 | 1 | F | Update of Global In-channel Tx Test Annex in 38.521-1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187915 | 0082 | 1 | F | Introduction of FR1 7.4 Maximum input level | 15.1.0 |
| 2018-12 | RAN#82 | R5-188032 | 0075 | 1 | F | Addition of 6.3D.4.1 Absolute Power tolerance for UL-MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-188033 | 0076 | 1 | F | Addition of 6.3D.4.2 Relative Power Tolerance for UL-MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-188034 | 0077 | 1 | F | Addition of 6.3D.4.3 Aggregate Power tolerance for UL-MIMO | 15.1.0 |
| 2018-12 | RAN#82 | R5-188035 | 0110 | 1 | F | Update to FR1 test case 6.3.3.4 PRACH time mask | 15.1.0 |
| 2018-12 | RAN#82 | R5-188206 | 0117 | 1 | F | Introduction of New FR1 test case 6.3.3.7 PUSCH-PUCCH and PUSCH-SRS time masks | 15.1.0 |
| 2018-12 | RAN#82 | R5-188207 | 0071 | 1 | F | 5G\_FR1 Text update for 7.3A Reference sensitivity for CA | 15.1.0 |
| 2018-12 | RAN#82 | R5-188208 | 0067 | 2 | F | Updates of MU in TS 38.521-1 Annex F during RAN5#81 | 15.1.0 |
| 2018-12 | RAN#82 | R5-188209 | 0068 | 2 | F | Updates of TT in TS 38.521-1 Annex F during RAN5#81 | 15.1.0 |
| 2018-12 | RAN#82 | R5-188210 | 0097 | 1 | F | TDD configuration for UE Tx test in FR1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-188211 | 0119 | 1 | F | Core alignment CR to capture TS 38.101-1 updates during RAN4#89 | 15.1.0 |
| 2019-03 | RAN#83 | R5-191034 | 0228 | - | F | Update Clause 2 of TS 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191035 | 0229 | - | F | Update Clause 3.2 of TS 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191039 | 0232 | - | F | Correction to TC 6.4A.2.1.1 Error Vector Magnitude for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-191088 | 0244 | - | F | Editorial cleaning up of test configuration tables in TS 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191089 | 0245 | - | F | Editorial correction of core alignment in TS 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191090 | 0246 | - | F | Updates of TT in TS38.521-1 Annex F during RAN5#NR4 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191156 | 0247 | - | F | General clauses updated for TS38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191244 | 0249 | - | F | Editorial change in 6.5.2.1 general section | 15.2.0 |
| 2019-03 | RAN#83 | R5-191245 | 0250 | - | F | Update ACS and Inband Blocking test cases in TS38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191258 | 0251 | - | F | Update to FR1 test case 6.5.4 Transmit intermodulation | 15.2.0 |
| 2019-03 | RAN#83 | R5-191262 | 0252 | - | F | Update of TC 7.6.3\_Out-of-band blocking | 15.2.0 |
| 2019-03 | RAN#83 | R5-191264 | 0253 | - | F | Introduction of TC 7.6.4 Narrow-band blocking | 15.2.0 |
| 2019-03 | RAN#83 | R5-191265 | 0254 | - | F | Introduction of TC 7.7 Spurious response | 15.2.0 |
| 2019-03 | RAN#83 | R5-191338 | 0256 | - | F | Update of test case 6.3.4.3, Power Control Relative power tolerance in 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191465 | 0257 | - | F | Correction of FR1 6.2.2 Maximum Power Reduction (MPR) | 15.2.0 |
| 2019-03 | RAN#83 | R5-191506 | 0262 | - | F | Shared Risk clarification in TS 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191526 | 0263 | - | F | Update to FR1 test case 6.3.3.6 SRS time mask | 15.2.0 |
| 2019-03 | RAN#83 | R5-191675 | 0267 | - | F | Addition of MU and TT for NR FR1 UL-MIMO test cases | 15.2.0 |
| 2019-03 | RAN#83 | R5-191815 | 0272 | - | F | OBW test procedure update for 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191846 | 0277 | - | F | FR1 Text update for 6.5.3.1 General spurious emission | 15.2.0 |
| 2019-03 | RAN#83 | R5-191848 | 0278 | - | F | Correction of errors in Table 6.1-1 of 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191849 | 0279 | - | F | FR1 Text update for 7.3C Reference sensitivity power level for SUL | 15.2.0 |
| 2019-03 | RAN#83 | R5-191852 | 0280 | - | F | FR1 Text update for 6.5.3.2 Spurious emission for UE co-existence | 15.2.0 |
| 2019-03 | RAN#83 | R5-191854 | 0281 | - | F | FR1 Text update for 7.3.2 Reference sensitivity power level | 15.2.0 |
| 2019-03 | RAN#83 | R5-192088 | 0317 | - | F | Test mode and test loop function activation in SA Tx RF test cases in TS 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192089 | 0318 | - | F | Test mode and test loop function activation in SA Rx RF test cases in TS 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192121 | 0320 | - | F | Update of Global In-channel Tx Test Annex for FR1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192402 | 0266 | 1 | F | Update of FR1 6.2.4 Configured transmitted power | 15.2.0 |
| 2019-03 | RAN#83 | R5-192407 | 0294 | 1 | F | Update of time alignment error for UL MIMO FR1 6.4D.3 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192408 | 0295 | 1 | F | Introduction of TC 6.4D.4 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192409 | 0309 | 1 | F | Update of FR1 6.2.1 MOP | 15.2.0 |
| 2019-03 | RAN#83 | R5-192411 | 0310 | 1 | F | Update of FR1 6.3.1 Minimum Output Power | 15.2.0 |
| 2019-03 | RAN#83 | R5-192412 | 0311 | 1 | F | Addition of FR1 6.3A.1 minimum output power for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192413 | 0321 | 1 | F | Update of transmit signal quality test cases for FR1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192414 | 0231 | 1 | F | Introduction of TC 7.7A.0 Minimum conformance requirements | 15.2.0 |
| 2019-03 | RAN#83 | R5-192416 | 0240 | 1 | F | Update to Wideband Intermodulation for SA FR1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192417 | 0241 | 1 | F | Updates to 7.9 spurious emission for SA in FR1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192418 | 0259 | 1 | F | Introduction of FR1 7.6D.3 Out-of-band blocking for UL-MIMO | 15.2.0 |
| 2019-03 | RAN#83 | R5-192419 | 0260 | 1 | F | Introduction of FR1 7.6D.4 Narrow band blocking for UL-MIMO | 15.2.0 |
| 2019-03 | RAN#83 | R5-192420 | 0261 | 1 | F | Introduction of FR1 7.8D.2 Wide band Intermodulation for UL-MIMO | 15.2.0 |
| 2019-03 | RAN#83 | R5-192421 | 0276 | 1 | F | Correction of FR1 7.4 Maximum input level | 15.2.0 |
| 2019-03 | RAN#83 | R5-192510 | 0322 | 1 | F | Asymmetric CH BWs test configuration for Reference Sensitivity | 15.2.0 |
| 2019-03 | RAN#83 | R5-192544 | 0230 | 1 | F | Correction to TC 6.4A.2.2 Carrier leakage for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192545 | 0248 | 1 | F | Update of test case 6.5.2.4.2, UTRA ACLR in 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192547 | 0273 | 1 | F | Update of FR1 6.2D.1 MOP for MIMO | 15.2.0 |
| 2019-03 | RAN#83 | R5-192548 | 0275 | 1 | F | Update of 6.2D.4 Configured Output Power for MIMO | 15.2.0 |
| 2019-03 | RAN#83 | R5-192549 | 0284 | 1 | F | Update of FR1 test case 6.3D.1 Minimum output power for UL-MIMO | 15.2.0 |
| 2019-03 | RAN#83 | R5-192550 | 0296 | 1 | F | Update of TC 6.5D.1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192551 | 0297 | 1 | F | Update of TC 6.5D.2.2 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192553 | 0298 | 1 | F | Introduction of TC 6.5D.2.3 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192554 | 0299 | 1 | F | Update of TC 6.5D.2.4.1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192555 | 0300 | 1 | F | Update of TC 6.5D.2.4.2 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192556 | 0301 | 1 | F | Update of 6.5D.3.1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192557 | 0302 | 1 | F | Update of 6.5D.3.2 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192558 | 0303 | 1 | F | Update of 6.5D.3.3 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192559 | 0304 | 1 | F | Update of 6.5D.4 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192561 | 0313 | 1 | F | Addition of FR1 6.3A.3 Transmit ON/OFF time mask for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192562 | 0325 | 1 | F | Update of FR1 6.2D.2 MPR for MIMO | 15.2.0 |
| 2019-03 | RAN#83 | R5-192563 | 0233 | 1 | F | Introduction of TC 7.7A.1 Spurious response for 2DL CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192564 | 0234 | 1 | F | Introduction of TC 7.7A.2 Spurious response for 3DL CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192565 | 0235 | 1 | F | Introduction of TC 7.7A.3 Spurious response for 4DL CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192566 | 0258 | 1 | F | Introduction of FR1 7.6D.2 Inband blocking for UL-MIMO | 15.2.0 |
| 2019-03 | RAN#83 | R5-192567 | 0285 | 1 | F | Update on TC 6.4A.1.1 Frequency error for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192570 | 0286 | 1 | F | Update on TCs in section 6.4A.2 Transmit modulation quality for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192576 | 0287 | 1 | F | Update on TC 6.5A.2.2.1 Spectrum emission mask for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192577 | 0288 | 1 | F | Update on TC 6.5A.2.4.1.1 NR ACLR for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192578 | 0289 | 1 | F | Update on TC 6.5A.2.4.2.1 UTRA ACLR for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192579 | 0290 | 1 | F | Update on TC 6.5A.3.1.1 General spurious emissions for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192580 | 0291 | 1 | F | Update on TC 6.5A.3.2.1 Spurious emissions for UE co-existence for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192581 | 0292 | 1 | F | Update on TC 6.5A.4.1 TX IM for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192583 | 0268 | 1 | F | Addition of 7.5A.0 Minimum conformance requirements | 15.2.0 |
| 2019-03 | RAN#83 | R5-192584 | 0269 | 1 | F | Addition of 7.5A.1 Adjacent channel selectivity for 2DL CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192585 | 0270 | 1 | F | Addition of 7.5A.2 Adjacent channel selectivity for 3DL CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192586 | 0271 | 1 | F | Addition of 7.5A.3 Adjacent channel selectivity for 4DL CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192587 | 0282 | 1 | F | FR1 Text update for 7.3A.2 Reference sensitivity power level for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192588 | 0283 | 1 | F | FR1 Text update for 7.3.2\_1 Reference sensitivity level with 4 Rx antenna ports | 15.2.0 |
| 2019-03 | RAN#83 | R5-192589 | 0305 | 1 | F | Update of 7.3D.2 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192590 | 0306 | 1 | F | Update of TC 7.4D | 15.2.0 |
| 2019-03 | RAN#83 | R5-192591 | 0307 | 1 | F | Introduction of TC 7.5D | 15.2.0 |
| 2019-03 | RAN#83 | R5-192592 | 0324 | 1 | F | Update of TC 7.7D Spurious response for UL-MIMO | 15.2.0 |
| 2019-03 | RAN#83 | R5-192593 | 0243 | 1 | F | Updates of TT in TS38.521-1 Annex F during RAN5#82 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192594 | 0265 | 1 | F | Correction of HARQ-ACK transmission timing for DL RMC for FR1 TDD SCS=60kHz | 15.2.0 |
| 2019-03 | RAN#83 | R5-192597 | 0319 | 1 | F | Updating test case 7.3.2 Reference sensitivity power level Table 7.3.2.4.1-3 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192598 | 0323 | 1 | F | Update OBW, SEM and ACLR in TS 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192682 | 0236 | 1 | F | Introduction of TC 7.9A.0 Minimum conformance requirements | 15.2.0 |
| 2019-03 | RAN#83 | R5-192683 | 0237 | 1 | F | Introduction of TC 7.9A.1 Spurious emission for 2DL CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192685 | 0312 | 2 | F | Addition of FR1 6.3A.2 Transmit OFF power for CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192693 | 0293 | 1 | F | Introduction of Annex on Characteristics of the Interfering Signal FR1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192837 | 0326 | 1 | F | Update of operating bands and channel arrangement to TS 38.521-1 | 15.2.0 |
| 2019-03 | RAN#83 | - | - | - | - | Editorial correction of references to TS 38.508-1 clause 4.6 tables | 15.2.0 |
| 2019-06 | RAN#84 | R5-193535 | 0389 | - | F | Update of test case 6.5.2.4.2, UTRA ACLR in 38.521-1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193536 | 0390 | - | F | Update of test case 6.3.4.3, Power Control Relative power tolerance | 15.3.0 |
|  |  |  |  |  |  |  |  |
| 2019-06 | RAN#84 | R5-193567 | 0394 | - | F | Correction of 38.521-1 7.6D.2 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193569 | 0395 | - | F | Correction of 38.521-1 7.6D.3 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193571 | 0396 | - | F | Correction of 38.521-1 7.6D.4 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193573 | 0397 | - | F | Correction of 38.521-1 7.8D.2 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193574 | 0398 | - | F | Correction of 38.521-1 6.2.2 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193585 | 0400 | - | F | Update of TC 7.7A.0 Spurious response for CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-193586 | 0401 | - | F | Correction of section number for UE diagram in Initial conditions of 38.521-1 Clause 6 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193589 | 0404 | - | F | Correction of section number for UE diagram in Initial conditions of 38.521-1 Clause 7 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193593 | 0405 | - | F | Unify Outer\_1RB and Edge\_1RB in Test Configuration Table of 38.521-1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193753 | 0413 | - | F | Update of 6.3D Output power dynamics for UL-MIMO | 15.3.0 |
| 2019-06 | RAN#84 | R5-193915 | 0417 | - | F | Update of NR FR1 6.2.3 A-MPR NS\_04 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193917 | 0418 | - | F | Update of SA FR1 RF 6.5D.2.3 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193918 | 0419 | - | F | Update of SA FR1 RF 6.5D.2.4.2 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193920 | 0420 | - | F | Update of SA FR1 RF 6.5D.3.3 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193930 | 0421 | - | F | Addition of NR FR1 6.2D.3 A-MPR for UL-MIMO | 15.3.0 |
| 2019-06 | RAN#84 | R5-193955 | 0423 | - | F | Update of clause 5 to TS 38.521-1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194125 | 0425 | - | F | Update Out of band emission test cases in TS 38.521-1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194126 | 0426 | - | F | Update ACS and Inbanblocking interferer definition in TS 38.521-1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194161 | 0428 | - | F | Update of test case 6.2.3 UE A-MPR, NS\_35 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194162 | 0429 | - | F | Update of test case 6.5.2.3; Additional spectrum emission mask | 15.3.0 |
| 2019-06 | RAN#84 | R5-194226 | 0435 | - | F | Correction to In-band emission test case | 15.3.0 |
| 2019-06 | RAN#84 | R5-194228 | 0437 | - | F | Correction to PRACH configurations | 15.3.0 |
| 2019-06 | RAN#84 | R5-194256 | 0439 | - | F | Correction to FR1 Reference Sensitivity | 15.3.0 |
| 2019-06 | RAN#84 | R5-194268 | 0440 | - | F | Update of 7.5A.0 Minimum conformance requirements | 15.3.0 |
| 2019-06 | RAN#84 | R5-194304 | 0442 | - | F | Correction to time domain allocation of DMRS | 15.3.0 |
| 2019-06 | RAN#84 | R5-194305 | 0443 | - | F | Updating 7.8.2 Wide band Intermodulation | 15.3.0 |
| 2019-06 | RAN#84 | R5-194307 | 0445 | - | F | Correction to ON/OFF time mask test | 15.3.0 |
| 2019-06 | RAN#84 | R5-194308 | 0446 | - | F | Correction to carrier leakage and in-band emission tests | 15.3.0 |
| 2019-06 | RAN#84 | R5-194312 | 0447 | - | F | FR1 Update for 7.3A Reference sensitivity for CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-194313 | 0448 | - | F | FR1 Update for 7.3.2 Reference sensitivity power level | 15.3.0 |
| 2019-06 | RAN#84 | R5-194314 | 0449 | - | F | FR1 Update for 7.3.3 Ref sensitivity ?RIB,c | 15.3.0 |
| 2019-06 | RAN#84 | R5-194315 | 0450 | - | F | FR1 Update for 7.3C Reference sensitivity for SUL | 15.3.0 |
| 2019-06 | RAN#84 | R5-194316 | 0451 | - | F | FR1 Update for 6.5.3.2 Spurious emission for UE co-existence | 15.3.0 |
| 2019-06 | RAN#84 | R5-194377 | 0454 | - | F | FR1 Update for 6.5.3.3 Additional spurious emissions | 15.3.0 |
| 2019-06 | RAN#84 | R5-194383 | 0455 | - | F | Update of 7.5A.2 Adjacent channel selectivity for 3DL CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-194905 | 0414 | 1 | F | Update of 6.3D.4.1 Absolute Power tolerance for UL-MIMO | 15.3.0 |
| 2019-06 | RAN#84 | R5-194906 | 0415 | 1 | F | Update of 6.3D.4.2 Relative Power Tolerance for UL-MIMO | 15.3.0 |
| 2019-06 | RAN#84 | R5-194908 | 0465 | 1 | F | Update of TC 6.3A.3 Transmit ON/OFF time mask for CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-194910 | 0463 | 1 | F | Update of TC 6.3A.1 Minimum output power for CA FR1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194911 | 0434 | 1 | F | Update of 6.2.3 for UE additional maximum output power reduction | 15.3.0 |
| 2019-06 | RAN#84 | R5-194912 | 0430 | 1 | F | Update of test case 6.2.3 UE A-MPR FR1, general part and minimum requirements | 15.3.0 |
| 2019-06 | RAN#84 | R5-194915 | 0438 | 1 | F | Correction to SRS time mask test | 15.3.0 |
| 2019-06 | RAN#84 | R5-194916 | 0444 | 1 | F | Correction to transmit signal quality test cases | 15.3.0 |
| 2019-06 | RAN#84 | R5-194917 | 0461 | 1 | F | Introduction of 6.2A.4.0.2 TIB for CA into Rel-15 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194918 | 0468 | 1 | F | Update of transmit signal quality test cases for FR1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194919 | 0407 | 1 | F | Update of TC 7.9A.1 Spurious emissions for 2DL CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-194920 | 0456 | 1 | F | Update of 7.5A.3 Adjacent channel selectivity for 4DL CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-194921 | 0469 | 1 | F | Correction to FR1 Reference Sensitivity test configurations with n70 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194922 | 0431 | 1 | F | Update of clause 3 to TS 38.521-1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194923 | 0432 | 1 | F | Update of clause 4 to TS 38.521-1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194924 | 0433 | 1 | F | Update of clause 5 for operating bands and channel arrangement | 15.3.0 |
| 2019-06 | RAN#84 | R5-194925 | 0452 | 1 | F | General clause updated for FR1 spec | 15.3.0 |
| 2019-06 | RAN#84 | R5-194926 | 0467 | 1 | F | Update of Global In-channel Tx Test Annex for FR1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194957 | 0392 | 1 | F | Updates of MU and TT in TS 38.521-1 Annex F during RAN5#NR5 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194973 | 0402 | 1 | F | Update of TC 7.9A.0 Spurious emissions for CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-194974 | 0403 | 1 | F | Update of TC 7.7D Spurious response for UL-MIMO | 15.3.0 |
| 2019-06 | RAN#84 | R5-195090 | 0470 | 1 | F | Update of FR1 ON\_ON time mask test cases | 15.3.0 |
| 2019-06 | RAN#84 | R5-195092 | 0441 | 1 | F | Update of 7.5A.1 Adjacent channel selectivity for 2DL CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-195140 | 0416 | 1 | F | Update of 6.3D.4.3 Aggregate Power tolerance for UL-MIMO | 15.3.0 |
| 2019-06 | RAN#84 | R5-195142 | 0422 | 1 | F | Addition of TT values for NR FR1 UL-MIMO test cases | 15.3.0 |
| 2019-06 | RAN#84 | R5-195143 | 0457 | 1 | F | Introduction of Occupied bandwidth for Inter-band CA in NR SA FR1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-195144 | 0458 | 1 | F | Update of 6.4D.3 Time alignment error for UL-MIMO FR1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-195145 | 0464 | 1 | F | Update of TC 6.3A.2 Transmit OFF power for CA FR1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-195198 | 0436 | 1 | F | Correction to power control test cases | 15.3.0 |
| 2019-06 | RAN#84 | R5-195403 | 0459 | 1 | F | Addition of 6.2A.1.3 FR1 MOP for inter-band CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-195430 | 0393 | 1 | F | Updates of MU and TT in TS 38.521-1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-195431 | 0424 | 1 | F | Core alignment with TS 38.101-1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-193550 | 0391 | - | F | Introduction of CA\_n41A-n79A into Rel-16 | 16.0.0 |
| 2019-06 | RAN#84 | R5-195053 | 0462 | 1 | F | Introduction of 6.2A.4.0.2 TIB for CA into Rel-16 | 16.0.0 |
| 2019-06 | RAN#84 | R5-195056 | 0399 | 1 | F | Introduction of CA\_n41 into Rel-16 TS 38.521-1 | 16.0.0 |
| 2019-06 | RAN#84 | R5-195405 | 0460 | 1 | F | Introduction of 6.2A.1.3 FR1 MOP for inter-band CA into Rel-16 | 16.0.0 |
| 2019-09 | RAN#85 | R5-195732 | 0472 | - | F | Update Clause 6.2A.4.0.2 TIB for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-195804 | 0474 | - | F | Update of UE A\_MPR test case in 6.2.3 | 16.1.0 |
| 2019-09 | RAN#85 | R5-196191 | 0477 | - | F | Update of Minimum conformance requirements and addition of test points in TC 6.2.2 | 16.1.0 |
| 2019-09 | RAN#85 | R5-196231 | 0483 | - | F | Correction to 6.5.2.3 Additional spectrum emission mask | 16.1.0 |
| 2019-09 | RAN#85 | R5-196233 | 0485 | - | F | Correction to 6.3.4.3 Power Control Relative power tolerance | 16.1.0 |
| 2019-09 | RAN#85 | R5-196234 | 0486 | - | F | Correction to PUCCH format in EVM and In-band emissions test | 16.1.0 |
| 2019-09 | RAN#85 | R5-196291 | 0488 | - | F | Add Annex F.4 Uplink Power window explanation for SA test cases | 16.1.0 |
| 2019-09 | RAN#85 | R5-196396 | 0489 | - | F | Update of Minimum output power for CA FR1 | 16.1.0 |
| 2019-09 | RAN#85 | R5-196402 | 0492 | - | F | Update of NR test case 6.2A.1-UE maximum output power for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-196413 | 0498 | - | F | Update of FR1 6.4D.1 Frequency error for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-196421 | 0502 | - | F | Update of FR1 6.4D.2.4 EVM equalizer spectrum flatness for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-196425 | 0504 | - | F | Update of DL RB allocation in Annex C | 16.1.0 |
| 2019-09 | RAN#85 | R5-196481 | 0514 | - | F | Remove references to 4Rx Reference Sensitivity test case 7.3.2\_1 from Annex F | 16.1.0 |
| 2019-09 | RAN#85 | R5-196499 | 0517 | - | F | Updated to Annex A for RF FR1 tests | 16.1.0 |
| 2019-09 | RAN#85 | R5-196500 | 0518 | - | F | General clause updated for FR1 spec | 16.1.0 |
| 2019-09 | RAN#85 | R5-196653 | 0521 | - | F | Update TT for 6.3D.4.1 | 16.1.0 |
| 2019-09 | RAN#85 | R5-196696 | 0523 | - | F | Update of Minimum conformance requirements and Test requirement in TC 7.4 | 16.1.0 |
| 2019-09 | RAN#85 | R5-196699 | 0524 | - | F | Update of Minimum conformance requirements in TC 6.3.2 | 16.1.0 |
| 2019-09 | RAN#85 | R5-196711 | 0525 | - | F | Addition of TT for 6.3D.4.2 | 16.1.0 |
| 2019-09 | RAN#85 | R5-196726 | 0526 | - | F | Addition of TT for 6.3D.4.3 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197307 | 0476 | 1 | F | Update UL-MIMO to UL MIMO to align with RAN4 terminology in FR1 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197308 | 0506 | 1 | F | Update for 6.5.3.1 General spurious emissions | 16.1.0 |
| 2019-09 | RAN#85 | R5-197309 | 0508 | 1 | F | Update for 6.5.3.3 Additional spurious emissions | 16.1.0 |
| 2019-09 | RAN#85 | R5-197312 | 0473 | 1 | F | Update of Additional spectrum emission mask test case 6.5.2.3 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197313 | 0480 | 1 | F | Add TT to 6.3D.1 Minimum output power for UL-MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-197314 | 0484 | 1 | F | Correction to PRACH configurations | 16.1.0 |
| 2019-09 | RAN#85 | R5-197316 | 0494 | 1 | F | Addition of NR test case 6.2A.3-UE additional maximum output power reduction for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-197318 | 0495 | 1 | F | Addition of NR test case 6.2A.4-Configured output power for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-197319 | 0499 | 1 | F | Update of FR1 6.4D.2.1 EVM for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-197321 | 0500 | 1 | F | Update of FR1 6.4D.2.2 Carrier leakage for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-197324 | 0501 | 1 | F | Update of FR1 6.4D.2.3 Inband emission for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-197327 | 0511 | 1 | F | Update for 7.3C.0 Minimum conformance requirements for SUL | 16.1.0 |
| 2019-09 | RAN#85 | R5-197328 | 0512 | 1 | F | Update for 7.3A.0 Minimum conformance requirements for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-197329 | 0522 | 1 | F | Update of Minimum conformance requirements and Test requirement in TCs 7.6.3 7.6.4 and 7.7 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197330 | 0527 | 1 | F | Update of 7.5A.0 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197492 | 0503 | 1 | F | Update of UL power configuration for ON/OFF and Absolute power tolerance | 16.1.0 |
| 2019-09 | RAN#85 | R5-197514 | 0478 | 1 | F | Correction of uplink power setting for SA FR1 transmitter test cases | 16.1.0 |
| 2019-09 | RAN#85 | R5-197515 | 0479 | 1 | F | Correction of uplink power setting for SA FR1 receiver test cases | 16.1.0 |
| 2019-09 | RAN#85 | R5-197519 | 0493 | 1 | F | Addition of NR test case 6.2A.2-UE maximum output power reduction for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-197520 | 0497 | 1 | F | Update of FR1 6.2D.1 MOP for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-197521 | 0507 | 1 | F | Update for 6.5.3.2 Spurious emission for UE co-existence | 16.1.0 |
| 2019-09 | RAN#85 | R5-197522 | 0515 | 1 | F | Update to Occupied bandwidth for CA in NR SA FR1 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197523 | 0496 | 1 | F | Addition of FR1 7.4A Maximum input level for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-197608 | 0510 | 1 | F | Update for 7.3C.2 Reference sensitivity power level for SUL | 16.1.0 |
| 2019-09 | RAN#85 | R5-197609 | 0513 | 1 | F | Update for 7.3.2 Reference sensitivity power level | 16.1.0 |
| 2019-09 | RAN#85 | R5-197610 | 0471 | 1 | F | Updates of MU and TT in TS 38.521-1 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197634 | 0475 | 2 | F | Update of operating bands and channel arrangement to TS38.521-1 g00 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197635 | 0491 | 2 | F | Update of Transmit ON/OFF time mask for CA FR1 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197639 | 0482 | 2 | F | Correction to power control TC 6.3.4.2 and 6.3.4.4 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197640 | 0509 | 2 | F | Update for 7.3A Reference sensitivity for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-197641 | 0528 | 2 | F | Addition of the connection setup in TS 38.521-1 | 16.1.0 |
| 2019-10 | RAN#85 | - | - | - | - | Deletion of R5-197560 which was added by mistake but was withdrawn and belonged to another spec | 16.1.1 |
| 2019-12 | RAN#86 | R5-197917 | 0705 | - | F | Addition of FR1 SUL test case 6.2C.5 | 16.2.0 |
| 2019-12 | RAN#86 | R5-197923 | 0711 | - | F | Editorial update of test case 6.4D.2.1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-198044 | 0714 | - | F | Update of Clause 7.9A.1 Spurious emission for 2DL CA | 16.2.0 |
| 2019-12 | RAN#86 | R5-198103 | 0715 | - | F | Correction of Clause 7.9 Spurious emissions | 16.2.0 |
| 2019-12 | RAN#86 | R5-198134 | 0716 | - | F | Updating incorrect note in test procedure | 16.2.0 |
| 2019-12 | RAN#86 | R5-198237 | 0723 | - | F | Alignment with core specification for test case 6.3.4.3 | 16.2.0 |
| 2019-12 | RAN#86 | R5-198397 | 0739 | - | F | Correction to Test Configuration for In-band emissions | 16.2.0 |
| 2019-12 | RAN#86 | R5-198398 | 0740 | - | F | Editorial correction to test configuration table in MPR test | 16.2.0 |
| 2019-12 | RAN#86 | R5-198399 | 0741 | - | F | Correction to the test procedure for frequency error | 16.2.0 |
| 2019-12 | RAN#86 | R5-198401 | 0743 | - | F | Correction to Common Uplink Configuration | 16.2.0 |
| 2019-12 | RAN#86 | R5-198479 | 0747 | - | F | Correction of UL RMCs | 16.2.0 |
| 2019-12 | RAN#86 | R5-198526 | 0753 | - | F | Update of test case 6.2.3 UE A\_MPR NS\_43 | 16.2.0 |
| 2019-12 | RAN#86 | R5-198546 | 0760 | - | F | Message Contents Update for TC 6.2.4 and 6.2D.4 of TS 38.521-1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-198547 | 0761 | - | F | Addition of NR FR1 intraband non-contiguous 2CA tests to 7.4A.1 and 7.5A.1 and updating 7.5A.1 to 38.521-1 to enable testing of CA combinations involving bands n66, n70 and n71 | 16.2.0 |
| 2019-12 | RAN#86 | R5-198635 | 0764 | - | F | Updated to Annex A for RF FR1 tests | 16.2.0 |
| 2019-12 | RAN#86 | R5-198747 | 0774 | - | F | Update for 7.3.3 | 16.2.0 |
| 2019-12 | RAN#86 | R5-198755 | 0777 | - | F | Introduction of n65 to 38.521-1 Chapter 7 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199085 | 0701 | 1 | F | Updates of MU and TT in TS 38.521-1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199308 | 0724 | 1 | F | Correction of 6.3D.3 Transmit ONOFF time mask for UL-MIMO | 16.2.0 |
| 2019-12 | RAN#86 | R5-199309 | 0725 | 1 | F | Correction of 6.3D.4.1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199310 | 0727 | 1 | F | Correction of 6.3D.4.2 Relative power tolerance for UL-MIMO | 16.2.0 |
| 2019-12 | RAN#86 | R5-199311 | 0731 | 1 | F | Corrections to 6.3A.1.1 Minimum output power for CA 2UL CA FR1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199313 | 0702 | 1 | F | Update of FR1 SUL test case 6.2C.1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199314 | 0703 | 1 | F | Addition of FR1 SUL test case 6.2C.3 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199315 | 0704 | 1 | F | Addition of FR1 SUL test case 6.2C.4 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199316 | 0706 | 1 | F | Addition of FR1 SUL test case 6.4C.1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199317 | 0707 | 1 | F | Addition of FR1 SUL test case 6.4C.2.1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199318 | 0708 | 1 | F | Addition of FR1 SUL test case 6.4C.2.2 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199319 | 0709 | 1 | F | Addition of FR1 SUL test case 6.4C.2.3 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199320 | 0710 | 1 | F | Addition of FR1 SUL test case 6.4C.2.4 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199321 | 0712 | 1 | F | Update test points in transmit quality to replace -40dBm by minimum output power | 16.2.0 |
| 2019-12 | RAN#86 | R5-199322 | 0746 | 1 | F | Correction to UL Power Control Window in FR1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199323 | 0749 | 1 | F | Corrections on A-MPR requirements in 38.521-1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199324 | 0750 | 1 | F | Update of UE A\_MPR Minimum Conformance requirements in 6.2.3 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199325 | 0751 | 1 | F | Update of test case 6.2.3 for UE A\_MPR, NS\_03 and NS\_03U | 16.2.0 |
| 2019-12 | RAN#86 | R5-199329 | 0752 | 1 | F | Update of test case 6.2.3 UE A\_MPR, NS\_05 and NS\_05U | 16.2.0 |
| 2019-12 | RAN#86 | R5-199330 | 0754 | 1 | F | Update of test case 6.2.3 UE A\_MPR NS\_43U | 16.2.0 |
| 2019-12 | RAN#86 | R5-199331 | 0755 | 1 | F | Adding of test requirements for UE A\_MPR NS\_100 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199332 | 0756 | 1 | F | Adding of test requirements for UE A\_MPR NS\_18 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199333 | 0758 | 1 | F | Update of Additional spectrum emission mask test case in 6.5.2.3 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199334 | 0775 | 1 | F | Update for 6.5.3.3 Additional spurious emissions | 16.2.0 |
| 2019-12 | RAN#86 | R5-199335 | 0718 | 1 | F | Correction of test applicability and minimum conformance requirements for SA FR1 7.6.4 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199336 | 0719 | 1 | F | Correction of minimum conformance requirements for SA FR1 7.6.3 7.7 and 7.9 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199337 | 0717 | 1 | F | Correction and addition of uplink power measurement MUs for SA FR1 TCs | 16.2.0 |
| 2019-12 | RAN#86 | R5-199338 | 0728 | 1 | F | Update of Operating bands and Channel arrangement to TS 38.521-1 R15 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199339 | 0766 | 1 | F | Update of Annex C.3.1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199412 | 0765 | 1 | F | Update of clause 5 for R16 CA configurations in 38.521-1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199433 | 0736 | 1 | F | Addition of reference sensitivity test for NR CA combination n29-n66 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199434 | 0729 | 1 | F | Update of Operating bands and Channel arrangement to TS 38.521-1 R16 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199435 | 0767 | 1 | F | Introduction of n29 and n65 to 38.521-1 Chapter 5 and 6.2.1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199484 | 0720 | 1 | F | Correction of test procedure of SA FR1 6.5.3.1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199485 | 0768 | 1 | F | Update to ACLR test case | 16.2.0 |
| 2019-12 | RAN#86 | R5-199486 | 0776 | 1 | F | Update for 6.5.3.2 Spurious emission for UE co-existence | 16.2.0 |
| 2019-12 | RAN#86 | R5-199490 | 0748 | 1 | F | update of 7.5A.2 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199491 | 0773 | 1 | F | Update for 7.3C.0 Minimum conformance requirements for SUL | 16.2.0 |
| 2019-12 | RAN#86 | R5-199493 | 0770 | 1 | F | Add section 4.5 Applicability and test coverage rules | 16.2.0 |
| 2019-12 | RAN#86 | R5-199502 | 0721 | 1 | F | Correction of test description for SA FR1 6.5.2.4.2 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199503 | 0730 | 1 | F | Addition of almost contiguous allocation test points and update of minimum conformance requirements for SA FR1 6.2.2 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199556 | 0735 | 1 | F | Introduction of 3CA reference sensitivity case 7.3A.2 for NR and addition of reference sensitivity test for many combinations involving bands n66, n70 and n71 to 38.521-1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199557 | 0762 | 1 | F | Introduction of CA blocking case 7.6A to 38.521-1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199563 | 0732 | 1 | F | Addition of 7.6A.3.1 Out-of-band blocking for CA (2DL CA) for SA FR1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199564 | 0733 | 1 | F | Addition of 7.6A.4.1 Narrow band blocking for CA (2DL CA) for SA FR1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199565 | 0734 | 1 | F | Addition of 7.8A.2.1 Wide band Intermodulation for CA (2DL CA) for SA FR1 | 16.2.0 |
| 2020-03 | RAN#87 | R5-200393 | 0789 |  | F | Adding MU and TT for FR1 Rx CA test cases | 16.3.0 |
| 2020-03 | RAN#87 | R5-200397 | 0791 |  | F | Updating power configuration for PRACH time mask | 16.3.0 |
| 2020-03 | RAN#87 | R5-200438 | 0792 |  | F | Clarification of measurement interval of frequency error in FR1 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200440 | 0794 |  | F | Correction to 6.3.4.3 Power Control Relative power tolerance | 16.3.0 |
| 2020-03 | RAN#87 | R5-200441 | 0795 |  | F | Correction to SEM and ACLR test cases | 16.3.0 |
| 2020-03 | RAN#87 | R5-200443 | 0797 |  | F | Correction to UL power window description for 6.3.4.4 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200461 | 0798 |  | F | Update of 7.6A.3.1 Out-of-band blocking for 2DL CA | 16.3.0 |
| 2020-03 | RAN#87 | R5-200462 | 0799 |  | F | Update of 7.6A.4.1 Narrow band blocking for 2DL CA | 16.3.0 |
| 2020-03 | RAN#87 | R5-200463 | 0800 |  | F | Update of 7.8A.2.1 Wide band Intermodulation for 2DL CA | 16.3.0 |
| 2020-03 | RAN#87 | R5-200570 | 0804 |  | F | Update of NR test case 6.5.3.2-Spurious emission for UE co-existence | 16.3.0 |
| 2020-03 | RAN#87 | R5-200640 | 0808 |  | F | Update of Minimum requirements of 6.2.2 UE maximum output power reduction | 16.3.0 |
| 2020-03 | RAN#87 | R5-200658 | 0810 |  | F | Update of 6.1 common part of Tx in TS38.521-1 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200659 | 0811 |  | F | Core spec alignment for test case 6.3.4.3 Relative power tolerance | 16.3.0 |
| 2020-03 | RAN#87 | R5-200664 | 0812 |  | F | Correction of UL configuration for almost contiguous allocation in 6.2.2 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200666 | 0813 |  | F | Update measurement bandwidth references in 6.5.4 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200693 | 0814 |  | F | Update for 6.5.3.2 Spurious emission for UE co-existence | 16.3.0 |
| 2020-03 | RAN#87 | R5-200700 | 0817 |  | F | Removal of square brackets for DCI format for test cases in 7.6 and 7.7 of SA FR1 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200721 | 0818 |  | F | Addition of new Rel-16 70MHz CBW for 6.3.2 and 7.4 of SA FR1 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200725 | 0819 |  | F | Correction of A-SE for NS\_04 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200755 | 0823 |  | F | Removing text from a Void clause | 16.3.0 |
| 2020-03 | RAN#87 | R5-200757 | 0825 |  | F | Correction of A\_MPR test for NS\_05 and NS\_05U | 16.3.0 |
| 2020-03 | RAN#87 | R5-200759 | 0826 |  | F | Update of test case 6.2.3 UE A\_MPR, NS\_37 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200761 | 0827 |  | F | Update of test case 6.2.3 UE A\_MPR, NS\_38 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200763 | 0828 |  | F | Update of test case 6.2.3 UE A\_MPR, NS\_39 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200765 | 0829 |  | F | Corrections of NS\_43 in 38.521-1 section 6 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200767 | 0830 |  | F | Corrections of NS\_43U in 38.521-1 section 6 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200892 | 0815 | 1 | F | Update for 6.5.3.3 Additional spurious emissions | 16.3.0 |
| 2020-03 | RAN#87 | R5-200893 | 0809 | 1 | F | Core spec alignment for 7.6.3 and 7.8 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200895 | 0787 | 1 | F | Introduction of n95 SUL band test cases | 16.3.0 |
| 2020-03 | RAN#87 | R5-200906 | 0824 | 1 | F | Aligning A-MPR clause with TS 38.101-1 Rel-15 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200907 | 0781 | 1 | F | Update of TC 7.7A.1 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200908 | 0782 | 1 | F | Update of Clause 4 in TS 38.521-1 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200909 | 0783 | 1 | F | Update of clause 5 to TS 38.521-1 in R15 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200922 | 0822 | 1 | F | Introduction of Rel-16 spurious emissions co-existence requirements for bands n48, n65 and n95 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200924 | 0788 | 1 | F | Adding statistical testing condition in Annex H for CA testing | 16.3.0 |
| 2020-03 | RAN#87 | R5-200962 | 0786 | 1 | F | Corrections to TC 6.3A.3 transmit On OFF time mask for CA FR1 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200971 | 0780 | 1 | F | Correction of reference numbers in TS 38.521-1 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200972 | 0793 | 1 | F | Correction to 6.2.3 A-MPR test case | 16.3.0 |
| 2020-03 | RAN#87 | R5-200974 | 0802 | 1 | F | Update of test requirements for NR test case 6.5D.2.2 and 6.5D.2.4 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200975 | 0803 | 1 | F | Update of NR SUL test cases | 16.3.0 |
| 2020-03 | RAN#87 | R5-200976 | 0820 | 1 | F | Update of NR test case 6.2.4-ConfigTP | 16.3.0 |
| 2020-03 | RAN#87 | R5-200977 | 0805 | 1 | F | Update of NR test case 7.4A Maximum input level for CA | 16.3.0 |
| 2020-03 | RAN#87 | R5-200978 | 0806 | 1 | F | Update of NR test case 7.6A.2 Inband Blocking for CA | 16.3.0 |
| 2020-03 | RAN#87 | R5-200979 | 0821 | 1 | F | Cleaning up of Rx 2DL CA test cases in FR1 | 16.3.0 |
| 2020-03 | RAN#87 | R5-201054 | 0785 | 1 | F | Update of R16 new bands and CBWs to TS 38.521-1 clause 5 | 16.3.0 |
| 2020-03 | RAN#87 | R5-201069 | 0832 | 1 | F | Adding n65 A-MPR and Emission Requirements | 16.3.0 |
| 2020-03 | RAN#87 | R5-201247 | 0790 | 2 | F | Cleaning up of power class 2 test cases in FR1 | 16.3.0 |
| 2020-03 | RAN#87 | R5-201238 | 0831 | 1 | F | Corrections of NS\_18 in 38.521-1 section 6 | 16.3.0 |
| 2020-06 | RAN#88 | R5-201597 | 0835 | - | F | Correction of 4RX Reference requirement for n77 high range in 7.3.2 | 16.4.0 |
| 2020-06 | RAN#88 | R5-201598 | 0836 | - | F | Correction of lower limit for test ID 55 in test 6.2.3 | 16.4.0 |
| 2020-06 | RAN#88 | R5-201734 | 0841 | - | F | Addition of NR test case 6.3C.1 Minimum output power for SUL | 16.4.0 |
| 2020-06 | RAN#88 | R5-201735 | 0842 | - | F | Addition of NR test case 6.3C.2 Transmit OFF power for SUL | 16.4.0 |
| 2020-06 | RAN#88 | R5-201736 | 0843 | - | F | Addition of NR test case 6.3C.3 Transmit ON/OFF time mask for SUL | 16.4.0 |
| 2020-06 | RAN#88 | R5-201739 | 0846 | - | F | Addition of NR test case 6.3C.4.3 Aggregate power tolerance for SUL | 16.4.0 |
| 2020-06 | RAN#88 | R5-201741 | 0848 | - | F | Update of NR test case 6.5C.3.3-Additional spurious emissions for SUL | 16.4.0 |
| 2020-06 | RAN#88 | R5-201742 | 0849 | - | F | Update test description of NR test case 7.6.3-Out-of-band blocking | 16.4.0 |
| 2020-06 | RAN#88 | R5-201744 | 0851 | - | F | Addition of NR test case 7.6C.3 Out-of-band blocking for SUL | 16.4.0 |
| 2020-06 | RAN#88 | R5-201745 | 0852 | - | F | Update of Annex F.3.2 and F.3.3 | 16.4.0 |
| 2020-06 | RAN#88 | R5-201749 | 0854 | - | F | Update of NR test case 7.4A.1 Maximum input level for 2DL CA | 16.4.0 |
| 2020-06 | RAN#88 | R5-201750 | 0855 | - | F | Addition of NR test case 7.4A.2 Maximum input level for 3DL CA | 16.4.0 |
| 2020-06 | RAN#88 | R5-201752 | 0857 | - | F | Addition of NR test case 7.6A.2.2 IBB for 3DL CA | 16.4.0 |
| 2020-06 | RAN#88 | R5-201764 | 0861 | - | F | Adding NS\_27 A\_MPR and Emission Requirements for band n48 | 16.4.0 |
| 2020-06 | RAN#88 | R5-201772 | 0865 | - | F | Adding NS\_47 A\_MPR and Emission Requirements for band n41 | 16.4.0 |
| 2020-06 | RAN#88 | R5-201801 | 0866 | - | F | Update of clause 5 to TS 38.521-1 in R15 | 16.4.0 |
| 2020-06 | RAN#88 | R5-201833 | 0867 | - | F | Update of Refsense requirements for n79 | 16.4.0 |
| 2020-06 | RAN#88 | R5-201834 | 0868 | - | F | Correction of FR1 PUCCH EVM definition | 16.4.0 |
| 2020-06 | RAN#88 | R5-201845 | 0871 | - | F | Editorial correction of 6.2.1 test requirements | 16.4.0 |
| 2020-06 | RAN#88 | R5-201847 | 0873 | - | F | Updating 6.3.4.3 alternating sub-test | 16.4.0 |
| 2020-06 | RAN#88 | R5-201861 | 0875 | - | F | Addition of asymmetric BW combination set 1 of n66 | 16.4.0 |
| 2020-06 | RAN#88 | R5-201934 | 0877 | - | F | Update of Operating bands and Channel arrangement to TS 38.521-1 for R16 CADC configurations | 16.4.0 |
| 2020-06 | RAN#88 | R5-202034 | 0883 | - | F | Addition of new test case 7.6A.3.2 Out-of-band blocking for CA 3DL CA R16 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202035 | 0884 | - | F | Addition of new test case 7.6A.3.3 Out-of-band blocking for CA 4DL CA R16 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202036 | 0885 | - | F | Addition of new test case 7.6A.4.2 Narrow band blocking for CA 3DL CA R16 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202037 | 0886 | - | F | Addition of new test case 7.6A.4.3 Narrow band blocking for CA 4DL CA R16 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202039 | 0888 | - | F | Addition of new test case 7.8A.2.3 Wide band Intermodulation for CA 4DL CA R16 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202041 | 0890 | - | F | Correction of test procedure and some typos in 7.6A.4.1 Narrow band blocking for CA 2DL CA R16 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202042 | 0891 | - | F | Correction of test procedure and test requirement in 7.8A.2.1 R16 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202109 | 0893 | - | F | Correction to n70 asymmetric test points in Rx tests | 16.4.0 |
| 2020-06 | RAN#88 | R5-202217 | 0899 | - | F | Corrections on transmitter power for CA in 38.521-1 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202422 | 0906 | - | F | Update F.1.2 with Relative Uplink power measurement uncertainty as 6.3.4.3 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202430 | 0909 | - | F | Add Reference sensitivity requirement for n48 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202484 | 0913 | - | F | Update of Reference sensitivity power level for R16 new CBW of n1 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202503 | 0914 | - | F | CR on EVM Window Centre Timing Definition in FR1 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202710 | 0840 | 1 | F | Update of NR test case 6.2A.3 AMPR for CA | 16.4.0 |
| 2020-06 | RAN#88 | R5-202711 | 0844 | 1 | F | Addition of NR test case 6.3C.4.1-Absolute power tolerance for SUL | 16.4.0 |
| 2020-06 | RAN#88 | R5-202712 | 0845 | 1 | F | Addition of NR test case 6.3C.4.2 Power Control Relative power tolerance for SUL | 16.4.0 |
| 2020-06 | RAN#88 | R5-202713 | 0847 | 1 | F | Update of NR test case 6.5.2.4 ACLR | 16.4.0 |
| 2020-06 | RAN#88 | R5-202714 | 0864 | 1 | F | Update of test case 6.2.3 UE A\_MPR, NS\_42 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202715 | 0905 | 1 | F | Update Uplink power control window size for SA TX TCs | 16.4.0 |
| 2020-06 | RAN#88 | R5-202716 | 0910 | 1 | F | Update for 6.5.3.1 General spurious emissions | 16.4.0 |
| 2020-06 | RAN#88 | R5-202717 | 0850 | 1 | F | Addition of NR test case 7.6C.2-Inband Blocking for SUL | 16.4.0 |
| 2020-06 | RAN#88 | R5-202718 | 0902 | 1 | F | Update of UL configuration in REFSENS | 16.4.0 |
| 2020-06 | RAN#88 | R5-202719 | 0903 | 1 | F | Diversity Characteristics requirements alignment | 16.4.0 |
| 2020-06 | RAN#88 | R5-202765 | 0880 | 1 | F | Updates to test case 6.5.2.2, Spectrum Emission Mask | 16.4.0 |
| 2020-06 | RAN#88 | R5-202781 | 0859 | 1 | F | Adding several new 2CA and 3CA combinations to 7.3A and corrections to 7.3A.1 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202783 | 0881 | 1 | F | Adding REFSENS requirements for 30 MHz channel bandwidth in band n41 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202791 | 0869 | 1 | F | Update of general clause 7.1 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202807 | 0904 | 1 | F | Receiver characteristics testing update to 38.521-1 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202821 | 0862 | 1 | F | Update of test case 6.2.3 UE A\_MPR, NS\_40 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202822 | 0863 | 1 | F | Update of test case 6.2.3 UE A\_MPR, NS\_41 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202823 | 0908 | 1 | F | Update for 6.5.3.3 Additional spurious emissions | 16.4.0 |
| 2020-06 | RAN#88 | R5-202860 | 0912 | 1 | F | Update of Spurious emission for UE co-existence for CA\_n1-n78 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202886 | 0860 | 1 | F | Aligning A-MPR clause with TS 38.101-1 Rel-15 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202887 | 0894 | 1 | F | NS\_05 corrections related to n65 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202888 | 0896 | 1 | F | Corrections on network signalling value abbreviation in 38.521-1 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202889 | 0897 | 1 | F | Corrections on NS signalling label for band n39 in 38.521-1 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202890 | 0900 | 1 | F | Correction on txDirectCurrentLocation in FR1 SA tests | 16.4.0 |
| 2020-06 | RAN#88 | R5-202891 | 0911 | 1 | F | Updated MOP UL MIMO test case to include steps for per port testing | 16.4.0 |
| 2020-06 | RAN#88 | R5-202892 | 0834 | 1 | F | Correction and clarifications of default DL physical channels power in annex C | 16.4.0 |
| 2020-06 | RAN#88 | R5-202927 | 0876 | 1 | F | Update of Operating bands and Channel arrangement to TS 38.521-1 for R16 new bands and CBWs | 16.4.0 |
| 2020-06 | RAN#88 | R5-202928 | 0856 | 1 | F | Update for NR test case 7.6A.2.1 Inband Blocking for 2DL CA | 16.4.0 |
| 2020-06 | RAN#88 | R5-202929 | 0887 | 1 | F | Addition of new test case 7.8A.2.2 Wide band Intermodulation for CA 3DL CA R16 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202930 | 0889 | 1 | F | Correction of CW interference setting for OOBB Inter-band 2DL CA in TC 7.6A.3.1 R16 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202931 | 0892 | 1 | F | Alignment of minimum conformance requirements in 7.6A.3.0 and 7.8A.2.0 with core spec R16 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202940 | 0879 | 1 | F | Updates to test case 6.5.2.4.1, NR ACLR | 16.4.0 |
| 2020-06 | RAN#88 | R5-202941 | 0870 | 1 | F | Skipping 2Rx testing on bands where UE support 4Rx for SA test cases | 16.4.0 |
| 2020-06 | RAN#88 | R5-202942 | 0901 | 1 | F | Re-organization of CA refsens test cases | 16.4.0 |
| 2020-06 | RAN#88 | R5-202957 | 0853 | 1 | F | Update of NR test case 6.2.2 UE maximum output power reduction | 16.4.0 |
| 2020-09 | RAN#89 | R5-203260 | 0917 | - | F | Adding NS\_47 to Additional spurious emissions test case | 16.5.0 |
| 2020-09 | RAN#89 | R5-203261 | 0918 | - | F | Adding UL MIMO additional spurious emissions test for NS\_47 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203290 | 0926 | - | F | Clarification of Interferer frequency selection in FR1 IBB test case 7.6.2 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203291 | 0927 | - | F | Correction of K1 to achieve PUCCH Format 3 in FDD in EVM and in-band emission | 16.5.0 |
| 2020-09 | RAN#89 | R5-203572 | 0932 | - | F | Corrected test config for NS\_24 in additional spurious emission test 6.5.3.3 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203678 | 0935 | - | F | Adding MU and TTs for Inter-band UL CA test cases | 16.5.0 |
| 2020-09 | RAN#89 | R5-203679 | 0936 | - | F | Updating message content in SUL test cases | 16.5.0 |
| 2020-09 | RAN#89 | R5-203682 | 0937 | - | F | Updating test case 6.5A.2.4.1-NR ACLR for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-203687 | 0939 | - | F | Updating channel configurations for Intra-band UL contiguous CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-203688 | 0940 | - | F | Updating intra-band CA UL and DL configurations | 16.5.0 |
| 2020-09 | RAN#89 | R5-203689 | 0941 | - | F | Adding MU and TTs for Intra-band UL CA test cases | 16.5.0 |
| 2020-09 | RAN#89 | R5-203690 | 0942 | - | F | Introduce general requirement for UL CA test cases | 16.5.0 |
| 2020-09 | RAN#89 | R5-203691 | 0943 | - | F | Updating NR test case 6.2A.1- MOP for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-203696 | 0946 | - | F | Addition of general clause 7.1A | 16.5.0 |
| 2020-09 | RAN#89 | R5-203697 | 0947 | - | F | Updating REFSENS minimum requirements for Intra-band non-contiguous CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-203698 | 0948 | - | F | Update of 7.4A.2-Maximum input level for 3DL CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-203700 | 0950 | - | F | Update of test case 7.6A.2-Inband blocking for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-203701 | 0951 | - | F | Update of test case 7.6A.2.2 Inband blocking for 3DL CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-203735 | 0956 | - | F | Add intra-band contiguous CA to 6.3A.2 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203748 | 0958 | - | F | Change of RB allocation start for test case 6.3.4.3 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203777 | 0960 | - | F | Update of NR test case 6.2.1 UE MOP for n30 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203778 | 0961 | - | F | Update of NR test case 6.2.2 UE MPR for n30 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203780 | 0962 | - | F | Update of NR test case 6.2D.1 UE MOP for UL MIMO for n30 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203783 | 0964 | - | F | Update of NR test case 6.5.3.2 Spurious Emissions for UE Co-Ex for n30 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203786 | 0965 | - | F | Update of NR test case 7.3 UE Ref Sens for n30 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203788 | 0967 | - | F | Update of NR test case 7.6.3 UE OBB for n30 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203789 | 0968 | - | F | Update of NR test case 7.6.4 UE NBB for n30 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203879 | 0972 | - | F | Correction of diversity characteristics requirement in section 7.2 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203880 | 0973 | - | F | Correction of UE mean power requirements Table numbers in SEM and ACLR test cases for SA FR1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203881 | 0974 | - | F | Adding NOTEs to the test requirement tables in 6.2D.2 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203885 | 0978 | - | F | Correction of test requirement for 6.2.1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-203967 | 0983 | - | F | Editorial correction of 6.2.4 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204010 | 0986 | - | F | Correction to target power level Pmin for SA UL MIMO TCs | 16.5.0 |
| 2020-09 | RAN#89 | R5-204035 | 0987 | - | F | Updating NR test case 7.6A.3 for n48 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204040 | 0989 | - | F | Update of NR test case 7.7A Spurious response for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-204054 | 0990 | - | F | Correction to test Configuration of flatness for Pi/2 BPSK | 16.5.0 |
| 2020-09 | RAN#89 | R5-204103 | 0991 | - | F | Correction of QPSK UL RMC | 16.5.0 |
| 2020-09 | RAN#89 | R5-204195 | 0996 | - | F | Update 6.5.3.2 Spurious emission for UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204202 | 0997 | - | F | Update for 7.3A.0 Minimum conformance requirements for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-204263 | 1001 | - | F | Update of CSI-RS definition for DL RMCs in TS 38.521-1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204711 | 0933 | 1 | F | Updating 6.2A.3-AMPR for CA for NS\_43 and NS\_01,NS\_43U and NS\_01 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204760 | 0934 | 1 | F | Cleaning up of Tx inter-band CA test cases | 16.5.0 |
| 2020-09 | RAN#89 | R5-204761 | 1000 | 1 | F | Editorial correction to FR1 co-existence requirements | 16.5.0 |
| 2020-09 | RAN#89 | R5-204762 | 0923 | 1 | F | Update of clause5 into TS 38.521-1 R15 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204807 | 0993 | 1 | F | Update of UE co-existence for CA\_n1-n78 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204808 | 0925 | 1 | F | Update of R16 CADC combos in TS 38.521-1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204823 | 0916 | 1 | F | Correction of test frequencies for NS\_47 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204824 | 0919 | 1 | F | Adding band n48 to maximum output power and maximum output power reduction tests | 16.5.0 |
| 2020-09 | RAN#89 | R5-204825 | 0984 | 1 | F | Addition of 25MHz for NR band n1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204826 | 0985 | 1 | F | Addition of AMPR NS\_48 for NR band n1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204827 | 0992 | 1 | F | Addition of n1 R16 new CBW into 38.521-1 Refsense test | 16.5.0 |
| 2020-09 | RAN#89 | R5-204828 | 0924 | 1 | F | Update of R16 new bands and CBWs in 38.521-1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204832 | 0952 | 1 | F | Introduce of new TC 6.3A.4.1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204833 | 0953 | 1 | F | Introduce of new TC 6.3A.4.2 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204834 | 0954 | 1 | F | Introduce of new TC 6.3A.4.3 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204835 | 0955 | 1 | F | Add intra-band contiguous CA to 6.3A.1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204836 | 0957 | 1 | F | Add intra-band contiguous CA to 6.3A.3 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204837 | 0949 | 1 | F | Adding band n48 for Blocking characteristics testing | 16.5.0 |
| 2020-09 | RAN#89 | R5-204839 | 0995 | 1 | F | Updated to FR1 general clauses for NRSL eV2X | 16.5.0 |
| 2020-09 | RAN#89 | R5-204854 | 0959 | 1 | F | Correct UE output power configuration to some UL MIMO cases | 16.5.0 |
| 2020-09 | RAN#89 | R5-204855 | 0969 | 1 | F | Removal of editor's note about missing of Rel-15 In-gap OOB blocking requirement in RAN4 spec | 16.5.0 |
| 2020-09 | RAN#89 | R5-204897 | 0929 | 1 | F | Update to 7.5A.2 ACS for 3DL CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-204898 | 0988 | 1 | F | Update of NR test case 7.5A Adjacent Channel selectivity for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-204905 | 0975 | 1 | F | Correction of 6.2D.1 and Test applicability of 6.5.2.4.2 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204906 | 0976 | 1 | F | Correction of test requirement for 6.2.4 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204907 | 0977 | 1 | F | Addition of test procedure and test requirement for PC2 fallback to PC3 for network signalling value NS\_04 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204908 | 0979 | 1 | F | Adding additional tolerance to test requirement of 6.2.1, 6.2.2, 6.2.3 and 6.2.4 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204909 | 0980 | 1 | F | Update of 6.2.3 for minimum conformance requirements for A-MPR | 16.5.0 |
| 2020-09 | RAN#89 | R5-204910 | 0970 | 1 | F | Alignment of requirements in 7.6.3 and 7.6A.3 with the core spec | 16.5.0 |
| 2020-09 | RAN#89 | R5-204911 | 0971 | 1 | F | Removal of SDL bands from single carrier Rx TCs 7.6.2, 7.6.3 and 7.6.4 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204912 | 0981 | 1 | F | Update of SA Rx test cases for 4Rx UEs | 16.5.0 |
| 2020-09 | RAN#89 | R5-204913 | 0998 | 1 | F | Update Uplink power control window size for SA RX TCs | 16.5.0 |
| 2020-09 | RAN#89 | R5-204960 | 0928 | 1 | F | Addition of test cases for n28 with CBW of 30MHz | 16.5.0 |
| 2020-09 | RAN#89 | R5-204961 | 0922 | 1 | F | n26 Rx requirements in 38.521-1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204962 | 0966 | 1 | F | Update of NR test case 7.6.2 UE IBB for n30 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204974 | 0945 | 1 | F | Updating of NR test case 6.2A.4-Configured output power for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-204980 | 0930 | 2 | F | Corrections and additions to 7.3A | 16.5.0 |
| 2020-09 | RAN#89 | R5-204981 | 0931 | 2 | F | Completing 3CA Rx cases 7.5A.2 and 7.7A.2 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204984 | 0944 | 1 | F | Update of NR test case 6.2A.2-MPR for CA | 16.5.0 |
| 2020-09 | RAN#89 | RP-201670 | 1002 | - | F | Adding FR1 PDCCH Aggregation Level in Annex C.3 | 16.5.0 |
| 2020-12 | RAN#90 | R5-205252 | 1005 | - | F | Adding NR Band n53 to UE maximum output power and MPR test cases | 16.6.0 |
| 2020-12 | RAN#90 | R5-205254 | 1007 | - | F | Adding NR Band n53 into Spurious emission for UE co-existence | 16.6.0 |
| 2020-12 | RAN#90 | R5-205299 | 1011 | - | F | Update of clause 5 in TS 38.521-1 R15 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205490 | 1014 | - | F | Update of Reference sensitivity power level for R16 new CBW of n3 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205493 | 1015 | - | F | Correction of diversity characteristics requirement in section 7.2 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205494 | 1016 | - | F | Correction of minimum conformance requirements and test requirement for narrow band blocking for Intra-band contiguous CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-205495 | 1017 | - | F | Correction of Allocated slots per Frame for DL reference measurement channels | 16.6.0 |
| 2020-12 | RAN#90 | R5-205535 | 1018 | - | F | Correcting RB start for test case 6.3C.4.2 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205537 | 1019 | - | F | Update of NR test case 6.2.1 UE MOP for n14 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205550 | 1023 | - | F | Update of NR test case 7.3 UE Ref Sens for n14 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205551 | 1024 | - | F | Update of NR test case 7.6.2 UE IBB for n14 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205552 | 1025 | - | F | Update of NR test case 7.6.3 UE OBB for n14 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205553 | 1026 | - | F | Update of NR test case 7.6.4 UE NBB for n14 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205557 | 1028 | - | F | Updating abbreviation list | 16.6.0 |
| 2020-12 | RAN#90 | R5-205569 | 1031 | - | F | Adding 30 MHz channel bandwidth to test requirements for UL MIMO Spurious | 16.6.0 |
| 2020-12 | RAN#90 | R5-205574 | 1032 | - | F | Co-existence Table corrections related to n65 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205700 | 1043 | - | F | Addition of V2X reference measurement channels | 16.6.0 |
| 2020-12 | RAN#90 | R5-205731 | 1045 | - | F | Introduce General requirement for CA configurations | 16.6.0 |
| 2020-12 | RAN#90 | R5-205732 | 1046 | - | F | Adding RB allocation for channel BW 70MHz | 16.6.0 |
| 2020-12 | RAN#90 | R5-205733 | 1047 | - | F | Updating test configuration tables for intra-band UL CA test cases | 16.6.0 |
| 2020-12 | RAN#90 | R5-205734 | 1048 | - | F | Updating NR test case MOP for MIMO for several NR bands | 16.6.0 |
| 2020-12 | RAN#90 | R5-205735 | 1049 | - | F | Updating NR test case MPR for MIMO for several NR bands | 16.6.0 |
| 2020-12 | RAN#90 | R5-205736 | 1050 | - | F | Updating minimum requirement for OBW for inter-band CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-205737 | 1051 | - | F | Update OBW testing for intra-band UL CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-205743 | 1055 | - | F | Updating NR test case 7.4A.2-Maximum input level for 3 DL CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-205745 | 1056 | - | F | Updating NR test case 7.5A.2- Adjacent channel selectivity for 3DL CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-205746 | 1057 | - | F | Updating NR test case 7.6A.2.2- In-band Blocking for 3DL CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-205748 | 1058 | - | F | Updating Narrow band blocking for CA for band n48 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205790 | 1061 | - | F | Removing the highest SCS from test configuration for Tx spurious emissions for UL MIMO | 16.6.0 |
| 2020-12 | RAN#90 | R5-205791 | 1062 | - | F | Update of MPR for PC3 half Pi BPSK DMRS in 6.2.2 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205796 | 1066 | - | F | Update of MOP for UL MIMO with ULFPTx in 6.2D.1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205799 | 1068 | - | F | Addition of new test case 6.5D.3\_1.2 UE co-existence spurious emissions for Rel-16 UL MIMO | 16.6.0 |
| 2020-12 | RAN#90 | R5-205800 | 1069 | - | F | Addition of new test case 6.5D.3\_1.3 additional spurious emissions for Rel-16 UL MIMO | 16.6.0 |
| 2020-12 | RAN#90 | R5-205852 | 1070 | - | F | Correction of RAR timing for PRACH TC 6.3.3.4 and EVM TC 6.4.2.1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205872 | 1073 | - | F | Editorial correction to minimum requirements of REFSENS for CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-205879 | 1075 | - | F | Update of Rx test cases to add 40MHz for NR band n38 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205882 | 1076 | - | F | Update of A-MPR for NS\_18 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206022 | 1082 | - | F | Update of 6.3.1 for UE minimum output power test | 16.6.0 |
| 2020-12 | RAN#90 | R5-206088 | 1088 | - | F | Correction to ASEM for NS\_27 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206160 | 1102 | - | F | Correction of Test Message Table 6.3.3.4.4.3-2 in section 6.3.3.4 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206638 | 1071 | 1 | F | Handling of delta Tib for UE supporting multiple band combinations | 16.6.0 |
| 2020-12 | RAN#90 | R5-206639 | 1077 | 1 | F | Update of A-MPR for NS\_46 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206640 | 1090 | 1 | F | Update for 6.5.3.2 Spurious emission for UE co-existence | 16.6.0 |
| 2020-12 | RAN#90 | R5-206641 | 1092 | 1 | F | Correction for 6.3.3.6 SRS time mask | 16.6.0 |
| 2020-12 | RAN#90 | R5-206642 | 1098 | 1 | F | Correction to spurious co-existence requirements for n28 and n83 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206643 | 1044 | 1 | F | CR to update DMRS position in UL RMC for FR1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206718 | 1037 | 1 | F | Addition of UL CA combinations to maximum output power for Inter-band CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-206719 | 1035 | 1 | F | Update of 7.5A.3 Adjacent channel selectivity for 4DL CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-206740 | 1006 | 1 | F | Adding NR Band n53 to UE additional maximum output power reduction test cases | 16.6.0 |
| 2020-12 | RAN#90 | R5-206741 | 1008 | 1 | F | Adding NS\_45 to Additional spurious emissions test case for NR Band n53 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206742 | 1020 | 1 | F | Update of NR test case 6.2.2 UE MPR for n14 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206743 | 1021 | 1 | F | Update of NR test case 6.2.3 UE A-MPR for n14 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206744 | 1022 | 1 | F | Update of NR test case 6.5.3.2 Spurious Emissions for UE Co-Ex for n14 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206745 | 1029 | 1 | F | Adding A-MPR test for band n30 with NS\_21 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206746 | 1030 | 1 | F | Adding additional Spectrum emission test for band n30 with NS\_21 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206747 | 1041 | 1 | F | Update of NR test case 6.5.2.3 Additional Spectrum Emission Mask for n30 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206748 | 1074 | 1 | F | Update of Tx test cases to add 40MHz for NR band n38 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206749 | 1080 | 1 | F | Correction of 6.3.2 for UE transmit OFF power test | 16.6.0 |
| 2020-12 | RAN#90 | R5-206750 | 1096 | 1 | F | Adding n26 Tx requirements | 16.6.0 |
| 2020-12 | RAN#90 | R5-206751 | 1009 | 1 | F | Adding NR Band n53 Receiver requirements | 16.6.0 |
| 2020-12 | RAN#90 | R5-206761 | 1010 | 1 | F | Update of Test case 6.3A.4.1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206762 | 1034 | 1 | F | Update of Test case 6.3A.4.3 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206763 | 1059 | 1 | F | Updating NR test case 7.8A.2.2-Wide band Intermodulation for 3DL CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-206764 | 1078 | 1 | F | Addition of 6.2E.1.1 V2X MOP for non-concurrent | 16.6.0 |
| 2020-12 | RAN#90 | R5-206765 | 1079 | 1 | F | Addition of 7.3E.2 V2X REFSENS for non-concurrent | 16.6.0 |
| 2020-12 | RAN#90 | R5-206766 | 1063 | 1 | F | Update of SEM for PC3 half Pi BPSK DMRS in 6.5.2.2 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206767 | 1064 | 1 | F | Update of NR ACLR for PC3 half Pi BPSK DMRS in 6.5.2.4.1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206768 | 1067 | 1 | F | Addition of new test case 6.5D.3\_1.1 general spurious emissions for Rel-16 UL MIMO | 16.6.0 |
| 2020-12 | RAN#90 | R5-206863 | 1060 | 1 | F | Update of signalling configuration for almost contiguous allocation across clause 6 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206864 | 1053 | 1 | F | Updating NR test case REFSENS for 2DL CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-206879 | 1036 | 1 | F | Addition of 2UL CA exception to reference sensitivity test case | 16.6.0 |
| 2020-12 | RAN#90 | R5-206880 | 1039 | 1 | F | Update of Refsense test case for CA\_n1A-n78A into 38.521-1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206881 | 1040 | 1 | F | Update of Refsense test case for CA\_n1A-n77A into 38.521-1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206882 | 1042 | 1 | F | Update of R16 CADC configurations into 38.521-1 clause 5 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206888 | 1089 | 1 | F | Update for 6.5D.3.3 Additional spurious emissions for UL MIMO | 16.6.0 |
| 2020-12 | RAN#90 | R5-206889 | 1094 | 1 | F | Update for 6.5.3.3 Additional spurious emission | 16.6.0 |
| 2020-12 | RAN#90 | R5-206890 | 1012 | 1 | F | Update of R16 new band and CBWs into TS 38.521-1 clause 5 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206891 | 1033 | 1 | F | Update of Test case 6.3A.4.2 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206892 | 1054 | 1 | F | Updating NR test case REFSENS for 3DL CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-206894 | 1027 | 1 | F | Addition of test case 6.5D.1\_1, Occupied bandwidth for UL MIMO (Rel-16 onward) | 16.6.0 |
| 2020-12 | RAN#90 | R5-206901 | 1093 | 1 | F | Update for 6.5A.3.2 Spurious emission for UE co-existence | 16.6.0 |
| 2020-12 | RAN#90 | R5-206912 | 1091 | 1 | F | Update for 6.5A.3.1 General spurious emissions for CA | 16.6.0 |
| 2021-03 | RAN#91 | R5-210169 | 1106 | - | F | Addition of TC 7.3A.0.3.2.4 RIB,c for four bands | 16.7.0 |
| 2021-03 | RAN#91 | R5-210170 | 1107 | - | F | Update of TC 7.7A.3 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210290 | 1108 | - | F | Clarification of uplink power measurement uncertainty in test case 6.3.4.3 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210291 | 1109 | - | F | Message exceptions definition in test case 6.2.2 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210384 | 1114 | - | F | Add TT to power control for UL CA | 16.7.0 |
| 2021-03 | RAN#91 | R5-210385 | 1115 | - | F | Update MU/TT on power control for UL CA | 16.7.0 |
| 2021-03 | RAN#91 | R5-210419 | 1116 | - | F | Addition of new test case 6.4E.2.2.1 Error Vector Magnitude for V2X for non-concurrent operation | 16.7.0 |
| 2021-03 | RAN#91 | R5-210423 | 1118 | - | F | Addition of 6.5E.2.2.1D | 16.7.0 |
| 2021-03 | RAN#91 | R5-210424 | 1119 | - | F | Addition of 6.5E.2.3.1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210425 | 1120 | - | F | Addition of 6.5E.2.3.1D | 16.7.0 |
| 2021-03 | RAN#91 | R5-210426 | 1121 | - | F | Addition of 6.5E.2.4.1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210427 | 1122 | - | F | Addition of 6.5E.2.4.1D | 16.7.0 |
| 2021-03 | RAN#91 | R5-210428 | 1123 | - | F | Addition of 6.5E.3.2.1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210429 | 1124 | - | F | Addition of 6.5E.3.2.1D | 16.7.0 |
| 2021-03 | RAN#91 | R5-210485 | 1125 | - | F | Correction of test purpose for 6.3.2 and 6.3D.2 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210487 | 1127 | - | F | Editorial correction for error in Table 7.6.4.4.1-1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210539 | 1129 | - | F | Introduction 4CA Reference Sensitivity test 7.3A.3 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210540 | 1130 | - | F | Introduction 4CA Maximum Input Level test 7.4A.3 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210541 | 1131 | - | F | Introduction 4CA In-Band Blocking test 7.6A.2.3 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210723 | 1133 | - | F | Omitting of FR1 Rx cases with UL-MIMO on TDD bands | 16.7.0 |
| 2021-03 | RAN#91 | R5-210782 | 1136 | - | F | Update of A-MPR minimum requirements for Rel-16 DMRS | 16.7.0 |
| 2021-03 | RAN#91 | R5-210787 | 1139 | - | F | Adding additional TP for half Pi BPSK DMRS to SEM test case for SUL | 16.7.0 |
| 2021-03 | RAN#91 | R5-210788 | 1140 | - | F | Adding additional TP for half Pi BPSK DMRS to NR ACLR test case for SUL | 16.7.0 |
| 2021-03 | RAN#91 | R5-210793 | 1142 | - | F | Update of the test configuration for carrier leakage for SUL | 16.7.0 |
| 2021-03 | RAN#91 | R5-210899 | 1146 | - | F | Removal of the highest SCS from test configuration for Tx spurious emissions for CA | 16.7.0 |
| 2021-03 | RAN#91 | R5-210902 | 1147 | - | F | Updating test case 7.3A.1\_1 for 4Rx test requirements | 16.7.0 |
| 2021-03 | RAN#91 | R5-210903 | 1148 | - | F | Editorial correction to clause 7.3.1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210906 | 1150 | - | F | Updating A-SEM for MIMO testing for NS\_04 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210908 | 1152 | - | F | Updating test applicability of test case 6.5D.2.4.2-UTRA ACLR for UL MIMO | 16.7.0 |
| 2021-03 | RAN#91 | R5-210911 | 1154 | - | F | Correction to test configuration table Test IDs for test case 6.5D.3.3 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210912 | 1155 | - | F | Correction to test case 6.2.3 AMPR for NS\_24 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210918 | 1160 | - | F | Updating MOP and MPR for MIMO testing for several NR bands | 16.7.0 |
| 2021-03 | RAN#91 | R5-210919 | 1161 | - | F | Updating 6.5A.3.1.0 for intra-band CA | 16.7.0 |
| 2021-03 | RAN#91 | R5-210920 | 1162 | - | F | Updating test requirement of CA test cases for CA configurations including n90 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210922 | 1164 | - | F | Updating test case 7.6A.4 for band n48 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210991 | 1174 | - | F | Update for 7.3.2 Reference sensitivity power level | 16.7.0 |
| 2021-03 | RAN#91 | R5-210995 | 1175 | - | F | Update for 6.5.3.2 Spurious emission for UE co-existence\_R15 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210996 | 1176 | - | F | Addition of test case 6.5D.2\_1.4.2, UTRA ACLR for UL MIMO (Rel-16 onward) | 16.7.0 |
| 2021-03 | RAN#91 | R5-211008 | 1178 | - | F | Update of CA\_n1A-n78C into 3DL CA Refsense TC 7.3A.2 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211026 | 1180 | - | F | Update of CA\_n1A-n78C into 3DL CA maximum input level TC 7.4A.2 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211037 | 1181 | - | F | Addition of minimum requirement for intra-band UL CA in the test case 6.4A.2 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211040 | 1182 | - | F | Addition of 70M into 38.521-1 TC6.3A.1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211041 | 1183 | - | F | Addition of 70M into 38.521-1 TC6.3D | 16.7.0 |
| 2021-03 | RAN#91 | R5-211048 | 1185 | - | F | Correction to test tolerance for FR1 blocking tests | 16.7.0 |
| 2021-03 | RAN#91 | R5-211092 | 1186 | - | F | Test ID separation to powerBoostPiBPSK 1 and 0 in Table 6.5.2.2.4.1-1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211109 | 1187 | - | F | Corrections to subclauses in 38.521-1 with appropriate subclause level and heading styles | 16.7.0 |
| 2021-03 | RAN#91 | R5-211113 | 1188 | - | F | Corrections to reference figures for transmission bandwidth in FR1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211133 | 1189 | - | F | Addition of ULFPTx in MPR test case | 16.7.0 |
| 2021-03 | RAN#91 | R5-211176 | 1191 | - | F | Reference to measurement BW corrected in 6.5D.4 TX intermodulation test case | 16.7.0 |
| 2021-03 | RAN#91 | R5-211274 | 1195 | - | F | Updating 6.5A.3.2 for CA\_n1A-n79A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211613 | 1184 | 1 | F | Spurious emissions for UE co-existence update to core specs | 16.7.0 |
| 2021-03 | RAN#91 | R5-211657 | 1192 | 1 | F | PC1 and PC3 Updates for Band n14 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211676 | 1110 | 1 | F | Clarifications for ON/OFF time mask for UL MIMO test case | 16.7.0 |
| 2021-03 | RAN#91 | R5-211677 | 1126 | 1 | F | Correction of test frequencies for NR band n28 30MHz test channel bandwidth of CA SUL and UL MIMO test cases in section 6 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211678 | 1151 | 1 | F | Updating AMPR for MIMO test case for NS\_35 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211679 | 1153 | 1 | F | Correction to RB allocation start for test case 6.3D.4.2 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211680 | 1128 | 1 | F | Correction of test frequencies for NR band n28 30MHz test channel bandwidth of CA SUL and UL MIMO test cases in section 7 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211681 | 1149 | 1 | F | Updating test case 7.3C.2-Reference sensitivity power level for SUL | 16.7.0 |
| 2021-03 | RAN#91 | R5-211682 | 1143 | 1 | F | Update of clause 5 to R15 TS 38.521-1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211764 | 1113 | 1 | F | Update of 7.5A.3 Adjacent channel selectivity for 4DL CA | 16.7.0 |
| 2021-03 | RAN#91 | R5-211765 | 1144 | 1 | F | Update of R16 CADC configurations into TS38.521-1 clause 5 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211786 | 1134 | 1 | F | Correction of test points for NS\_48 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211787 | 1135 | 1 | F | Addition of A-MPR test for NS\_49 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211788 | 1177 | 1 | F | Update for 6.5.3.2 Spurious emission for UE co-existence\_R16 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211804 | 1172 | 1 | F | Updating Editors Note in 6.2A.2 and 6.2A.4 for intra-band UL CA | 16.7.0 |
| 2021-03 | RAN#91 | R5-211805 | 1159 | 1 | F | Updating general requirements for intra-band non-contiguous CA | 16.7.0 |
| 2021-03 | RAN#91 | R5-211806 | 1117 | 1 | F | Addition of 6.5E.2.2.1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211807 | 1137 | 1 | F | Adding test point for Rel-16 DMRS in EVM equalizer spectrum flatness test case | 16.7.0 |
| 2021-03 | RAN#91 | R5-211808 | 1141 | 1 | F | Addition of new test case 6.4C.2.5 EVM equalizer spectrum flatness for half Pi BPSK DMRS for SUL | 16.7.0 |
| 2021-03 | RAN#91 | R5-211911 | 1165 | 1 | F | Adding NR test case-Time mask for Uplink carriers switching | 16.7.0 |
| 2021-03 | RAN#91 | R5-211912 | 1166 | 1 | F | Adding MU and TT for Uplink carriers switching testing | 16.7.0 |
| 2021-03 | RAN#91 | R5-211915 | 1138 | 1 | F | Adding additional TP for half Pi BPSK DMRS to MPR test case for SUL | 16.7.0 |
| 2021-03 | RAN#91 | R5-210804 | 1145 | - | F | Update of R17 CADC configurations into TS38.521-1 clause 5 | 17.0.0 |
| 2021-03 | RAN#91 | R5-210932 | 1169 | - | F | Updating Additional spurious emissions testing for SUL band n83 and n84 | 17.0.0 |
| 2021-03 | RAN#91 | R5-210933 | 1170 | - | F | Updating clause 6.2C.2 for Rel-17 SUL combinations | 17.0.0 |
| 2021-03 | RAN#91 | R5-210934 | 1171 | - | F | Updating REFSENS for SUL for new R17 configurations | 17.0.0 |
| 2021-03 | RAN#91 | R5-211174 | 1190 | - | F | Addition of R17 new CBWs into 38.521-1 clause 5 | 17.0.0 |
| 2021-03 | RAN#91 | R5-211837 | 1167 | 1 | F | Updating MPR testing for SUL band n83 | 17.0.0 |
| 2021-03 | RAN#91 | R5-211838 | 1168 | 1 | F | Updating AMPR testing for SUL band n83 and n84 | 17.0.0 |
| 2021-06 | RAN#92 | R5-212029 | 1198 | - | F | Updating clause 6.2C.2 for Rel-17 SUL combinations | 17.1.0 |
| 2021-06 | RAN#92 | R5-212168 | 1201 | - | F | Removal of technical content in 38.521-1 v16.7.0 and substitution with pointer to the next Release | 17.1.0 |
| 2021-06 | RAN#92 | R5-212340 | 1216 | - | F | Typos in references of clause 6.5.3.2 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212619 | 1218 | - | F | Correction to A-MPR test ID for NS\_24 in TC6.2.3 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212668 | 1220 | - | F | Correction of A-MPR test requirements for NS\_04 band n41 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212671 | 1222 | - | F | Addition of A-MPR test requirements for NS\_03 band n70 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212682 | 1227 | - | F | Update of 70M CBW into TC 6.3D.3 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212704 | 1228 | - | F | Update of 70M CBW into TC 6.3.3.2 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212739 | 1229 | - | F | Update of V2X in Section 5 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212740 | 1230 | - | F | Update to FR1 test case title in clause 6 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212741 | 1231 | - | F | Update to FR1 test case title in clause 7 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212839 | 1235 | - | F | Update of clause 3 for symbols and abbreviations | 17.1.0 |
| 2021-06 | RAN#92 | R5-212856 | 1240 | - | F | Correction of the test step number in the test requirement section | 17.1.0 |
| 2021-06 | RAN#92 | R5-212914 | 1241 | - | F | Editorial correction of 6.2.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212926 | 1243 | - | F | Addition of 6.1E General section | 17.1.0 |
| 2021-06 | RAN#92 | R5-212927 | 1244 | - | F | Addition of 6.2E.2.1 V2X MPR non-concurrent | 17.1.0 |
| 2021-06 | RAN#92 | R5-212928 | 1245 | - | F | Addition of 6.3E.1.1 V2X minimum output power non-concurrent | 17.1.0 |
| 2021-06 | RAN#92 | R5-212969 | 1246 | - | F | Updating AMPR for SUL test case for n84 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212970 | 1247 | - | F | Updating UTRA ACLR for SUL testing for n84 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212971 | 1248 | - | F | Updating test case 7.6C.2 Inband Blocking for SUL | 17.1.0 |
| 2021-06 | RAN#92 | R5-212972 | 1249 | - | F | Updating test case 7.6C.3 Out-of-band blocking for SUL | 17.1.0 |
| 2021-06 | RAN#92 | R5-212974 | 1251 | - | F | Updating H.2.2 for NR SA FR1 testing | 17.1.0 |
| 2021-06 | RAN#92 | R5-212979 | 1252 | - | F | Correction to RB allocations for test case 6.2.3 A-MPR for NS\_46 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212980 | 1253 | - | F | Updating test case general spurious emission for CA\_n28A-n41A | 17.1.0 |
| 2021-06 | RAN#92 | R5-212981 | 1254 | - | F | Updating Spurious emission for UE co-existence for CA\_n28A-n41A | 17.1.0 |
| 2021-06 | RAN#92 | R5-212983 | 1255 | - | F | Updating Transmitter power for CA requirements for CA\_n28A-n41A | 17.1.0 |
| 2021-06 | RAN#92 | R5-212988 | 1257 | - | F | Updating 6.2D.3 A-MPR for UL MIMO for band n1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212989 | 1258 | - | F | Updating UTRA ACLR for MIMO testing for NR band n1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212992 | 1260 | - | F | Updating 6.2C.2 for new R17 SUL configurations | 17.1.0 |
| 2021-06 | RAN#92 | R5-212993 | 1261 | - | F | Updating test case 6.2A.1 MOP for CA for R17 configuration CA\_n28A-n79A | 17.1.0 |
| 2021-06 | RAN#92 | R5-212994 | 1262 | - | F | Correction to wrong RB allocations in NR test case 6.5C.3.3 | 17.1.0 |
| 2021-06 | RAN#92 | R5-212998 | 1265 | - | F | Updating test case 7.3C.2 REFSENS for SUL for new R17 SUL configurations | 17.1.0 |
| 2021-06 | RAN#92 | R5-212999 | 1266 | - | F | Updating REFSENS for SUL 3CC testing for new R17 SUL configurations | 17.1.0 |
| 2021-06 | RAN#92 | R5-213000 | 1267 | - | F | Updating 7.6C.3 Out-of-band blocking for SUL\_n79A-n83A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213015 | 1270 | - | F | Updating test description to enable DFT-s-OFDM modulation across clause 6 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213016 | 1271 | - | F | Updating message contents to enable DFT-s-OFDM modulation in 7.3 refsens | 17.1.0 |
| 2021-06 | RAN#92 | R5-213058 | 1275 | - | F | Update of test configuration for UTRA ACLR for Rel-16 UL MIMO | 17.1.0 |
| 2021-06 | RAN#92 | R5-213100 | 1278 | - | F | Updating 6.5D.3\_1.3 Additional spurious emissions for UL MIMO Rel-16 onward for NR band n1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213101 | 1279 | - | F | Correction to Reference sensitivity test requirements in DL CA | 17.1.0 |
| 2021-06 | RAN#92 | R5-213102 | 1280 | - | F | Corrections to band n70 reference sensitivity testing | 17.1.0 |
| 2021-06 | RAN#92 | R5-213160 | 1285 | - | F | Correction to Message Contents Condition for NR ACLR | 17.1.0 |
| 2021-06 | RAN#92 | R5-213882 | 1202 | 1 | F | Change Editors note in 6.2D.2 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213883 | 1208 | 1 | F | Update p-Max of PCC to 6.2A.1.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213884 | 1209 | 1 | F | Update p-Max of PCC to 6.2A.2.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213885 | 1210 | 1 | F | Update p-Max of PCC to 6.5A.1.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213886 | 1211 | 1 | F | Update p-Max of PCC to out of band emission for CA | 17.1.0 |
| 2021-06 | RAN#92 | R5-213887 | 1212 | 1 | F | Update p-Max of PCC to spurious emission for CA | 17.1.0 |
| 2021-06 | RAN#92 | R5-213888 | 1213 | 1 | F | Correct message content to 6.2A.4.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213889 | 1214 | 1 | F | Cleanup for TS 38.521-1spurious emission for UE co-existence table (non CA) | 17.1.0 |
| 2021-06 | RAN#92 | R5-213890 | 1215 | 1 | F | Cleanup for TS 38.521-1 spurious emission for UE co-existence table (CA Bands) | 17.1.0 |
| 2021-06 | RAN#92 | R5-213891 | 1221 | 1 | F | Correction of A-MPR and A-SEM test requirements for NS\_06 band n12 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213892 | 1242 | 1 | F | Addition of A-MPR NS\_10 test | 17.1.0 |
| 2021-06 | RAN#92 | R5-213893 | 1250 | 1 | F | Updating NR SA test frequency selection for NR band n28 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213894 | 1224 | 1 | F | Update of R15 38.521-1 clause 5 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213970 | 1256 | 1 | F | Updating test case REFSENS for CA for CA\_n28A-n41A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213971 | 1272 | 1 | F | Corrections to NR Rx CA cases | 17.1.0 |
| 2021-06 | RAN#92 | R5-213972 | 1284 | 1 | F | Update of CA\_n1A-n78C into 3DL CA TCs in 38.521-1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213978 | 1232 | 1 | F | Correction of 6.5.1 for test of channel occupied bandwidth | 17.1.0 |
| 2021-06 | RAN#92 | R5-213979 | 1233 | 1 | F | Correction of 6.5.2.2 for test of spectrum emission mask | 17.1.0 |
| 2021-06 | RAN#92 | R5-213980 | 1234 | 1 | F | Correction of 6.5.2.4 for test of adjacent channel leakage ratio | 17.1.0 |
| 2021-06 | RAN#92 | R5-213981 | 1282 | 1 | F | Update of 70M CBW into TC 6.3.3.4 PRACH time mask | 17.1.0 |
| 2021-06 | RAN#92 | R5-213982 | 1283 | 1 | F | Update of 70M CBW into 38.521-1 TC 6.3A.4.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213983 | 1223 | 1 | F | Update of R16 new CBW configurations into TS38.521-1 clause 5 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213995 | 1239 | 1 | F | Update of minimum conformance requirements for Occupied bandwidth for CA in TC 6.5A.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213998 | 1203 | 1 | F | Update of 6.5E.2.2.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213999 | 1204 | 1 | F | Update of 6.5E.2.3.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-214000 | 1205 | 1 | F | Update of 6.5E.2.4.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-214001 | 1206 | 1 | F | Update of 6.5E.3.2.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-214002 | 1207 | 1 | F | Addition of 6.5E.3.3.1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-214003 | 1236 | 1 | F | Addition of new test case 6.4E.2.2.1D Error Vector Magnitude for V2X for non-concurrent operation SL-MIMO | 17.1.0 |
| 2021-06 | RAN#92 | R5-214004 | 1237 | 1 | F | Addition of new test case 6.4E.2.4.1 In band emissions for V2X for non-concurrent operation | 17.1.0 |
| 2021-06 | RAN#92 | R5-214005 | 1238 | 1 | F | Addition of new test case 6.4E.2.4.1D In band emissions for V2X for non-concurrent operation SL-MIMO | 17.1.0 |
| 2021-06 | RAN#92 | R5-214007 | 1274 | 1 | F | Test case 6.2D.4 updated for ULFPTx | 17.1.0 |
| 2021-06 | RAN#92 | R5-214021 | 1199 | 1 | F | Updating clause 7.3C for Rel-17 SUL combinations | 17.1.0 |
| 2021-06 | RAN#92 | R5-214022 | 1263 | 1 | F | Updating REFSENS for CA test case for CA\_n28A-n79A | 17.1.0 |
| 2021-06 | RAN#92 | R5-214023 | 1268 | 1 | F | Adding new test case 7.6C.2\_1 Inband Blocking for SUL and DL CA | 17.1.0 |
| 2021-06 | RAN#92 | R5-214024 | 1269 | 1 | F | Adding new test case 7.6C.3\_1 Out-of-band blocking for SUL and DL CA | 17.1.0 |
| 2021-06 | RAN#92 | R5-214025 | 1226 | 1 | F | Update of R17 CADC configurations into TS38.521-1 clause 5 | 17.1.0 |
| 2021-06 | RAN#92 | R5-214110 | 1225 | 1 | F | Update of R16 new CADC configurations into TS38.521-1 clause 5 | 17.1.0 |
| 2021-09 | RAN#93 | R5-214221 | 1288 | - | F | Updating clause 6.2C.2 for Rel-17 SUL combinations in TS 38.521-1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-214224 | 1289 | - | F | Update clause 7 for R17 CA and SUL RX characteristics in TS 38.521-1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-214476 | 1294 | - | F | Addition of Configured Tx Power Minimum Conformance Requirements for n41 Power Class 1.5 | 17.2.0 |
| 2021-09 | RAN#93 | R5-214477 | 1295 | - | F | Addition of MOP for UL MIMO Minimum Conformance Requirements for n41 Power Class 1.5 | 17.2.0 |
| 2021-09 | RAN#93 | R5-214479 | 1297 | - | F | Update of NR ACLR Test Requirement for n41 Power Class 1.5 | 17.2.0 |
| 2021-09 | RAN#93 | R5-214598 | 1305 | - | F | Addition of reference section for TDD DL reference measurement channels in 7.1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-214599 | 1306 | - | F | Correction of test SCS in the test configuration table | 17.2.0 |
| 2021-09 | RAN#93 | R5-214600 | 1307 | - | F | Correction of Test Frequencies in the test configuration table | 17.2.0 |
| 2021-09 | RAN#93 | R5-214601 | 1308 | - | F | Correction of Test Frequencies for NR band n28 and30MHz test channel bandwidth in the test configuration table | 17.2.0 |
| 2021-09 | RAN#93 | R5-214603 | 1310 | - | F | Unify the Terminology of normal condition in the test configuration tables | 17.2.0 |
| 2021-09 | RAN#93 | R5-214604 | 1311 | - | F | Correction of subclause titles with appropriate styles | 17.2.0 |
| 2021-09 | RAN#93 | R5-215043 | 1313 | - | F | Correcting test frequencies in test case 6.2D.4 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215073 | 1316 | - | F | Addition of 6.2E.1.1D MOP for non-concurrent with SL-MIMO | 17.2.0 |
| 2021-09 | RAN#93 | R5-215074 | 1317 | - | F | Addition of 6.2E.2.1D MPR for non-concurrent with SL-MIMO | 17.2.0 |
| 2021-09 | RAN#93 | R5-215075 | 1318 | - | F | Addition of 6.3E.1.1D Minimum output power for non-concurrent with SL-MIMO | 17.2.0 |
| 2021-09 | RAN#93 | R5-215080 | 1319 | - | F | Addition of NR ACLR for intra-band CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-215165 | 1321 | - | F | Correction of test frequencies for A-MPR NS\_47 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215185 | 1323 | - | F | Update of 6.2D.2 MPR for UL MIMO with supporting ULFPTx | 17.2.0 |
| 2021-09 | RAN#93 | R5-215214 | 1331 | - | F | Corrections on power tolerance for intra-band contiguous CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-215282 | 1334 | - | F | Introduction of CA\_n71(2A) to Rx cases | 17.2.0 |
| 2021-09 | RAN#93 | R5-215284 | 1335 | - | F | Updating message contents for SUL test cases | 17.2.0 |
| 2021-09 | RAN#93 | R5-215285 | 1336 | - | F | Removal of SUL band in NR single-carrier test cases | 17.2.0 |
| 2021-09 | RAN#93 | R5-215286 | 1337 | - | F | Editorial correction to test case 6.2A.1 and 6.2A.2 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215287 | 1338 | - | F | Correction to test procedure of test case 6.5.2.3 Additional SEM | 17.2.0 |
| 2021-09 | RAN#93 | R5-215297 | 1339 | - | F | Updating the test requirement of NR test case MPR for MIMO | 17.2.0 |
| 2021-09 | RAN#93 | R5-215298 | 1340 | - | F | Updating NR test case 6.2A.1 MOP for intra-band non-contiguous UL CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-215305 | 1344 | - | F | Updating test case 6.5A.1.1 occupied bandwidth for intra-band CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-215307 | 1345 | - | F | Updating test case 6.3A.2 Transmit OFF power for intra-band non-contiguous UL CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-215311 | 1346 | - | F | Updating MOP testing for SUL band n97 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215312 | 1347 | - | F | Updating MPR testing for SUL band n97 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215332 | 1350 | - | F | Update of requirement for spurious emission test case in 6.5A.3.2.1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215334 | 1352 | - | F | Correction of A-MPR test configuration for NS\_27 in 6.2.3 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215335 | 1353 | - | F | Correction of A-SPR test configuration for NS\_17 in 6.5.3.3 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215373 | 1354 | - | F | Update Test applicability to FR1 TC 6.3C.2 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215406 | 1359 | - | F | Update of CBW 70MHz into TC 6.3.4.2 absolute power tolerance | 17.2.0 |
| 2021-09 | RAN#93 | R5-215438 | 1360 | - | F | Update of CBW 70MHz into TC 6.3.4.3 relative power tolerance | 17.2.0 |
| 2021-09 | RAN#93 | R5-215439 | 1361 | - | F | Update of CBW 70MHz into TC 6.3A.3.1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215463 | 1366 | - | F | Correct the abbreviations for network signalling value in 38.521-1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215472 | 1368 | - | F | Correction of test configuration in test case 6.5.2.2.2 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215513 | 1372 | - | F | Update of CBW 70MHz into TC 6.3A.3.1\_1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215562 | 1374 | - | F | Introduction of Reference sensitivity for NR-U | 17.2.0 |
| 2021-09 | RAN#93 | R5-215564 | 1376 | - | F | Introduction of Spectrum emission mask for NR-U | 17.2.0 |
| 2021-09 | RAN#93 | R5-215573 | 1378 | - | F | Update for 6.5.4 Transmit intermodulation | 17.2.0 |
| 2021-09 | RAN#93 | R5-215845 | 1315 | 1 | F | Correction of UTRA ACLR for inter-band CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-215846 | 1320 | 1 | F | Adding A-MPR NS\_06 test case for band 14 power class 1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215847 | 1312 | 1 | F | Update of FR1 UL RMCs | 17.2.0 |
| 2021-09 | RAN#93 | R5-215929 | 1356 | 1 | F | Update of R16 new CBW configurations into TS38.521-1 clause 5 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215962 | 1325 | 1 | B | Introduction of MOP, MPR and configured Tx power test cases for n24 and n99 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215963 | 1327 | 1 | B | Introduction of n24 and n99 to spurious emissions and addition spurious emission test cases | 17.2.0 |
| 2021-09 | RAN#93 | R5-215964 | 1348 | 1 | F | Updating Spurious emissions for UE co-existence test cases for R17 requirements | 17.2.0 |
| 2021-09 | RAN#93 | R5-215965 | 1328 | 1 | B | Introduction of n24 to receiver sensitivity test cases | 17.2.0 |
| 2021-09 | RAN#93 | R5-215966 | 1329 | 1 | B | Introduction of n24 - blocking test cases | 17.2.0 |
| 2021-09 | RAN#93 | R5-215967 | 1358 | 1 | F | Update of R17 new band and CBWs into TS38.521-1 clause 5 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215983 | 1292 | 1 | F | Introduction of NR-U MOP test case | 17.2.0 |
| 2021-09 | RAN#93 | R5-215984 | 1293 | 1 | F | Introduction of NR-U in general clauses | 17.2.0 |
| 2021-09 | RAN#93 | R5-215985 | 1375 | 1 | F | Introduction of general spurious emission for NR-U | 17.2.0 |
| 2021-09 | RAN#93 | R5-215986 | 1298 | 1 | F | Update of Tx test cases for PC2 CA\_n3A-n41A with UL CA\_n3A-n41A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215987 | 1299 | 1 | F | Update of Tx test cases for PC2 CA\_n28A-n79A with UL CA\_n28A-n79A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215988 | 1300 | 1 | F | Update of Tx test cases for PC2 CA\_n28A-n41A with UL CA\_n28A-n41A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215989 | 1301 | 1 | F | Update of Tx test cases for PC2 CA\_n40A-n41A with UL CA\_n40A-n41A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215990 | 1302 | 1 | F | Update of Tx test cases for PC2 CA\_n3A-n41A with UL PC2 n41A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215991 | 1303 | 1 | F | Update of Tx test cases for PC2 CA\_n28A-n79A with UL PC2 n79A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215992 | 1304 | 1 | F | Update of Tx test cases for PC2 CA\_n28A-n41A with UL PC2 n41A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215999 | 1296 | 1 | F | Addition of MOP for UL MIMO Test Requirements for n41 Power Class 1.5 | 17.2.0 |
| 2021-09 | RAN#93 | R5-216000 | 1369 | 1 | F | Adding Power Class 1.5 for LTE Band 41and NR Band n41 MOP | 17.2.0 |
| 2021-09 | RAN#93 | R5-216001 | 1370 | 1 | F | Adding Power Class 1.5 for LTE Band 41and NR Band n41 MPR | 17.2.0 |
| 2021-09 | RAN#93 | R5-216002 | 1371 | 1 | F | Adding Power Class 1.5 for LTE Band 41and NR Band n41 A-MPR | 17.2.0 |
| 2021-09 | RAN#93 | R5-216029 | 1290 | 1 | F | Update of NR FR1 General ON-OFF time mask test case | 17.2.0 |
| 2021-09 | RAN#93 | R5-216030 | 1291 | 1 | F | Update of NR FR1 SRS time mask test case | 17.2.0 |
| 2021-09 | RAN#93 | R5-216031 | 1330 | 1 | F | Cleanup for spurious emission for UE co-existence table | 17.2.0 |
| 2021-09 | RAN#93 | R5-216032 | 1332 | 1 | F | Update intra-band CA to 6.2A.2.1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-216033 | 1373 | 1 | F | Update to the coherent UL-MIMO test case | 17.2.0 |
| 2021-09 | RAN#93 | R5-216034 | 1377 | 1 | F | Correction to test applicability for different NS value | 17.2.0 |
| 2021-09 | RAN#93 | R5-216035 | 1351 | 1 | F | Correction to test configuration in 7.3A.1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-216065 | 1341 | 1 | F | Updating test case 6.3A.4.1 Absolute power tolerance for intra-band non-contiguous UL CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-216066 | 1342 | 1 | F | Updating test case 6.3A.4.2 Relative power tolerance for intra-band non-contiguous UL CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-216067 | 1343 | 1 | F | Updating test case 6.3A.4.3 Aggregate power tolerance for intra-band non-contiguous UL CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-216080 | 1357 | 1 | F | Update of R17 CADC configurations into TS38.521-1 clause 5 | 17.2.0 |
| 2021-09 | RAN#93 | R5-216084 | 1333 | 1 | F | Update p-Max of PCC of intra-band CA to 6.5A.1.1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-216085 | 1364 | 1 | F | Correction of 6.2.3 for UE additional maximum output power reduction | 17.2.0 |
| 2021-09 | RAN#93 | R5-216086 | 1365 | 1 | F | Correction of 6.2.1 for UE capability IE for maximum output power | 17.2.0 |
| 2021-09 | RAN#93 | R5-216107 | 1363 | 1 | F | Update of 6.2A.1 for UE maximum output power for CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-216110 | 1362 | 1 | F | Update of 6.3.3.6 for SRS time mask test for BW 70MHz | 17.2.0 |
| 2021-09 | RAN#93 | R5-216114 | 1326 | 1 | B | Introduction of A-MPR test cases for n24 and n99 | 17.2.0 |
| 2021-09 | RAN#93 | R5-216141 | 1322 | 1 | F | Correction to IE and UE capability for low PAPR DMRS across Tx cases | 17.2.0 |
| 2021-12 | RAN#94 | R5-216512 | 1391 | - | F | Updates on FR1 On-Off time mask for UL MIMO test 6.3D.3 upon RAN4 clarifications | 17.3.0 |
| 2021-12 | RAN#94 | R5-216514 | 1392 | - | F | Editorial corrections for NS\_47 in A-MPR FR1 test 6.2.3 | 17.3.0 |
| 2021-12 | RAN#94 | R5-216515 | 1393 | - | F | Corrections for NS\_27 in A-MPR FR1 test 6.2.3 | 17.3.0 |
| 2021-12 | RAN#94 | R5-216533 | 1399 | - | F | Addition of asymmetric channel bandwidths for n24 | 17.3.0 |
| 2021-12 | RAN#94 | R5-217111 | 1410 | - | F | Clarifications for inter-band testing in 7.4.A.1 2DL CA MIL test | 17.3.0 |
| 2021-12 | RAN#94 | R5-217112 | 1411 | - | F | Clarifications for inter-band testing in 7.5.A.1 2DL CA ACS test | 17.3.0 |
| 2021-12 | RAN#94 | R5-217199 | 1412 | - | F | Update for 6.3.3.1 Transmit ON/OFF time mask general | 17.3.0 |
| 2021-12 | RAN#94 | R5-217200 | 1413 | - | F | Update for 6.3.3.6 SRS time mask | 17.3.0 |
| 2021-12 | RAN#94 | R5-217202 | 1415 | - | F | Addition of Annex E.4.7 Modified signal under test | 17.3.0 |
| 2021-12 | RAN#94 | R5-217215 | 1416 | - | F | Correction to IE and UE capability for low PAPR DMRS | 17.3.0 |
| 2021-12 | RAN#94 | R5-217216 | 1417 | - | F | Removal of low PAPR test points from 6.2.3 A-MPR | 17.3.0 |
| 2021-12 | RAN#94 | R5-217234 | 1418 | - | F | Introduction of ACLR for NR-U | 17.3.0 |
| 2021-12 | RAN#94 | R5-217235 | 1419 | - | F | Introduction of 7.3F.3 for NR-U | 17.3.0 |
| 2021-12 | RAN#94 | R5-217261 | 1421 | - | F | Addition of CA\_n26A-66A, CA\_n26A-70A, CA\_n48A-66A, CA\_n48A-70A and CA\_n48A-n71A to the UL CA Maximum output power and Tx Spurious emissions | 17.3.0 |
| 2021-12 | RAN#94 | R5-217262 | 1422 | - | F | Addition of Reference Sensitivity test for CA combinations CA\_n26A-66A, CA\_n26A-70A, CA\_n48A-66A and CA\_n48A-70A | 17.3.0 |
| 2021-12 | RAN#94 | R5-217263 | 1423 | - | F | Addition of intra-band non-contiguous + intra-band non-contiguous to 4CA Reference sensitivity, Maximum input level and blocking cases | 17.3.0 |
| 2021-12 | RAN#94 | R5-217427 | 1431 | - | F | Correction to test configuration of NS\_49 in 6.2.3 | 17.3.0 |
| 2021-12 | RAN#94 | R5-217476 | 1437 | - | F | Cleaning up General sections of NR SA test cases | 17.3.0 |
| 2021-12 | RAN#94 | R5-217479 | 1440 | - | F | Correction to PDCCH DCI format for test case 6.4A.2.3.1 | 17.3.0 |
| 2021-12 | RAN#94 | R5-217482 | 1443 | - | F | Update to test case Transmit ON/OFF time mask for SUL | 17.3.0 |
| 2021-12 | RAN#94 | R5-217485 | 1446 | - | F | Updating title of clause 6.4D | 17.3.0 |
| 2021-12 | RAN#94 | R5-217487 | 1448 | - | F | Adding intra-band contiguous CA non-contiguous RB allocations in 6.1A | 17.3.0 |
| 2021-12 | RAN#94 | R5-217492 | 1453 | - | F | Updating 6.3A.4.3 Aggregate power tolerance for intra-band CA | 17.3.0 |
| 2021-12 | RAN#94 | R5-217552 | 1455 | - | F | Addition of n3 CBW 50MHz into TC 7.3.2 Reference sensitivity power level | 17.3.0 |
| 2021-12 | RAN#94 | R5-217553 | 1456 | - | F | Editorial cleanup of message exceptions in PRACH time mask | 17.3.0 |
| 2021-12 | RAN#94 | R5-217608 | 1463 | - | F | Update to 5G V2X RMCs | 17.3.0 |
| 2021-12 | RAN#94 | R5-217609 | 1464 | - | F | Correction to 5G V2X RF tests | 17.3.0 |
| 2021-12 | RAN#94 | R5-217631 | 1466 | - | F | Update of R16 new band and CBWs into TS38.521-1 clause 5 | 17.3.0 |
| 2021-12 | RAN#94 | R5-217660 | 1469 | - | F | Update of R17 new band and CBWs into TS38.521-1 clause 5 | 17.3.0 |
| 2021-12 | RAN#94 | R5-217665 | 1471 | - | F | Update of CBW 70MHz into TC 6.3D.4.2 | 17.3.0 |
| 2021-12 | RAN#94 | R5-217686 | 1477 | - | F | Update of R16 CADC configurations into TS38.521-1 clause 5 | 17.3.0 |
| 2021-12 | RAN#94 | R5-217746 | 1478 | - | F | Update 7.5A.3 Adjacent channel selectivity for 4DL CA within RF1 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218223 | 1379 | 1 | F | Update of 6.3.3.4 PRACH time mask | 17.3.0 |
| 2021-12 | RAN#94 | R5-218224 | 1408 | 1 | F | Corrections for CA MPR table reference | 17.3.0 |
| 2021-12 | RAN#94 | R5-218225 | 1420 | 1 | F | 6.5.3 Spurious emissions-Editorial correction | 17.3.0 |
| 2021-12 | RAN#94 | R5-218226 | 1433 | 1 | F | Correction to the number of HARQ process for PUCCH format 3 with FDD condition | 17.3.0 |
| 2021-12 | RAN#94 | R5-218227 | 1438 | 1 | F | Updating SRS time mask test case | 17.3.0 |
| 2021-12 | RAN#94 | R5-218228 | 1439 | 1 | F | Correction to PDCCH DCI format for test case 6.4.2.3 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218229 | 1441 | 1 | F | Correction to NR test case 6.4A.1.1 - Frequency error for CA | 17.3.0 |
| 2021-12 | RAN#94 | R5-218230 | 1442 | 1 | F | Update to NR FR1 ON-OFF time mask for CA (2UL CA) | 17.3.0 |
| 2021-12 | RAN#94 | R5-218232 | 1475 | 1 | F | Update of NR FR1 TC 6.3A.3 Transmit ON/OFF time mask for CA | 17.3.0 |
| 2021-12 | RAN#94 | R5-218233 | 1432 | 1 | F | Correction to the periodicity of CSI-RS for tracking | 17.3.0 |
| 2021-12 | RAN#94 | R5-218280 | 1470 | 1 | F | Update of CBW 70MHz into TC 6.3D.4.1 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218281 | 1473 | 1 | F | Update of CBW 70MHz into 6.5A of 38.521-1 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218282 | 1474 | 1 | F | Update of CBW 70MHz into 6.5C of 38.521-1 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218292 | 1450 | 1 | F | Updating 6.2A.4 Configured output power for intra-band UL CA | 17.3.0 |
| 2021-12 | RAN#94 | R5-218300 | 1401 | 1 | F | Update to test case 6.4E.2.4.1 In-band emissions for V2X / non-concurrent operation | 17.3.0 |
| 2021-12 | RAN#94 | R5-218301 | 1402 | 1 | F | Update to test case 6.4E.2.4.1D In-band emissions for V2X / non-concurrent operation / SL-MIMO | 17.3.0 |
| 2021-12 | RAN#94 | R5-218302 | 1403 | 1 | F | Addition of new test case 6.4E.2.4.2 In-band emissions for V2X / con-current operation | 17.3.0 |
| 2021-12 | RAN#94 | R5-218303 | 1404 | 1 | F | Addition of new test case 6.4E.2.5.1 EVM equalizer spectrum flatness for V2X / non-concurrent operation | 17.3.0 |
| 2021-12 | RAN#94 | R5-218304 | 1405 | 1 | F | Addition of new test case 6.4E.2.5.1D EVM equalizer spectrum flatness for V2X / non-concurrent operation / SL-MIMO | 17.3.0 |
| 2021-12 | RAN#94 | R5-218305 | 1406 | 1 | F | Addition of new test case 6.4E.2.5.2 EVM equalizer spectrum flatness for V2X / con-current operation | 17.3.0 |
| 2021-12 | RAN#94 | R5-218362 | 1397 | 1 | F | Updates to A-MPR test case for n24 and n99 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218363 | 1398 | 1 | F | Updates to additional spurious emission test case for n24 and n99 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218365 | 1467 | 1 | F | Update of R17 CADC configurations into TS38.521-1 clause 5 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218373 | 1425 | 1 | F | Update of MOP test cases for PC2 CA\_n3A-n78A with UL CA\_n3A-n78A | 17.3.0 |
| 2021-12 | RAN#94 | R5-218379 | 1380 | 1 | F | Update of PC1.5 n41 MOP test requirement | 17.3.0 |
| 2021-12 | RAN#94 | R5-218380 | 1381 | 1 | F | Adding Power Class 1.5 for NR Band n79 MOP | 17.3.0 |
| 2021-12 | RAN#94 | R5-218381 | 1382 | 1 | F | Introduction of PC1.5 n79 MOP for UL MIMO | 17.3.0 |
| 2021-12 | RAN#94 | R5-218382 | 1383 | 1 | F | Introduction of PC1.5 n79 MPR | 17.3.0 |
| 2021-12 | RAN#94 | R5-218383 | 1384 | 1 | F | Introduction of PC2 n34 MOP | 17.3.0 |
| 2021-12 | RAN#94 | R5-218384 | 1385 | 1 | F | Introduction of PC2 n34 MOP for UL MIMO | 17.3.0 |
| 2021-12 | RAN#94 | R5-218385 | 1386 | 1 | F | Introduction of PC2 n34 MPR | 17.3.0 |
| 2021-12 | RAN#94 | R5-218386 | 1387 | 1 | F | Introduction of PC2 n39 MOP | 17.3.0 |
| 2021-12 | RAN#94 | R5-218387 | 1388 | 1 | F | Introduction of PC2 n39 MOP for UL MIMO | 17.3.0 |
| 2021-12 | RAN#94 | R5-218388 | 1389 | 1 | F | Introduction of PC2 n39 MPR | 17.3.0 |
| 2021-12 | RAN#94 | R5-218389 | 1390 | 1 | F | Introduction of PC2 n39 A-MPR for NS\_50 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218411 | 1468 | 1 | F | Introduction of NR-U A-MPR test case | 17.3.0 |
| 2021-12 | RAN#94 | R5-218416 | 1409 | 1 | F | Clarifications on additional UE co-ex requirements for 2 Band UL CA | 17.3.0 |
| 2021-12 | RAN#94 | R5-218417 | 1429 | 1 | F | Update of 6.2.2 for UE maximum output power reduction | 17.3.0 |
| 2021-12 | RAN#94 | R5-218418 | 1430 | 1 | F | Update of 6.2.3.3.28 for alignment of NS\_56 with RAN4 specification | 17.3.0 |
| 2021-12 | RAN#94 | R5-218419 | 1444 | 1 | F | Update to test case Transmit ON/OFF time mask for UL MIMO | 17.3.0 |
| 2021-12 | RAN#94 | R5-218420 | 1445 | 1 | F | Updating test applicability to FR1 test cases | 17.3.0 |
| 2021-12 | RAN#94 | R5-218421 | 1465 | 1 | F | Update of A-MPR NS\_04 for band n41 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218422 | 1476 | 1 | F | 38.521-1\_Corrections of test cases having impact on ETSI EN 301 908 25 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218423 | 1435 | 1 | F | Updating 7.3A.2 Reference sensitivity for CA\_n1A-n78A-n79A | 17.3.0 |
| 2021-12 | RAN#94 | R5-218456 | 1434 | 1 | F | Addition of UE co-existence requirements for band n40 to TS 38.521-1 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218457 | 1449 | 1 | F | Updating 6.2A.2 MPR for CA test case for intra-band UL CA | 17.3.0 |
| 2021-12 | RAN#94 | R5-218458 | 1451 | 1 | F | Updating 6.3A.4.1 Absolute power tolerance for intra-band CA | 17.3.0 |
| 2021-12 | RAN#94 | R5-218459 | 1454 | 1 | F | Updating 6.5A.1.1 Occupied bandwidth for CA | 17.3.0 |
| 2021-12 | RAN#94 | R5-218471 | 1462 | 1 | F | Addition of CA\_n1A-n3A into TC 7.3A Reference sensitivity for CA | 17.3.0 |
| 2021-12 | RAN#94 | R5-218476 | 1424 | 1 | F | Update of MOP test cases for PC2 CA\_n1A-n78A with UL CA\_n1A-n78A | 17.3.0 |
| 2021-12 | RAN#94 | R5-218477 | 1394 | 1 | F | PC1.5 MPR n77 n78 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218478 | 1395 | 1 | F | PC1.5 MOP n77 n78 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218481 | 1414 | 1 | F | Introduction of new test case 6.4.2.1a | 17.3.0 |
| 2022-03 | RAN#95 | R5-220071 | 1481 | - | F | Addition of Test description and Test requirement for 6.3A.2.1 Transmit OFF power for 2UL CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-220072 | 1482 | - | F | Correction of Table number in step 4 of 6.3A.4.2.1.4.1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220073 | 1483 | - | F | Correction of Test SCS in Table 6.2D.2.4.1-1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220074 | 1484 | - | F | Addition of missing clause titles for 6.5B, 6.5D.2\_1.4 and 6.5D.2\_1.4.1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220075 | 1485 | - | F | Correction of clause title styles | 17.4.0 |
| 2022-03 | RAN#95 | R5-220076 | 1486 | - | F | Correction of Test SCS in Table 7.3C.2.4.1-1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220077 | 1487 | - | F | Correction of style in Table 7.4D.4.1-1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220078 | 1488 | - | F | Correction of Test frequency in Table 7.6C.3\_1.1.4.1-1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220080 | 1489 | - | F | Adding additional tolerance to test requirement of Transmitter power test cases | 17.4.0 |
| 2022-03 | RAN#95 | R5-220081 | 1490 | - | F | Removal of Editor note about PC1 requirements in Rel-15 and Rel-16 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220082 | 1491 | - | F | Correction of table numbers in 7.6C.2\_1.1 and 7.6C.3\_1.1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220084 | 1493 | - | F | Introduction of new V2X test cases in 7.6E | 17.4.0 |
| 2022-03 | RAN#95 | R5-220086 | 1495 | - | F | Introduction of new V2X test cases in 7.8E | 17.4.0 |
| 2022-03 | RAN#95 | R5-220138 | 1497 | - | F | Update test requirements of PC2 n34 MOP for UL MIMO | 17.4.0 |
| 2022-03 | RAN#95 | R5-220139 | 1498 | - | F | Update test requirements of PC2 n39 MOP for UL MIMO | 17.4.0 |
| 2022-03 | RAN#95 | R5-220249 | 1510 | - | F | Corrected REFSENS reference in SUL Frequency error test | 17.4.0 |
| 2022-03 | RAN#95 | R5-220250 | 1511 | - | F | Correction of test requirements in spurious test 7.7D | 17.4.0 |
| 2022-03 | RAN#95 | R5-220251 | 1512 | - | F | DL RMC correction for TDD SCS 60kHz | 17.4.0 |
| 2022-03 | RAN#95 | R5-220252 | 1513 | - | F | Editorial correction to minimum requirements in test 6.2D.2 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220253 | 1514 | - | F | General corrections in FR1 6.3A.3.1 ONOFF time mask CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-220254 | 1515 | - | F | Frequency correction for NS\_27 in A-MPR test | 17.4.0 |
| 2022-03 | RAN#95 | R5-220255 | 1516 | - | F | n71 IBNC - UL allocation correction for testing REFSENS without exceptions | 17.4.0 |
| 2022-03 | RAN#95 | R5-220273 | 1518 | - | F | Clarifications on 5G NR connectivity options for RF FR1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220280 | 1520 | - | F | Update CA configurations for CA\_n41A-n79A BCS1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220349 | 1522 | - | F | Adding NR bands for UL MIMO in FR1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220362 | 1527 | - | F | Introduction of CA\_n7A-n78A reference sensitivity test requirements | 17.4.0 |
| 2022-03 | RAN#95 | R5-220537 | 1531 | - | F | Correction on test procedure and initial condition for power tolerance test cases | 17.4.0 |
| 2022-03 | RAN#95 | R5-220639 | 1532 | - | F | Editorial, correction of clause numbering in test case 6.5D.2.4.1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220752 | 1536 | - | F | Updating on additional UE co-ex requirements for 2 Band UL CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-220753 | 1537 | - | F | Updating on n74 co-existence for TS 38.521-1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220870 | 1547 | - | F | Updating MOP and Configured Tx Power TCs for CA\_n24A-n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220871 | 1548 | - | F | Updating MOP and Configured Tx Power TCs for CA\_n24A-n48A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220872 | 1549 | - | F | Updating MOP and Configured Tx Power TCs for CA\_n24A-n77A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220873 | 1550 | - | F | Updating reference sensitivity test requirement for CA combination of n24 and n41 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220874 | 1551 | - | F | Updating Delta\_RIB\_c and reference sensitivity test requirement for CA combination of n24 and n48 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220893 | 1558 | - | F | Correction to test procedure of SRS time mask | 17.4.0 |
| 2022-03 | RAN#95 | R5-220899 | 1560 | - | F | Correction to test requirement of NS\_27 in 6.2.3 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220900 | 1561 | - | F | Correction to test requirement of NS\_47 in 6.2.3 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220905 | 1563 | - | F | Correction to test CBW for Non-SUL carrier in 6.4C.2.2 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220906 | 1564 | - | F | Correction to test requirement of 6.5C.3.2 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220914 | 1566 | - | F | Correction to RMC for PUCCH format 1 test cases | 17.4.0 |
| 2022-03 | RAN#95 | R5-220915 | 1567 | - | F | Correction to connection diagram and test configuration for Tx SUL test cases | 17.4.0 |
| 2022-03 | RAN#95 | R5-220919 | 1568 | - | F | Correction to transmission slot in SRS time mask test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221046 | 1570 | - | F | Addition of 6.5.2.3 on new CBW to A-SEM for NS\_04 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221051 | 1571 | - | F | Correction of 6.2A.1 for UE maximum output power for CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221052 | 1572 | - | F | Correction of 6.2A.2 on UE MPR for CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221106 | 1573 | - | F | Correcting test applicabilities for MIMO test cases | 17.4.0 |
| 2022-03 | RAN#95 | R5-221107 | 1574 | - | F | Correcting to NR test case 6.2A.1 MOP for CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221109 | 1576 | - | F | Updating test case 6.2.3 AMPR for NS\_03 and NS\_03U | 17.4.0 |
| 2022-03 | RAN#95 | R5-221113 | 1577 | - | F | Updating General Spurious testing for CA\_n41A-n79A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221114 | 1578 | - | F | Updating A-MPR for CA testing for CA\_n41A-n79A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221116 | 1579 | - | F | Updating minimum requirements for test case 6.2.3 AMPR | 17.4.0 |
| 2022-03 | RAN#95 | R5-221117 | 1580 | - | F | Updating test case Additional spurious emissions for NS\_46 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221119 | 1582 | - | F | Updating UTRA ACLR for UL MIMO Rel-16 onward for NS\_100 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221120 | 1583 | - | F | Updating Additional spurious emissions for UL MIMO Rel-16 onward for several bands | 17.4.0 |
| 2022-03 | RAN#95 | R5-221121 | 1584 | - | F | Updating 6.1A for intra-band contiguous CA Outer1 RB allocation | 17.4.0 |
| 2022-03 | RAN#95 | R5-221122 | 1585 | - | F | Updating test case 6.2A.2 MPR for intra-band non-contiguous CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221128 | 1588 | - | F | Updating FR1 Spectrum emission mask for intra-band CA test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221130 | 1589 | - | F | Updating Relative power control tolerance testing for intra-band CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221198 | 1591 | - | F | Addition of CBW 70MHz into TC 6.5D | 17.4.0 |
| 2022-03 | RAN#95 | R5-221200 | 1592 | - | F | Addition of CBW 70MHz into Rx TCs | 17.4.0 |
| 2022-03 | RAN#95 | R5-221209 | 1593 | - | F | Updating MPR minimum requirement for NR band n97 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221244 | 1596 | - | F | Addition of CA\_n1A-n3A into TC 6.2A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221266 | 1604 | - | F | Correction of in-band emissions test cases | 17.4.0 |
| 2022-03 | RAN#95 | R5-221267 | 1605 | - | F | Correction of SRS time mask test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221322 | 1606 | - | F | Update for 6.5C.3.3 Additional spurious emissions for SUL | 17.4.0 |
| 2022-03 | RAN#95 | R5-221339 | 1610 | - | F | A-MPR updates for n77 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221361 | 1613 | - | F | Editorial update within channel raster section | 17.4.0 |
| 2022-03 | RAN#95 | R5-221675 | 1480 | 1 | F | Correction of test applicability of A-MPR | 17.4.0 |
| 2022-03 | RAN#95 | R5-221676 | 1528 | 1 | F | Alignment of test points of ACLR with MPR | 17.4.0 |
| 2022-03 | RAN#95 | R5-221677 | 1539 | 1 | F | Corrections of Tx TCs having impact on ETSI EN 301 908-25 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221678 | 1557 | 1 | F | Correction to note of general spurious emissions | 17.4.0 |
| 2022-03 | RAN#95 | R5-221679 | 1559 | 1 | F | Correction to test requirement of 6.2.4 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221680 | 1562 | 1 | F | Correction to measurement timing for inter-band CA with FDD and TDD | 17.4.0 |
| 2022-03 | RAN#95 | R5-221681 | 1565 | 1 | F | Editorial correction to SUL test cases | 17.4.0 |
| 2022-03 | RAN#95 | R5-221682 | 1607 | 1 | F | Editorial correction to clause 6.5.3.2 and 6.5.3.3 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221683 | 1541 | 1 | F | Update to statistical testing | 17.4.0 |
| 2022-03 | RAN#95 | R5-221684 | 1603 | 1 | F | Correction to FR1 UL RMCs | 17.4.0 |
| 2022-03 | RAN#95 | R5-221758 | 1509 | 1 | F | Update Spurious emissions for UE co-existence for CA\_n3A-n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221759 | 1517 | 1 | F | Update Spurious emissions for UE co-existence for CA\_n41A-n79A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221760 | 1508 | 1 | F | Update Reference sensitivity test case for CA\_n3A-n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221761 | 1526 | 1 | F | Introduction of CA\_n5A-n78A reference sensitivity test requirements | 17.4.0 |
| 2022-03 | RAN#95 | R5-221762 | 1538 | 1 | F | Introduction of CA\_n5A-n7A and CA\_n7A\_n78A maximum output power test requirements | 17.4.0 |
| 2022-03 | RAN#95 | R5-221763 | 1611 | 1 | F | MSD test configurations modification for US inter-band CA combinations with n77 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221764 | 1507 | 1 | F | Update operating bands and CA configurations for CA\_n3A-n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221765 | 1553 | 1 | F | General updates of clause 5 for R16 CADC configurations | 17.4.0 |
| 2022-03 | RAN#95 | R5-221788 | 1597 | 1 | F | New channel bandwidth for n25. UL-MIMO. | 17.4.0 |
| 2022-03 | RAN#95 | R5-221789 | 1602 | 1 | F | Addition of CBHWs 25 MHz, 30 MHz, 40 MHz for n25 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221790 | 1598 | 1 | F | New channel bandwidth for n25. refsens and UL-MIMO | 17.4.0 |
| 2022-03 | RAN#95 | R5-221791 | 1540 | 1 | F | General updates of clause 5 for R16 new CBW configurations | 17.4.0 |
| 2022-03 | RAN#95 | R5-221794 | 1581 | 1 | F | Updating test case AMPR for MIMO | 17.4.0 |
| 2022-03 | RAN#95 | R5-221795 | 1586 | 1 | F | Updating Absolute power tolerance for intra-band non-contiguous CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221796 | 1587 | 1 | F | Updating FR1 ACLR for intra-band CA test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221817 | 1492 | 1 | F | Introduction of new V2X test cases in 6.3E.2 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221818 | 1542 | 1 | F | Update to NR V2X test cases with non-concurrent operation | 17.4.0 |
| 2022-03 | RAN#95 | R5-221819 | 1543 | 1 | F | Addition of 6.2E.2.2 MPR for concurrent operation | 17.4.0 |
| 2022-03 | RAN#95 | R5-221820 | 1494 | 1 | F | Introduction of new V2X test cases in 7.7E | 17.4.0 |
| 2022-03 | RAN#95 | R5-221870 | 1601 | 1 | F | Update of R17 new CBW 45M into refsense TC | 17.4.0 |
| 2022-03 | RAN#95 | R5-221877 | 1519 | 1 | F | Update of R17 NR inter-band CA Tx requirements within FR1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221878 | 1521 | 1 | F | Update of R17 NR inter-band CA Rx requirements within FR1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221879 | 1552 | 1 | F | Updating Delta\_RIB\_c and reference sensitivity test requirement for CA combination of n24 and n77 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221880 | 1569 | 1 | F | Addition of several CA combinations to Reference Sensitivity test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221881 | 1554 | 1 | F | General updates of clause 5 for R17 CADC configurations | 17.4.0 |
| 2022-03 | RAN#95 | R5-221882 | 1590 | 1 | F | Updating clause 5.2C for R17 SUL configurations | 17.4.0 |
| 2022-03 | RAN#95 | R5-221894 | 1599 | 1 | F | Introduction of NR-U OFF power test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221895 | 1600 | 1 | F | Introduction of NR-U General ON/OFF time mask test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221896 | 1529 | 1 | F | Update of MOP test cases for PC2 CA\_n1A-n78A with UL CA\_n1A-n78A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221897 | 1530 | 1 | F | Update of MOP test cases for PC2 CA\_n3A-n78A with UL CA\_n3A-n78A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221898 | 1534 | 1 | F | Update superscripts of power class for inter-band CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221899 | 1535 | 1 | F | Update MOP for 2 bands DL and 1 band UL CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221900 | 1594 | 1 | F | Update MOP for Intra-band contiguous CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221901 | 1595 | 1 | F | Update MOP for Intra-band non-contiguous CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221902 | 1505 | 1 | F | Update UL CA configurations for PC2 and PC1.5 CA\_n41C | 17.4.0 |
| 2022-03 | RAN#95 | R5-221903 | 1506 | 1 | F | Update configuration for PC2 CA\_n3A-n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221904 | 1502 | 1 | F | Update NR ACLR test case for PC1.5 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221905 | 1496 | 1 | F | Update TC Frequency Error for DSS | 17.4.0 |
| 2022-03 | RAN#95 | R5-221906 | 1499 | 1 | F | Update TC Frequency Error for UL MIMO for DSS | 17.4.0 |
| 2022-03 | RAN#95 | R5-221907 | 1500 | 1 | F | Update TC Frequency Error for CA for DSS | 17.4.0 |
| 2022-03 | RAN#95 | R5-221912 | 1609 | 1 | F | Update for 6.4.2.1a EVM including symbols with transient period | 17.4.0 |
| 2022-03 | RAN#95 | R5-221930 | 1575 | 1 | F | Updating message contents for REFSENS for 2DL CA exceptions testing | 17.4.0 |
| 2022-06 | RAN#96 | R5-222174 | 1616 | - | F | Correction to n46 ARFCN | 17.5.0 |
| 2022-06 | RAN#96 | R5-222200 | 1617 | - | F | Removing the empty space in the table number of Table 7.3.2.3-1a and correct the style of table title of Table 7.3.2.3-1b | 17.5.0 |
| 2022-06 | RAN#96 | R5-222201 | 1618 | - | F | Correction of test metric of out of band emission for UL MIMO | 17.5.0 |
| 2022-06 | RAN#96 | R5-222202 | 1619 | - | F | Correction of Test Environment in Table 6.5A.2.2.1.4.1-2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222203 | 1620 | - | F | Correction of test applicability of 6.4.2.5 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222204 | 1621 | - | F | Moving test requirement of 6.3E.1.1D to the correct section and correction of style of some table notes | 17.5.0 |
| 2022-06 | RAN#96 | R5-222205 | 1622 | - | F | Correction of clause style in 6.2E.2.2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222206 | 1623 | - | F | Removing FFS for the test configuration table in 6.2E.1.1.4.1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222241 | 1629 | - | F | Update Spurious emissions for UE co-existence for CA\_n41C | 17.5.0 |
| 2022-06 | RAN#96 | R5-222310 | 1631 | - | F | Introduction of Transmitter power for NR-DC | 17.5.0 |
| 2022-06 | RAN#96 | R5-222311 | 1632 | - | F | Introduction of UE maximum output power reduction for NR-DC | 17.5.0 |
| 2022-06 | RAN#96 | R5-222312 | 1633 | - | F | Introduction of UE additional maximum output power reduction for NR-DC | 17.5.0 |
| 2022-06 | RAN#96 | R5-222313 | 1634 | - | F | Introduction of Configured output power for inter-band NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222327 | 1648 | - | F | Editorial correction for references to Table 5.5A.3-1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222331 | 1649 | - | F | FR1 - 6.5A.3.2 - Spurious for co-existence - correction for CA\_n41-n79 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222334 | 1652 | - | F | Reference correction in test case 6.5C.4 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222335 | 1653 | - | F | Correction of min value for A-MPR - FR1 - NS\_44 - Test ID 17 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222336 | 1654 | - | F | Replace n79C by n77C in test case 6.2A.2.1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222337 | 1655 | - | F | Editorial correction in Test IDs in FR1 test case 7.5A.2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222338 | 1656 | - | F | Corrections for n50 and n79 in FR1 test case 7.3.2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222339 | 1657 | - | F | Editorial corrections for FR1 in annex F.1.2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222351 | 1659 | - | F | Update of reference sense test case 7.3.2 for n48 and CWBs 30 and 70 MHz | 17.5.0 |
| 2022-06 | RAN#96 | R5-222352 | 1660 | - | F | Update of reference sense test case 7.3.2 for n2 and CWBs 25 30 and 40 MHz | 17.5.0 |
| 2022-06 | RAN#96 | R5-222353 | 1661 | - | F | Update of reference sense test case 7.3.2 for n5 and CWB 25 MHz | 17.5.0 |
| 2022-06 | RAN#96 | R5-222354 | 1662 | - | F | Introducing CBW 70 MHz for Default Downlink Power levels in Annex C | 17.5.0 |
| 2022-06 | RAN#96 | R5-222355 | 1663 | - | F | Introducing CBW 30 MHz for Characteristics of the Interfering Signalling in Annex D | 17.5.0 |
| 2022-06 | RAN#96 | R5-222356 | 1664 | - | F | Introducing CBW 70 MHz for Characteristics of the Interfering Signalling in Annex D | 17.5.0 |
| 2022-06 | RAN#96 | R5-222448 | 1667 | - | F | Editorial correction of REFSENS test case 7.3.2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222450 | 1669 | - | F | Correction of REFSENS test case for n66 and CBW 25 and 30 MHz | 17.5.0 |
| 2022-06 | RAN#96 | R5-222481 | 1671 | - | F | Correction to EVM measurement point for DFTs-OFDM DM-RS Type 2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222540 | 1674 | - | F | Correction of REFSENS test case for n66 and CBW 40 MHz | 17.5.0 |
| 2022-06 | RAN#96 | R5-222571 | 1676 | - | F | Addition of reference sensitivity test for several CA combinations | 17.5.0 |
| 2022-06 | RAN#96 | R5-222655 | 1678 | - | F | Addition of UE co-existence requirements for band n18 to TS 38.521-1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222664 | 1682 | - | F | General updates of clause 5 for R17 new CBW configurations | 17.5.0 |
| 2022-06 | RAN#96 | R5-222683 | 1693 | - | F | Update of R17 CADC configurations into refsense TC | 17.5.0 |
| 2022-06 | RAN#96 | R5-222738 | 1696 | - | F | Update 7.3F.2 Ref sensitivity power level | 17.5.0 |
| 2022-06 | RAN#96 | R5-222739 | 1697 | - | F | Introduction of 7.6F.2 IBB for NR\_U | 17.5.0 |
| 2022-06 | RAN#96 | R5-222745 | 1700 | - | F | Update 6.5.3.2 Spurious emissions for UE co-existence | 17.5.0 |
| 2022-06 | RAN#96 | R5-222746 | 1701 | - | F | Introduction of ACS for NR\_U | 17.5.0 |
| 2022-06 | RAN#96 | R5-222808 | 1703 | - | F | Correction of A-MPR regions for NS\_46 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222857 | 1706 | - | F | Updates of clause 5 for R15 bands and CBW configurations | 17.5.0 |
| 2022-06 | RAN#96 | R5-222873 | 1707 | - | F | Aligning test case Occupied bandwidth for UL MIMO with the latest work plan version | 17.5.0 |
| 2022-06 | RAN#96 | R5-222930 | 1719 | - | F | Update of the definition of uplink RB allocation for power class 1.5 UE | 17.5.0 |
| 2022-06 | RAN#96 | R5-222939 | 1720 | - | F | Aligning test case 6.5D.2.4.1 NR ACLR for UL MIMO with the latest work plan version | 17.5.0 |
| 2022-06 | RAN#96 | R5-222955 | 1722 | - | F | Aligning test case 6.5D.2.4.2 UTRA ACLR for UL MIMO with the latest work plan version | 17.5.0 |
| 2022-06 | RAN#96 | R5-222975 | 1723 | - | F | Addition of CA\_n1A-n8A into MOP TC | 17.5.0 |
| 2022-06 | RAN#96 | R5-222993 | 1724 | - | F | Corrections of DCI format for Tx TCs having impact on ETSI EN 301 908-25 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222997 | 1725 | - | F | Removal of brackets for DCI for Rx test cases | 17.5.0 |
| 2022-06 | RAN#96 | R5-223018 | 1727 | - | F | Update of Annex F for UL MIMO test cases | 17.5.0 |
| 2022-06 | RAN#96 | R5-223022 | 1728 | - | F | Addition of CA\_n1A-n8A into Refsens TC | 17.5.0 |
| 2022-06 | RAN#96 | R5-223124 | 1731 | - | F | Updating minimum requirement for 7.6A.3 OOB for CA testing | 17.5.0 |
| 2022-06 | RAN#96 | R5-223130 | 1734 | - | F | Updating almost contiguous RB allocation for 45MHz CBW | 17.5.0 |
| 2022-06 | RAN#96 | R5-223133 | 1736 | - | F | Updating Additional spurious emissions for NS\_48 for 45MHz CBW | 17.5.0 |
| 2022-06 | RAN#96 | R5-223134 | 1737 | - | F | Updating test case 6.3.1 Minimum output power for CBW 45MHz | 17.5.0 |
| 2022-06 | RAN#96 | R5-223135 | 1738 | - | F | Updating transmit ON\_OFF time mask test case for 45MHz CBW | 17.5.0 |
| 2022-06 | RAN#96 | R5-223136 | 1739 | - | F | Updating test case 7.4 Maximum input level for new Rel-17 CBWs | 17.5.0 |
| 2022-06 | RAN#96 | R5-223137 | 1740 | - | F | Updating 6.3D.1 Minimum output power for UL MIMO for 45MHz CBW | 17.5.0 |
| 2022-06 | RAN#96 | R5-223138 | 1741 | - | F | Updating transmit ON\_OFF time mask for MIMO test case for 45MHz CBW | 17.5.0 |
| 2022-06 | RAN#96 | R5-223159 | 1746 | - | F | Update TC 6.5.3.3 Additional spurious emissions for PC2 n39 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223198 | 1748 | - | F | Addition of redcap requirement into sub-clause 7.1 and 7.2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223655 | 1753 | 1 | F | Introduction of test specifications for additional Rel-16 CA combos to Clause 6 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223656 | 1650 | 1 | F | Test procedure correction in FR1 CA test case 7.6A.4.3 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223657 | 1721 | 1 | F | General updates of clause 5 for R16 CADC configurations | 17.5.0 |
| 2022-06 | RAN#96 | R5-223693 | 1750 | 1 | F | Update test configuration table for NS\_27 of A-MPR | 17.5.0 |
| 2022-06 | RAN#96 | R5-223694 | 1694 | 1 | F | Update of CBW 70MHz into refsens TC | 17.5.0 |
| 2022-06 | RAN#96 | R5-223695 | 1692 | 1 | F | General updates of clause 5 for R16 new CBW configurations | 17.5.0 |
| 2022-06 | RAN#96 | R5-223697 | 1666 | 1 | F | Corrections in message exceptions and test points for FR1 test case 6.3A.4.1.1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223698 | 1702 | 1 | F | Update 6.5.3.2 Spur-emiss R16\_17 for UE co-exist | 17.5.0 |
| 2022-06 | RAN#96 | R5-223699 | 1732 | 1 | F | Correction to NS\_27 in test case AMPR for MIMO | 17.5.0 |
| 2022-06 | RAN#96 | R5-223700 | 1651 | 1 | F | Test procedure correction in FR1 CA test case 7.6A.4.2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223705 | 1726 | 1 | F | Addition of spectrum emission mask testing for UL MIMO with ULFPTx | 17.5.0 |
| 2022-06 | RAN#96 | R5-223729 | 1733 | 1 | F | Updating RB allocation for CBW 45MHz | 17.5.0 |
| 2022-06 | RAN#96 | R5-223730 | 1735 | 1 | F | Updating AMPR test case for NS\_48 for CBW 45MHz | 17.5.0 |
| 2022-06 | RAN#96 | R5-223731 | 1658 | 1 | F | Update of reference sense test case 7.3.2 for n41 and CWB 70 MHz | 17.5.0 |
| 2022-06 | RAN#96 | R5-223734 | 1679 | 1 | F | Updating General Spurious Emissions TC for CA\_n24-n41 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223735 | 1680 | 1 | F | Updating General Spurious Emissions TCs for CA\_n24-n48 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223736 | 1681 | 1 | F | Updating General Spurious Emissions TCs for CA\_n24-n77 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223737 | 1683 | 1 | F | Updating Spurious emission for UE co-existence TC for CA\_n24-n41 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223738 | 1684 | 1 | F | Updating Spurious emission for UE co-existence TC for CA\_n24-n48 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223739 | 1685 | 1 | F | Updating Spurious emission for UE co-existence TC for CA\_n24-n77 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223740 | 1686 | 1 | F | Updating AMPR TC for Rel-17 CA\_n24-n41 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223741 | 1687 | 1 | F | Updating AMPR TC for Rel-17 CA\_n24-n48 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223742 | 1689 | 1 | F | Updating AMPR TC for Rel-17 CA\_n24-n77 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223743 | 1690 | 1 | F | General updates of clause 5 for R17 CADC configurations | 17.5.0 |
| 2022-06 | RAN#96 | R5-223754 | 1695 | 1 | F | Add MU and TT for 7.5F.1 and 7.6F.2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223756 | 1635 | 1 | F | Introduction of Output power dynamics and Minimum output power for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223757 | 1636 | 1 | F | Introduction of Transmit OFF power for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223758 | 1637 | 1 | F | Introduction of Transmit ON/OFF time mask for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223759 | 1638 | 1 | F | Introduction of Transmit signal quality and Frequency error for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223760 | 1639 | 1 | F | Introduction of Error Vector Magnitude for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223761 | 1640 | 1 | F | Introduction of Carrier leakage for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223762 | 1641 | 1 | F | Introduction of In-band emissions for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223763 | 1642 | 1 | F | Introduction of Output RF spectrum emissions and Occupied bandwidth for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223764 | 1643 | 1 | F | Introduction of Out of band emission Spectrum emission mask for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223765 | 1644 | 1 | F | Introduction of Adjacent channel leakage ratio for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223766 | 1645 | 1 | F | Introduction of Spurious emission for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223767 | 1646 | 1 | F | Introduction of Transmit intermodulation for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223768 | 1647 | 1 | F | Introduction of NR-DC references to transmitter test requirements | 17.5.0 |
| 2022-06 | RAN#96 | R5-223769 | 1630 | 1 | F | Introduction of configuration DC\_n48A-n70A for NR-DC in FR1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223770 | 1665 | 1 | F | UL MIMO MOP requirements for PC1.5 in n77 and n78 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223773 | 1625 | 1 | F | Removal of PC1.5 from TC 6.2.1 MOP | 17.5.0 |
| 2022-06 | RAN#96 | R5-223774 | 1626 | 1 | F | Removal of PC1.5 from TC 6.2.2 MPR | 17.5.0 |
| 2022-06 | RAN#96 | R5-223775 | 1627 | 1 | F | Removal of PC1.5 from TC 6.2.3 A-MPR | 17.5.0 |
| 2022-06 | RAN#96 | R5-223776 | 1628 | 1 | F | Removal of PC1.5 from TC 6.5.2.4.1 ACLR | 17.5.0 |
| 2022-06 | RAN#96 | R5-223777 | 1713 | 1 | F | Addition of new test case 6.2G.1 maximum output power for Tx Diversity | 17.5.0 |
| 2022-06 | RAN#96 | R5-223778 | 1714 | 1 | F | Addition of new test case 6.2G.2 maximum output power reduction for Tx Diversity | 17.5.0 |
| 2022-06 | RAN#96 | R5-223779 | 1715 | 1 | F | Addition of new test case 6.2G.3 additional maximum output power reduction for Tx Diversity | 17.5.0 |
| 2022-06 | RAN#96 | R5-223780 | 1716 | 1 | F | Addition of new test case 6.5G.2.3 Adjacent channel leakage ratio for Tx Diversity | 17.5.0 |
| 2022-06 | RAN#96 | R5-223781 | 1729 | 1 | F | Introduce SRS IL for UE with NR TxD | 17.5.0 |
| 2022-06 | RAN#96 | R5-223782 | 1718 | 1 | F | Addition of Annex F for Tx Diversity test cases | 17.5.0 |
| 2022-06 | RAN#96 | R5-223785 | 1709 | 1 | F | Addition of Redcap MOP 6.2I.1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223786 | 1710 | 1 | F | Addition of Redcap MPR 6.2I.2 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223787 | 1711 | 1 | F | Addition of Redcap AMPR 6.2I.3 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223788 | 1712 | 1 | F | Addition of Redcap configured output power 6.2I.4 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223789 | 1704 | 1 | F | Addition of Reference sensitivity TC for RedCap | 17.5.0 |
| 2022-06 | RAN#96 | R5-223790 | 1705 | 1 | F | Addition of redcap general requirement into clause 3-5 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223804 | 1624 | 1 | F | Moving additional tolerance in 6.2A.3.1.5 and 6.2D.3.5 to end of the section | 17.5.0 |
| 2022-06 | RAN#96 | R5-223805 | 1670 | 1 | F | Correction to time mask test cases | 17.5.0 |
| 2022-06 | RAN#96 | R5-223806 | 1672 | 1 | F | Correction to RB allocation and test requirement in 6.2.3 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223807 | 1673 | 1 | F | Correction to DCI format in 6.4.2.1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223809 | 1708 | 1 | F | Update to MPR test requirements to remove ambiguity of T\_LC | 17.5.0 |
| 2022-06 | RAN#96 | R5-223810 | 1743 | 1 | F | Correction to Test Channel Bandwidths for FR1 CA | 17.5.0 |
| 2022-06 | RAN#96 | R5-223811 | 1744 | 1 | F | Editorial correction to test requirement of Aggregate power tolerance for UL MIMO | 17.5.0 |
| 2022-06 | RAN#96 | R5-223812 | 1752 | 1 | F | Update 6.2.3 for additional maximum power reduction | 17.5.0 |
| 2022-06 | RAN#96 | R5-223813 | 1675 | 1 | F | Clarification of BCS in test configuration of CA test cases | 17.5.0 |
| 2022-06 | RAN#96 | R5-223872 | 1698 | 1 | F | Update 6.4.2.1a EVM including symbols with transient period | 17.5.0 |
| 2022-06 | RAN#96 | R5-223873 | 1755 | 1 | F | Update for 6.3.3.1 General clause of Tx ON-OFF time mask | 17.5.0 |
| 2022-06 | RAN#96 | R5-223875 | 1699 | 2 | F | Update AMPR for NS\_04 | 17.5.0 |
| 2022-09 | RAN#97 | R5-224167 | 1757 | - | F | Addition of NR-DC into symbols clause 3.2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224169 | 1758 | - | F | Introduction of General spurious emissions requirements for CA\_n48A-n70A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224170 | 1759 | - | F | Introduction of Spurious emissions band UE co-existence Test configurations for CA\_n48A-n70A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224171 | 1760 | - | F | Introduction of Reference sensitivity for inter-band NR-DC in FR1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224172 | 1761 | - | F | Introduction of Maximum input level for inter-band NR-DC in FR1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224173 | 1762 | - | F | Introduction of Adjacent channel selectivity for inter-band NR-DC in FR1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224174 | 1763 | - | F | Introduction of Blocking characteristics for inter-band NR-DC in FR1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224175 | 1764 | - | F | Introduction of Spurious response for inter-band NR-DC in FR1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224176 | 1765 | - | F | Introduction of Intermodulation characteristics for inter-band NR-DC in FR1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224177 | 1766 | - | F | Introduction of Spurious emissions for inter-band NR-DC in FR1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224205 | 1767 | - | F | Addition of 30 MHz ChBW to NS\_27 for testing of A-MPR | 17.6.0 |
| 2022-09 | RAN#97 | R5-224206 | 1768 | - | F | Addition of 30 MHz ChBW for testing of NS\_27 additional spectrum emission mask and spurious emissions | 17.6.0 |
| 2022-09 | RAN#97 | R5-224222 | 1771 | - | F | Update of A-SE for n39 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224231 | 1772 | - | F | Update Reference sensitivity exceptions for CA\_n3A-n41A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224241 | 1776 | - | F | Correction of additional tolerance to test requirement in 6.2F.1.5 and 6.2F.3.5 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224242 | 1777 | - | F | Adding additional tolerance to test requirement of TxD Transmitter power test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-224243 | 1778 | - | F | Correction of additional test points for asymmetric channel bandwidths in Rx test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-224244 | 1779 | - | F | Correction of Table 7.3F.2.4.1-1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224245 | 1780 | - | F | Removing of n91, n92, n93 and n94 from 7.3I.2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224246 | 1781 | - | F | Removing of n91, n92, n93 and n94 from 7.6.2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224274 | 1786 | - | F | Update of MOP test case for UL CA\_n1A-n78A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224289 | 1792 | - | F | Updates of clause 5 for R15 bands and CBW configurations | 17.6.0 |
| 2022-09 | RAN#97 | R5-224291 | 1793 | - | F | 7.3A.1\_1 - Test requirements corrections | 17.6.0 |
| 2022-09 | RAN#97 | R5-224292 | 1794 | - | F | NS\_15 minimum requirements missing in test case 6.5.3.3 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224293 | 1795 | - | F | Requirement correction for ON power in test 6.3D.3 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224300 | 1802 | - | F | 7.3.2 - Test requirements corrections | 17.6.0 |
| 2022-09 | RAN#97 | R5-224301 | 1803 | - | F | General clean up in 38.521-1 annex F | 17.6.0 |
| 2022-09 | RAN#97 | R5-224617 | 1808 | - | F | Addition of test requirement for CA\_n77C in 7.3A.1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224628 | 1811 | - | F | Correction to interference values in Rx test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-224765 | 1812 | - | F | Update to 6.2D.3 to add AMPR NS\_04 for ULFPTx | 17.6.0 |
| 2022-09 | RAN#97 | R5-224767 | 1814 | - | F | Update to 6.5D.2.3 to add A-SEM NS\_04 for ULFPTx | 17.6.0 |
| 2022-09 | RAN#97 | R5-224779 | 1815 | - | F | Addition of 6.3G.1 Minimum output power for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-224780 | 1816 | - | F | Addition of 6.3G.2 Transmit OFF power for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-224781 | 1817 | - | F | Addition of 6.3G.3.1 General ON/OFF time mask for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-224782 | 1818 | - | F | Addition of 6.3G.3.2 PRACH time mask for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-224783 | 1819 | - | F | Addition of 6.3G.3.3 SRS time mask for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-224784 | 1820 | - | F | Addition of 6.3G.4.2 Relative power tolerance for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-224785 | 1821 | - | F | Addition of 6.3G.4.3 Aggregate power tolerance for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-224790 | 1826 | - | F | Update of Annex F to add 6.3G and 6.4G new test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-224811 | 1827 | - | F | Addition of 6.3F.1 Minimum output power for NR-U | 17.6.0 |
| 2022-09 | RAN#97 | R5-224812 | 1828 | - | F | Addition of 6.4F.1 Frequency error for NR-U | 17.6.0 |
| 2022-09 | RAN#97 | R5-224830 | 1832 | - | F | Update configuration table of 6.5D.2.3 to refer to AMPR | 17.6.0 |
| 2022-09 | RAN#97 | R5-224831 | 1833 | - | F | Update to SEM for CA | 17.6.0 |
| 2022-09 | RAN#97 | R5-224832 | 1834 | - | F | Update to SEM for SUL | 17.6.0 |
| 2022-09 | RAN#97 | R5-224834 | 1835 | - | F | Update to MOP for CA to add CA\_41C PC2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224835 | 1836 | - | F | Update to MPR for CA to add CA\_41C PC2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224837 | 1837 | - | F | Update to configured output power for CA to add CA\_41C PC2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224838 | 1838 | - | F | Update to SEM for CA to add CA\_41C PC2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224843 | 1840 | - | F | Update to MOP to add PC2 TxD requirements for band n1 and n3 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224857 | 1843 | - | F | Addition of n3 CBW 35MHz, 45MHz into refsens | 17.6.0 |
| 2022-09 | RAN#97 | R5-224874 | 1847 | - | F | Updating A-MPR Test Case for CA\_n24-n41 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224875 | 1848 | - | F | Updating A-MPR Test Case for CA\_n24-n48 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224876 | 1849 | - | F | Updating A-MPR Test Case for CA\_n24-n77 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224885 | 1850 | - | F | Correction of 6.5.3.3 for NS\_14 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224899 | 1852 | - | F | Update IBB for NR-U | 17.6.0 |
| 2022-09 | RAN#97 | R5-224900 | 1853 | - | F | Adding OOB blocking for NR-U | 17.6.0 |
| 2022-09 | RAN#97 | R5-224902 | 1854 | - | F | Introduction of Spurious response for NR\_U | 17.6.0 |
| 2022-09 | RAN#97 | R5-224904 | 1855 | - | F | Addition of Wide band Intermodulation for NR\_U | 17.6.0 |
| 2022-09 | RAN#97 | R5-224905 | 1856 | - | F | Update TT for NR\_U test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-224935 | 1859 | - | F | Corrections on requirements of A-MPR for NS\_05 and NS\_05U | 17.6.0 |
| 2022-09 | RAN#97 | R5-224941 | 1860 | - | F | Update of reference sensitivity power level for 3DL CA | 17.6.0 |
| 2022-09 | RAN#97 | R5-224982 | 1863 | - | F | Update of MOP TC to add PC2 requirements for band n1 and n3 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225003 | 1865 | - | F | Editorial correction to UTRA ACLR test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-225011 | 1866 | - | F | Add new test case 6.5G.3.1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225033 | 1869 | - | F | Update to test coverage rules in FR1 SA RF tests | 17.6.0 |
| 2022-09 | RAN#97 | R5-225058 | 1873 | - | F | Addition of 4Rx for FDD band n8 into TC 7.3.2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225063 | 1874 | - | F | Update MOP PC2 testing for CA\_n41A-n79A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225064 | 1875 | - | F | Updating test configurations for SUL test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-225068 | 1877 | - | F | Correction to AMPR test requirement for NS\_04 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225069 | 1878 | - | F | Updating structure of clause 6.3C.3 Transmit ON/OFF time mask for SUL | 17.6.0 |
| 2022-09 | RAN#97 | R5-225070 | 1879 | - | F | Updating TT in Annex F for R15 time mask test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-225071 | 1880 | - | F | Updating test case 6.3.3.2 General ON/OFF time mask | 17.6.0 |
| 2022-09 | RAN#97 | R5-225072 | 1881 | - | F | Updating AMPR for NS\_47 PC2 almost contiguous RB allocation testing | 17.6.0 |
| 2022-09 | RAN#97 | R5-225078 | 1884 | - | F | Updating MU and TT in Annex F for several time mask test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-225079 | 1885 | - | F | Updating Occupied bandwidth for 45MHz CBW | 17.6.0 |
| 2022-09 | RAN#97 | R5-225080 | 1886 | - | F | Updating Occupied bandwidth for UL MIMO for 45MHz CBW | 17.6.0 |
| 2022-09 | RAN#97 | R5-225081 | 1887 | - | F | Updating SRS time mask test case for 45MHz CBW | 17.6.0 |
| 2022-09 | RAN#97 | R5-225082 | 1888 | - | F | Updating Spectrum Emission Mask for 45MHz CBW | 17.6.0 |
| 2022-09 | RAN#97 | R5-225083 | 1889 | - | F | Updating Absolute power tolerance for 45MHz CBW | 17.6.0 |
| 2022-09 | RAN#97 | R5-225084 | 1890 | - | F | Updating Absolute power tolerance for UL MIMO for 45MHz CBW | 17.6.0 |
| 2022-09 | RAN#97 | R5-225085 | 1891 | - | F | Updating Relative power tolerance for 45MHz CBW | 17.6.0 |
| 2022-09 | RAN#97 | R5-225086 | 1892 | - | F | Updating Relative power tolerance for UL MIMO for 45MHz CBW | 17.6.0 |
| 2022-09 | RAN#97 | R5-225089 | 1895 | - | F | Adding new test case MOP for SUL with UL MIMO | 17.6.0 |
| 2022-09 | RAN#97 | R5-225091 | 1896 | - | F | Adding MU and TT for new SUL and UL MIMO test case | 17.6.0 |
| 2022-09 | RAN#97 | R5-225113 | 1897 | - | F | Correction for CA\_n41A-n79A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225114 | 1898 | - | F | Editorial correction of common uplink configuration | 17.6.0 |
| 2022-09 | RAN#97 | R5-225168 | 1900 | - | F | Updating ACLR for 45MHz CBW | 17.6.0 |
| 2022-09 | RAN#97 | R5-225169 | 1901 | - | F | Updating Maximum input level for UL MIMO for 45MHz CBW | 17.6.0 |
| 2022-09 | RAN#97 | R5-225683 | 1858 | 1 | F | Update of Refsens TC for RedCap UE in 7.3I | 17.6.0 |
| 2022-09 | RAN#97 | R5-225687 | 1769 | 1 | F | Update test procedure of MOP for TxD | 17.6.0 |
| 2022-09 | RAN#97 | R5-225689 | 1770 | 1 | F | Update test procedure of MOP | 17.6.0 |
| 2022-09 | RAN#97 | R5-225702 | 1805 | 1 | F | Updating Spurious emission for UE co-existence TC for CA\_n2-n77, CA\_n5-n77, CA\_n66-n77 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225703 | 1806 | 1 | F | Update Rx Requirements for additional Rel-16 CA combos | 17.6.0 |
| 2022-09 | RAN#97 | R5-225704 | 1902 | 1 | F | General updates of clause 5 for R16 CADC configurations | 17.6.0 |
| 2022-09 | RAN#97 | R5-225718 | 1756 | 1 | F | Correction to UL Configuration for Band n14 REFSENS | 17.6.0 |
| 2022-09 | RAN#97 | R5-225720 | 1851 | 1 | F | Update 6.5.3 Spur-emiss R16\_17 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225721 | 1882 | 1 | F | Adding ON/OFF time mask for Tx Uplink switching testing for SUL | 17.6.0 |
| 2022-09 | RAN#97 | R5-225722 | 1883 | 1 | F | Updating test case 6.3A.3.1\_1 Time mask for switching between two uplink carriers | 17.6.0 |
| 2022-09 | RAN#97 | R5-225723 | 1810 | 1 | F | Correction to CA configuration in 7.4A.2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225728 | 1844 | 1 | F | Addition of n8 CBW 35MHz into refsens | 17.6.0 |
| 2022-09 | RAN#97 | R5-225729 | 1791 | 1 | F | General updates of clause 5 for R17 new CBW configurations | 17.6.0 |
| 2022-09 | RAN#97 | R5-225733 | 1845 | 1 | F | Addition of TX spurious emissions test points for seven UL CA combinations | 17.6.0 |
| 2022-09 | RAN#97 | R5-225734 | 1846 | 1 | F | Addition many 4CA NR combinations to reference sensitivity test | 17.6.0 |
| 2022-09 | RAN#97 | R5-225735 | 1868 | 1 | F | General updates of clause 5 for R17 CADC configurations | 17.6.0 |
| 2022-09 | RAN#97 | R5-225750 | 1829 | 1 | F | Add PC2 test configuration and requirement table for n1 A-MPR | 17.6.0 |
| 2022-09 | RAN#97 | R5-225751 | 1785 | 1 | F | Introduction of REFSENS test requirements for PC2 UL CA\_n1A-n78A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225753 | 1788 | 1 | F | TxD MPR test requirements for PC 1.5 FWA UEs | 17.6.0 |
| 2022-09 | RAN#97 | R5-225754 | 1790 | 1 | F | UL MIMO MPR Tests for PC1.5 UEs | 17.6.0 |
| 2022-09 | RAN#97 | R5-225756 | 1789 | 1 | F | TxD A-MPR test requirements for NS\_04 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225757 | 1822 | 1 | F | Addition of 6.4G.1 Frequency error for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-225758 | 1823 | 1 | F | Addition of 6.4G.2.2 Carrier leakage for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-225759 | 1824 | 1 | F | Addition of 6.4G.2.3 In-band emissions for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-225760 | 1825 | 1 | F | Addition of 6.4G.2.4 EVM equalizer spectrum flatness for Tx Diversity | 17.6.0 |
| 2022-09 | RAN#97 | R5-225761 | 1862 | 1 | F | Add new test case 6.5G.1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225762 | 1867 | 1 | F | Add new test case 6.5G.4 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225763 | 1871 | 1 | F | Updates to receiver requirements for TxD scenarios | 17.6.0 |
| 2022-09 | RAN#97 | R5-225768 | 1864 | 1 | F | Update of PC2 UE requirements for band n1 and n3 into TC 7.3.2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225784 | 1775 | 1 | F | Correction of additional tolerance to test requirement of R15 Transmitter power test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-225785 | 1782 | 1 | F | Editorial correction to TC 6.5.3.3 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225786 | 1787 | 1 | F | Corrections to A-MPR test requirements for NS\_04 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225787 | 1796 | 1 | F | Test procedure and requirement correction in OBW test 6.5D.1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225788 | 1831 | 1 | F | Update to 6.2D.3 to align NS\_04 test configuration with 6.2.3 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225789 | 1876 | 1 | F | Updating Additional emission test cases for NS\_xxU | 17.6.0 |
| 2022-09 | RAN#97 | R5-225790 | 1899 | 1 | F | Correction of UL MIMO A-MPR test case | 17.6.0 |
| 2022-09 | RAN#97 | R5-225791 | 1773 | 1 | F | Addition of Operating bands in Table 5.2-1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225869 | 1809 | 1 | F | Correction to EVM measurement point for DFTs-OFDM DM-RS Type 2 | 17.6.0 |
| 2022-10 | RAN#97 | R5-225687 | 1769 | 1 | F | re-implementation of R5-225687 which was only partly according to latest spec | 17.6.1 |
| 2022-12 | RAN#98 | R5-225950 | 1904 |  | F | Editorial and reference corrections to MPR for NR-DC | 17.7.0 |
| 2022-12 | RAN#98 | R5-225955 | 1905 |  | F | Adding UE maximum output power for new NR bands n91, n92, n93 and n94 | 17.7.0 |
| 2022-12 | RAN#98 | R5-225957 | 1907 |  | F | Adding UE additional maximum output power reduction for new NR bands n91, n92, n93 and n94 | 17.7.0 |
| 2022-12 | RAN#98 | R5-225958 | 1908 |  | F | Adding spurious emissions for UE co-existence for new NR bands n91, n92, n93 and n94 | 17.7.0 |
| 2022-12 | RAN#98 | R5-225959 | 1909 |  | F | Adding Reference sensitivity power level for new NR bands n91, n92, n93 and n94 | 17.7.0 |
| 2022-12 | RAN#98 | R5-225960 | 1910 |  | F | Adding in-band blocking for new NR bands n91, n92, n93 and n94 | 17.7.0 |
| 2022-12 | RAN#98 | R5-225961 | 1911 |  | F | Adding Out-of-band blocking for new NR bands n91, n92, n93 and n94 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226013 | 1913 |  | F | Corrections and additions of Rel-15 band combinations in NR CA spurious emission UE co-existence test case 6.5A.3.2.1 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226014 | 1914 |  | F | Corrections and additions of Rel-16 band combinations in NR CA spurious emission UE co-existence test case 6.5A.3.2.1 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226015 | 1915 |  | F | Corrections and additions of Rel-17 band combinations in NR CA spurious emission UE co-existence test case 6.5A.3.2.1 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226087 | 1919 |  | F | FR1 Narrow band blocking - corrections for inter-band and intra-band non-contiguous | 17.7.0 |
| 2022-12 | RAN#98 | R5-226334 | 1943 |  | F | Update A-MPR test requirement for NS\_47 for CA\_n41A-n79A | 17.7.0 |
| 2022-12 | RAN#98 | R5-226358 | 1945 |  | F | Removal of R15 FR1 pending CA configs from cl 6 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226362 | 1949 |  | F | Removal of R16 FR1 pending CA configs from cl 7 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226363 | 1950 |  | F | Removal of R17 FR1 pending CA configs from cl 5 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226520 | 1958 |  | F | Corrections and additions of Rel-15 band combinations in NR CA general spurious emission test case 6.5A.3.1 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226595 | 1965 |  | F | Update for 7.3I Ref sensitivity for RedCap | 17.7.0 |
| 2022-12 | RAN#98 | R5-226722 | 1971 |  | F | General updates of clause 5 for R17 new CBW configurations | 17.7.0 |
| 2022-12 | RAN#98 | R5-226729 | 1975 |  | F | General updates of clause 5 for R17 CADC configurations | 17.7.0 |
| 2022-12 | RAN#98 | R5-226753 | 1979 |  | F | Editorial correction to UTRA ACLR test cases | 17.7.0 |
| 2022-12 | RAN#98 | R5-226755 | 1980 |  | F | Updated to test applicability of UL MIMO test 6.2D.3 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226762 | 1981 |  | F | Correction to title in Annex F for TC7.8D.2 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226763 | 1982 |  | F | Correction to title of TC7.8F.2 | 17.7.0 |
| 2022-12 | RAN#98 | R5-226765 | 1983 |  | F | Editorial correction to clause 4.3 description | 17.7.0 |
| 2022-12 | RAN#98 | R5-226849 | 1993 |  | F | Adding new FR1 test case Configured Transmitted Power for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226850 | 1994 |  | F | Adding new FR1 test case Minimum output power for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226851 | 1995 |  | F | Adding new FR1 test case Transmit OFF power for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226853 | 1997 |  | F | Adding new FR1 test case REFSENS for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226854 | 1998 |  | F | Adding new FR1 test case REFSENS for SUL with UL MIMO and DL CA | 17.7.0 |
| 2022-12 | RAN#98 | R5-226855 | 1999 |  | F | Adding new FR1 test case Maximum input level for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226856 | 2000 |  | F | Adding new FR1 test case Adjacent channel selectivity for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226857 | 2001 |  | F | Adding new FR1 test case In-band blocking for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226858 | 2002 |  | F | Adding new FR1 test case Out-of-band blocking for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226859 | 2003 |  | F | Adding new FR1 test case Narrow band blocking for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226860 | 2004 |  | F | Adding new FR1 test case Spurious response for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226861 | 2005 |  | F | Adding new FR1 test case Wide band Intermodulation for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-226866 | 2007 |  | F | Updating Spectrum emission mask for UL MIMO for 45MHz CBW | 17.7.0 |
| 2022-12 | RAN#98 | R5-226914 | 2024 |  | F | Updating Annex E for TxD test cases | 17.7.0 |
| 2022-12 | RAN#98 | R5-226915 | 2025 |  | F | Updating Annex F for TxD test cases | 17.7.0 |
| 2022-12 | RAN#98 | R5-226920 | 2026 |  | F | Correction to spurious emission co-existence | 17.7.0 |
| 2022-12 | RAN#98 | R5-226937 | 2027 |  | F | Updating MU and TT for new test cases for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-227064 | 2028 |  | F | Suffix definition for Tx Diversity clauses | 17.7.0 |
| 2022-12 | RAN#98 | R5-227079 | 2032 |  | F | Correction to DFT-s RB allocation for CBW 45 MHz | 17.7.0 |
| 2022-12 | RAN#98 | R5-227080 | 2033 |  | F | Correction to test configuration and test requirements tables in 6.2.3 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227081 | 2034 |  | F | Addition of intra-band CA configurations to 3CA Rx test cases | 17.7.0 |
| 2022-12 | RAN#98 | R5-227082 | 2035 |  | F | Correction to test procedure of 7.6A.2.2 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227083 | 2036 |  | F | Correction to applicability of 7.3A.2 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227102 | 2038 |  | F | Updates to common uplink configuration | 17.7.0 |
| 2022-12 | RAN#98 | R5-227103 | 2039 |  | F | Editorial updates to common uplink configuration | 17.7.0 |
| 2022-12 | RAN#98 | R5-227116 | 2041 |  | F | Update of MOP TC for RedCap | 17.7.0 |
| 2022-12 | RAN#98 | R5-227221 | 2042 |  | F | Corrections and additions of Rel-17 band combinations in NR CA general spurious emission test case 6.5A.3.1 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227237 | 2044 |  | F | Update CBW 35MHz for n3, n8 into TC 6.3.1, 6.3.2 and 6.3.3.6 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227246 | 2045 |  | F | Update CBW 35MHz into clause 6.5.1 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227301 | 2051 |  | F | Introduction of CA\_n48A-n77A and CA\_n71A-n77A Rx requirements | 17.7.0 |
| 2022-12 | RAN#98 | R5-227320 | 2052 |  | F | Addition of new annex I for ModifiedMPR-Behavior | 17.7.0 |
| 2022-12 | RAN#98 | R5-227321 | 2053 |  | F | Updates to annex I ModifiedMPR-Behavior for band n30 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227323 | 2055 |  | F | Updates to annex I ModifiedMPR-Behavior for bands n77 and n78 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227324 | 2056 |  | F | Updates to annex I ModifiedMPR-Behavior for band n79 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227728 | 1941 | 1 | F | Style correction in 7.8A.2 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227729 | 1936 | 1 | F | Style correction for 6.3C.3.2 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227730 | 1931 | 1 | F | Style correction in 6.2B.4.0 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227731 | 1933 | 1 | F | Style correction in 6.2D.2.5 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227732 | 1951 | 1 | F | Removal of R17 FR1 pending CA configs from cl 7 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227733 | 1921 | 1 | F | Correct Table 6.2.3.4.1-4a A-MPR test configuration table | 17.7.0 |
| 2022-12 | RAN#98 | R5-227734 | 1922 | 1 | F | Correction of A-MPR setting in Table 6.2.3.5-6a | 17.7.0 |
| 2022-12 | RAN#98 | R5-227735 | 1923 | 1 | F | Correct Table 6.2.3.3.4-5 A-MPR specification table number | 17.7.0 |
| 2022-12 | RAN#98 | R5-227736 | 1920 | 1 | F | Update Table 6.2A.2.1.4.1-1 band definition | 17.7.0 |
| 2022-12 | RAN#98 | R5-227737 | 1924 | 1 | F | Update Table 6.5A.2.2.1.4.1-1 definition of powerBoostPi2BPSK setting | 17.7.0 |
| 2022-12 | RAN#98 | R5-227738 | 1926 | 1 | F | Correct n41 MSD test frequency of 7.3A | 17.7.0 |
| 2022-12 | RAN#98 | R5-227739 | 1927 | 1 | F | Update 7.3C.1 frequency description | 17.7.0 |
| 2022-12 | RAN#98 | R5-227740 | 2054 | 1 | F | Updates to annex I ModifiedMPR-Behavior for band n41 power class 1.5 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227741 | 1959 | 1 | F | Addition of 6.4F.2.1 EVM for NR-U | 17.7.0 |
| 2022-12 | RAN#98 | R5-227742 | 1957 | 1 | F | Correction on REFSENS test requirements for CA PC2 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227743 | 1952 | 1 | F | Update a few NRCA combos in deltaTIB,c table | 17.7.0 |
| 2022-12 | RAN#98 | R5-227744 | 1963 | 1 | F | Update General spurious emissions for CA\_n2A-n5A | 17.7.0 |
| 2022-12 | RAN#98 | R5-227745 | 1964 | 1 | F | General spurious emissions for CA\_n2A-n48A | 17.7.0 |
| 2022-12 | RAN#98 | R5-227746 | 1962 | 1 | F | Update Ref sense for CA\_n2A-n5A | 17.7.0 |
| 2022-12 | RAN#98 | R5-227747 | 2037 | 1 | F | Update to Transmit ON OFF time mask for UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-227748 | 2040 | 1 | F | Addition of test point in ref sensitivity for CA\_n41A-n66A/- | 17.7.0 |
| 2022-12 | RAN#98 | R5-227749 | 1978 | 1 | F | General updates of clause 5 for R16 CADC configurations | 17.7.0 |
| 2022-12 | RAN#98 | R5-227750 | 1934 | 1 | F | Removal of FFS for Table 6.2E.1.1.4.1-1 and Table 6.2E.1.1D.4.1-1 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227751 | 1940 | 1 | F | Correction of clause number in 7.7F.1.4.1 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227753 | 1929 | 1 | F | Correction of test applicability and test requirement of 6.2.3 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227754 | 1930 | 1 | F | Addition of message contents exceptions for network signalling value NS\_03 of n86 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227755 | 1932 | 1 | F | Correction of 6.2C.5 for n86 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227756 | 1935 | 1 | F | Correction of initial condition description in 6.3.4.2.4.1 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227757 | 1939 | 1 | F | Addition of NS\_3U in 6.5C.2.3 for n86 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227758 | 2006 | 1 | F | Updating REFSENS testing for n79 new CBW | 17.7.0 |
| 2022-12 | RAN#98 | R5-227759 | 1992 | 1 | F | Adding new FR1 test case MOP for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-227760 | 2046 | 1 | F | Corrections on MOP band edge relaxation for intra-band contiguous and non-contiguous CA band combinations | 17.7.0 |
| 2022-12 | RAN#98 | R5-227761 | 2049 | 1 | F | Introduction of CA\_n71A-n77A Transmitter power requirements | 17.7.0 |
| 2022-12 | RAN#98 | R5-227870 | 1976 | 1 | F | General updates of clause 5 for R16 new CBW configurations | 17.7.0 |
| 2022-12 | RAN#98 | R5-227896 | 1953 | 1 | F | Update Rx Requirements for CA\_n66A-n77A | 17.7.0 |
| 2022-12 | RAN#98 | R5-227898 | 1954 | 1 | F | Update a few frequency selections in test configuration tables | 17.7.0 |
| 2022-12 | RAN#98 | R5-227899 | 1955 | 1 | F | Update reference sensitivity requirement table | 17.7.0 |
| 2022-12 | RAN#98 | R5-227900 | 1916 | 1 | F | almost contiguous allocation correction in MPR and A-MPR test cases | 17.7.0 |
| 2022-12 | RAN#98 | R5-227901 | 1917 | 1 | F | almost contiguous allocation correction in SEM test case | 17.7.0 |
| 2022-12 | RAN#98 | R5-227902 | 1918 | 1 | F | almost contiguous allocation correction in TxD MPR test case | 17.7.0 |
| 2022-12 | RAN#98 | R5-227903 | 1966 | 1 | F | Test configuration table correction for NS\_04 in 6.5D.2.3 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227905 | 2008 | 1 | F | Updating AMPR for NS\_49 for 45MHz CBW | 17.7.0 |
| 2022-12 | RAN#98 | R5-227906 | 2009 | 1 | F | Updating Additional Spurious emission testing for NS\_49 for 45MHz | 17.7.0 |
| 2022-12 | RAN#98 | R5-227913 | 2011 | 1 | F | Updating 6.2.2, 6.2D.2 and 6.2G.2 to coordinate the MPR test | 17.7.0 |
| 2022-12 | RAN#98 | R5-227917 | 1984 | 1 | F | Corrections and additions of Rel-16 band combinations in NR CA general spurious emission test case 6.5A.3.1 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227918 | 2050 | 1 | F | Introduction of CA\_n71A-n77A Spurious emissions requirements | 17.7.0 |
| 2022-12 | RAN#98 | R5-227919 | 1947 | 1 | F | Removal of R16 FR1 pending CA configs from cl 5 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227920 | 1906 | 1 | F | Adding UE maximum output power reduction for new NR bands n91, n92, n93 and n94 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227921 | 1960 | 1 | F | Addition of 6.5F.1 Occupied bandwidth for NR-U | 17.7.0 |
| 2022-12 | RAN#98 | R5-227922 | 1970 | 1 | F | Adding 6.5F.4 Transmit intermod for NR-U | 17.7.0 |
| 2022-12 | RAN#98 | R5-227923 | 1973 | 1 | F | Introduction of 6.4F.2.2 Carrier leakage for NR-U | 17.7.0 |
| 2022-12 | RAN#98 | R5-227924 | 1977 | 1 | F | Update 6.5F.3.1 General spurious emissions for NR-U | 17.7.0 |
| 2022-12 | RAN#98 | R5-227925 | 1968 | 1 | F | Update 7.5F.1 ACS for NR-U | 17.7.0 |
| 2022-12 | RAN#98 | R5-227926 | 1969 | 1 | F | Update 7.3F.2 Ref sensitivity for NR-U | 17.7.0 |
| 2022-12 | RAN#98 | R5-227927 | 1972 | 1 | F | Update 7.6F.2.1 IBB for NR-U | 17.7.0 |
| 2022-12 | RAN#98 | R5-227928 | 1974 | 1 | F | Update MU and TT for NR\_U test cases | 17.7.0 |
| 2022-12 | RAN#98 | R5-227930 | 1991 | 1 | F | Update MOP PC2 testing for CA\_n41A-n79A | 17.7.0 |
| 2022-12 | RAN#98 | R5-227931 | 1996 | 1 | F | Adding new FR1 test case Transmit ON/OFF time mask for SUL with UL MIMO | 17.7.0 |
| 2022-12 | RAN#98 | R5-227934 | 2031 | 1 | F | Limit transmit modulation quality for Tx Diversity to power per any antenna connector higher than a threshold | 17.7.0 |
| 2022-12 | RAN#98 | R5-227935 | 2043 | 1 | F | Update of 7.3.2 Reference sensitivity power level for redcap | 17.7.0 |
| 2022-12 | RAN#98 | R5-227936 | 2057 | 1 | F | Additional requirements and A-MPR for NS\_21 and n30 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227938 | 1938 | 1 | F | Addition of test configuration, test procedure and test requirement for NS\_41 and NS\_42 in 6.5.3.3 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227939 | 1946 | 1 | F | Removal of R15 FR1 pending CA configs from cl 7 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227940 | 1944 | 1 | F | Removal of R15 FR1 pending CA configs from cl 5 | 17.7.0 |
| 2022-12 | RAN#98 | R5-227942 | 1948 | 1 | F | Removal of R16 FR1 pending CA configs from cl 6 | 17.7.0 |
| 2022-12 | RAN#98 | R5-228045 | 1956 | 1 | F | Correction on configured transmitted power requirements for CA PC2 | 17.7.0 |
| 2022-12 | RAN#98 | R5-228053 | 1985 | 1 | F | Add new test case 6.5G.3.2 | 17.7.0 |
| 2022-12 | RAN#98 | R5-228054 | 1986 | 1 | F | Add new test case 6.5G.3.3 | 17.7.0 |
| 2022-12 | RAN#98 | R5-228055 | 1987 | 1 | F | Configured transmitted power for Tx Diversity | 17.7.0 |
| 2022-12 | RAN#98 | R5-228056 | 2010 | 1 | F | Updating 6.2.1, 6.2D.1 and 6.2G.1 to coordinate the MOP test | 17.7.0 |
| 2022-12 | RAN#98 | R5-228057 | 2012 | 1 | F | Updating 6.2.4 and 6.2D.4 to coordinate the Configured transmitted power test | 17.7.0 |
| 2022-12 | RAN#98 | R5-228058 | 2013 | 1 | F | Updating 6.3, 6.3D and 6.3G to coordinate the output power dynamic test | 17.7.0 |
| 2022-12 | RAN#98 | R5-228059 | 2014 | 1 | F | Addition of 6.3G.4.1 absolute power tolerance for TxD | 17.7.0 |
| 2022-12 | RAN#98 | R5-228060 | 2015 | 1 | F | Updating 6.4, 6.4D and 6.4G to coordinate the transmit signal quality test | 17.7.0 |
| 2022-12 | RAN#98 | R5-228061 | 2016 | 1 | F | Addition of 6.4G.2.1 EVM for TxD | 17.7.0 |
| 2022-12 | RAN#98 | R5-228062 | 2017 | 1 | F | Updating 6.5, 6.5D and 6.5G to coordinate the output spectrum emission test | 17.7.0 |
| 2022-12 | RAN#98 | R5-228063 | 2018 | 1 | F | Addition of 6.5G.2.1 SEM for TxD | 17.7.0 |
| 2022-12 | RAN#98 | R5-228064 | 2019 | 1 | F | Addition of 6.5G.2.2 A-SEM for TxD | 17.7.0 |
| 2022-12 | RAN#98 | R5-228065 | 2020 | 1 | F | Addition of 6.5G.2.3.2 UTRA ACLR for TxD | 17.7.0 |
| 2022-12 | RAN#98 | R5-228066 | 2023 | 1 | F | Updating section 7 for TxD | 17.7.0 |
| 2023-03 | RAN#99 | R5-230068 | 2059 | - | F | Adding UE maximum output power for new NR bands n100, n101 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230069 | 2060 | - | F | Adding UE maximum output power reduction for new NR bands n100, n101 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230070 | 2061 | - | F | Adding UE additional maximum output power reduction for new NR bands n100, n101 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230072 | 2063 | - | F | Adding Reference sensitivity power level for new NR bands n100, n101 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230073 | 2064 | - | F | Adding in-band blocking for new NR bands n100, n101 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230074 | 2065 | - | F | Adding Out-of-band blocking for new NR bands n100, n101 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230075 | 2066 | - | F | Adding Narrowband blocking for new NR bands n100, n101 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230091 | 2069 | - | F | Update of the conformance requirements for the configured transmitted power for Inter-band CA | 17.8.0 |
| 2023-03 | RAN#99 | R5-230218 | 2070 | - | F | Clarification on editors note of EVM including symbols with transient period | 17.8.0 |
| 2023-03 | RAN#99 | R5-230283 | 2077 | - | F | Update minimum requirements of reference sensitivity exceptions due to intermodulation interference for 3DL/2UL cases of CA\_n2A-n5A-n77A, CA\_n2A-n66A-n77A, and CA\_n5A-n66A-n77A | 17.8.0 |
| 2023-03 | RAN#99 | R5-230284 | 2078 | - | F | Update delta TIB,c for CA\_n2A-n5A-n77A, CA\_n2A-n66A-n77A, and CA\_n5A-n66A-n77A | 17.8.0 |
| 2023-03 | RAN#99 | R5-230285 | 2079 | - | F | Update delta RIB,c for CA\_n2A-n5A-n77A, CA\_n2A-n66A-n77A, and CA\_n5A-n66A-n77A | 17.8.0 |
| 2023-03 | RAN#99 | R5-230286 | 2080 | - | F | Update Chapter 5 for inter-band NR CA configurations of three bands CA\_n2A-n5A-n77A, CA\_n2A-n66A-n77A, and CA\_n5A-n66A-n77A | 17.8.0 |
| 2023-03 | RAN#99 | R5-230303 | 2081 | - | F | FR1 - ACLR requirements for PC3 missing in 6.5G.2.3.1 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230304 | 2082 | - | F | FR1 - Out-of-band blocking 3DL and 4DL CA - carrier selection correction | 17.8.0 |
| 2023-03 | RAN#99 | R5-230311 | 2089 | - | F | FR1 ACS and IBB 2DL CA - Corrections for n48-n77 case | 17.8.0 |
| 2023-03 | RAN#99 | R5-230312 | 2090 | - | F | FR1 - SRS time mask - P-max to be limited to 23dBm | 17.8.0 |
| 2023-03 | RAN#99 | R5-230551 | 2092 | - | F | Style correction in 6.2.2.2 and removal of PC 1.5 from 6.2.2.3 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230552 | 2093 | - | F | Correction of test applicability of 6.2.3 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230553 | 2094 | - | F | Editorial correction of style for clause heading of 6.3A.3.1 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230554 | 2095 | - | F | Editorial correction of style for table heading of Table 6.3D.3.4.3-1 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230555 | 2096 | - | F | Editorial correction for test applicability in 6.5.2.3.2 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230556 | 2097 | - | F | Correction of test applicability and test description of 6.5.3.3 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230557 | 2098 | - | F | Editorial correction for table titles in 6.5C | 17.8.0 |
| 2023-03 | RAN#99 | R5-230558 | 2099 | - | F | Editorial correction for subclause number in 6.5E.3.2.1D | 17.8.0 |
| 2023-03 | RAN#99 | R5-230561 | 2102 | - | F | Editorial correction for content style in test applicability section of some TxD test cases | 17.8.0 |
| 2023-03 | RAN#99 | R5-230562 | 2103 | - | F | Addition of subclause F.1.0 | 17.8.0 |
| 2023-03 | RAN#99 | R5-230678 | 2110 | - | F | Correction in 6.2D.4 to cover power boost Pi/2 BPSK | 17.8.0 |
| 2023-03 | RAN#99 | R5-230806 | 2111 | - | F | Introduction of CA\_n3A-n78A PC2 REFSENS test requirements | 17.8.0 |
| 2023-03 | RAN#99 | R5-230808 | 2112 | - | F | General updates of clause 5 for R16 CADC configurations | 17.8.0 |
| 2023-03 | RAN#99 | R5-230888 | 2126 | - | F | Correcting the definition of RedCap UE | 17.8.0 |
| 2023-03 | RAN#99 | R5-230915 | 2127 | - | F | Adding 6.4F.2.2 Carrier leakage for NR-U | 17.8.0 |
| 2023-03 | RAN#99 | R5-230916 | 2128 | - | F | Adding 6.4F.2.3 In-band emissions for NR-U | 17.8.0 |
| 2023-03 | RAN#99 | R5-230917 | 2129 | - | F | Update\_MU\_TT for NR-U | 17.8.0 |
| 2023-03 | RAN#99 | R5-230918 | 2130 | - | F | Introduction of 6.4F.2.4\_for NR-U | 17.8.0 |
| 2023-03 | RAN#99 | R5-230919 | 2131 | - | F | Adding 6.5F.4 Transmit intermod for NR-U | 17.8.0 |
| 2023-03 | RAN#99 | R5-230967 | 2133 | - | F | Clarification on relationship between CBW applicability and order of CC | 17.8.0 |
| 2023-03 | RAN#99 | R5-230968 | 2134 | - | F | Clarification of notes in test configuration tables of Rx test cases for CA | 17.8.0 |
| 2023-03 | RAN#99 | R5-230972 | 2138 | - | F | Addition of CBW 35 MHz, 45 MHz, 70 MHz to IBB and OBB for CA | 17.8.0 |
| 2023-03 | RAN#99 | R5-230974 | 2140 | - | F | Correction to test procedure of SEM for intra-band non-contiguous CA | 17.8.0 |
| 2023-03 | RAN#99 | R5-230975 | 2141 | - | F | Addition of new annex for difference of relative phase and power errors for UL coherent MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-230995 | 2142 | - | F | Update of PUCCH aggregate power TC | 17.8.0 |
| 2023-03 | RAN#99 | R5-230998 | 2144 | - | F | Update of new NR Bands into TC 7.3I.2 Reference sensitivity power level for redcap | 17.8.0 |
| 2023-03 | RAN#99 | R5-231073 | 2145 | - | F | Updating test case Occupied bandwidth for SUL | 17.8.0 |
| 2023-03 | RAN#99 | R5-231075 | 2147 | - | F | Correction to RB allocations for intra-band contiguous CA | 17.8.0 |
| 2023-03 | RAN#99 | R5-231076 | 2148 | - | F | Updating test requirement of test case Absolute power tolerance for SUL | 17.8.0 |
| 2023-03 | RAN#99 | R5-231077 | 2149 | - | F | Updating test case Relative power tolerance for SUL | 17.8.0 |
| 2023-03 | RAN#99 | R5-231078 | 2150 | - | F | Correction to test case Relative power tolerance for UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231080 | 2151 | - | F | Updating clause 4.3 to align with core specification | 17.8.0 |
| 2023-03 | RAN#99 | R5-231081 | 2152 | - | F | Updating MOP for MIMO testing for band n24 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231082 | 2153 | - | F | Updating MPR for MIMO test case for band n24 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231083 | 2154 | - | F | Adding new FR1 test case Absolute power tolerance for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231085 | 2156 | - | F | Adding new FR1 test case Aggregate power tolerance for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231086 | 2157 | - | F | Adding new FR1 test case Occupied bandwidth for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231087 | 2158 | - | F | Adding new FR1 test case Frequency error for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231089 | 2160 | - | F | Adding new FR1 test case Spectrum emission mask for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231090 | 2161 | - | F | Updating MU and TT for new test cases for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231092 | 2162 | - | F | Editorial correction to In-band blocking for Intra-band contiguous CA | 17.8.0 |
| 2023-03 | RAN#99 | R5-231097 | 2166 | - | F | Adding new FR1 test case EVM equalizer spectrum flatness for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231098 | 2167 | - | F | Adding new FR1 test case Time alignment error for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231099 | 2168 | - | F | Adding new FR1 test case Transmit intermodulation for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231175 | 2169 | - | F | Update of MOP TC for CA\_n3A-n8A | 17.8.0 |
| 2023-03 | RAN#99 | R5-231179 | 2170 | - | F | Updated to TC6.5.1 for n14 with 10MHz CBW | 17.8.0 |
| 2023-03 | RAN#99 | R5-231191 | 2171 | - | F | Update of delta TIB,c for new R16 CA configurations | 17.8.0 |
| 2023-03 | RAN#99 | R5-231291 | 2180 | - | F | Corrections on scaling factors for MPR and NS\_04 SEM requirements | 17.8.0 |
| 2023-03 | RAN#99 | R5-231295 | 2181 | - | F | Corrections on the requirements for UE MPR for intra-band contiguous CA in FR1 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231299 | 2182 | - | F | Editorial update of MPR test cases | 17.8.0 |
| 2023-03 | RAN#99 | R5-231300 | 2183 | - | F | Update of NR ACLR test case | 17.8.0 |
| 2023-03 | RAN#99 | R5-231302 | 2184 | - | F | Editorial correction of in-band emissions for SUL | 17.8.0 |
| 2023-03 | RAN#99 | R5-231379 | 2187 | - | F | Correction for wrong reference in NS\_50 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231380 | 2188 | - | F | Correction on band combinations for UE co-existence | 17.8.0 |
| 2023-03 | RAN#99 | R5-231618 | 2101 | 1 | F | Editorial correction for content style in 6.2.1.2, 6.5.2.4.1.2, 6.5.3.1.2, 6.5.3.2.2 and 6.5.4.2 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231619 | 2179 | 1 | F | Corrections on the test for UE maximum output power | 17.8.0 |
| 2023-03 | RAN#99 | R5-231626 | 2172 | 1 | F | Update of Spurious emissions for UE co-existence for CA\_n1A-n8A | 17.8.0 |
| 2023-03 | RAN#99 | R5-231627 | 2173 | 1 | F | Update of general spurious emissions for CA\_n1A-n8A | 17.8.0 |
| 2023-03 | RAN#99 | R5-231628 | 2073 | 1 | F | Introduction of CA\_n41A-n66A, RIB,c and sensitivity exception. | 17.8.0 |
| 2023-03 | RAN#99 | R5-231629 | 2074 | 1 | F | Introduction of CA\_n41A-n66A new test point. | 17.8.0 |
| 2023-03 | RAN#99 | R5-231630 | 2075 | 1 | F | Introduction of CA\_n41A-n66A, exception test point due to CBI | 17.8.0 |
| 2023-03 | RAN#99 | R5-231631 | 2174 | 1 | F | Introduction of CA\_n41A-n71A configuration, RIB,c and sensitivity exception. | 17.8.0 |
| 2023-03 | RAN#99 | R5-231637 | 2071 | 1 | F | Correction to RB allocation configuration for intra-band contiguous CA in Table 6.1A-1b | 17.8.0 |
| 2023-03 | RAN#99 | R5-231638 | 2137 | 1 | F | Addition of CBW 35 MHz and 45 MHz to NS\_03 in Additional SEM | 17.8.0 |
| 2023-03 | RAN#99 | R5-231639 | 2123 | 1 | F | Updating Annex F for intra-band contiguous CA test cases | 17.8.0 |
| 2023-03 | RAN#99 | R5-231640 | 2125 | 1 | F | Removing redundant test cases | 17.8.0 |
| 2023-03 | RAN#99 | R5-231641 | 2117 | 1 | F | Adding PC2 intra-band contiguous testing to 6.2A.3.1 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231642 | 2118 | 1 | F | Adding PC2 intra-band contiguous testing to 6.5A.2.3 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231643 | 2119 | 1 | F | Adding PC2 intra-band contiguous testing to 6.5A.3.3 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231644 | 2120 | 1 | F | Adding PC2 intra-band contiguous testing to 6.5A.2.4.1 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231645 | 2121 | 1 | F | Adding PC2 intra-band contiguous testing to 6.5A.3.1.1 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231646 | 2122 | 1 | F | Adding PC2 intra-band contiguous testing to 6.5A.3.2.1 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231647 | 2115 | 1 | F | Adding 45MHz PC2 test configuration to 6.2.3 NS\_49 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231648 | 2113 | 1 | F | Update to minimum requirement of 6.2.3 NS\_27 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231649 | 2114 | 1 | F | Update to configuration table of 6.2.3 NS\_18 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231650 | 2155 | 1 | F | Adding new FR1 test case Relative power tolerance for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231651 | 2159 | 1 | F | Adding new FR1 test case Error Vector Magnitude for SUL with UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231652 | 2163 | 1 | F | Correction to Additional spurious emissions for UL MIMO | 17.8.0 |
| 2023-03 | RAN#99 | R5-231653 | 2165 | 1 | F | Correction to RB allocation for test case A-MPR\_for NS\_48 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231654 | 2084 | 1 | F | FR1 PC2 NS\_49 A-MPR - RB allocations inconsistent vs applicable A-MPR | 17.8.0 |
| 2023-03 | RAN#99 | R5-231655 | 2072 | 1 | F | Corrections of test requirement tables for spurious emission for UE co-existence for NR CA | 17.8.0 |
| 2023-03 | RAN#99 | R5-231656 | 2076 | 1 | F | Update test configuration and test requirement for three band interband reference sensitivity for CA\_n2A-n5A-n77A, CA\_n2A-n66A-n77A, and CA\_n5A-n66A-n77A | 17.8.0 |
| 2023-03 | RAN#99 | R5-231657 | 2067 | 1 | F | Adding UE maximum output power reduction for new NR bands n91, n92, n93, n94 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231659 | 2177 | 1 | F | Corrections on additional reference channels parameters for TDD | 17.8.0 |
| 2023-03 | RAN#99 | R5-231700 | 2085 | 1 | F | FR1 Refsens - RB allocation alignment to core specs | 17.8.0 |
| 2023-03 | RAN#99 | R5-231701 | 2106 | 1 | F | Update CBW 35MHz into sub-clauses 6.3.1, 6.3.2, 6.3.3.2, 6.3.4 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231702 | 2107 | 1 | F | Update CBW 35MHz into sub-clause 6.3D.1 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231703 | 2108 | 1 | F | Update CBW 35MHz into sub-clauses 6.5.2.2, 6.5.2.4.1, 6.5D.1, 6.5D.2 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231704 | 2109 | 1 | F | Update CBW 35MHz into sub-clause 7.4D | 17.8.0 |
| 2023-03 | RAN#99 | R5-231705 | 2104 | 1 | F | General updates of clause 5 for R17 new CBW configurations | 17.8.0 |
| 2023-03 | RAN#99 | R5-231796 | 2164 | 1 | F | Correction to Uplink configuration RB allocation for n78 in REFSENS testing | 17.8.0 |
| 2023-03 | RAN#99 | R5-231807 | 2100 | 1 | F | Correction of test case title of 7.6D.2\_1 and 7.8D.2\_1 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231857 | 2062 | 1 | F | Adding spurious emissions for UE co-existence for new NR bands n100, n101 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231858 | 2124 | 1 | F | Update to applicability of legacy test cases | 17.8.0 |
| 2023-03 | RAN#99 | R5-231861 | 2105 | 1 | F | Update CBW 35MHz into sub-clause 6.2.2 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231863 | 2132 | 1 | F | Update of inter-band CA reference sensitivity to handle simultaneous Rx/Tx capability | 17.8.0 |
| 2023-03 | RAN#99 | R5-231885 | 2176 | 1 | F | Updates to A-MPR and A-SEM for NS\_21 | 17.8.0 |
| 2023-03 | RAN#99 | R5-231889 | 2175 | 2 | F | Introduction of CA\_n41A-n71A new test point. | 17.8.0 |
| 2023-03 | RAN#99 | R5-231952 | 2136 | 1 | F | Correction to SDL band for blocking test cases | 17.8.0 |
| 2023-03 | RAN#99 | R5-231953 | 2143 | 1 | F | Addition of configuration for carrier aggregation RMCs | 17.8.0 |
| 2023-03 | RAN#99 | R5-231964 | 2178 | 1 | F | Corrections on channel bandwidth for V2X | 17.8.0 |
| 2023-06 | RAN#100 | R5-232109 | 2190 | - | F | Introduction of Output power requirements for CA\_n28A-n78A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232111 | 2192 | - | F | Introduction of General spurious emissions test requirements for CA\_n28A-n78A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232113 | 2194 | - | F | Introduction of Spurious emissions for UE co-existence test requirements for CA\_n28A-n78A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232119 | 2196 | - | F | Add Reference sensitivity power level test requirements for CA\_n28A-n78A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232241 | 2197 | - | F | Update general spurious emissions for CA\_n2A-n77A, CA\_n5A-n77A, and CA\_n66A-n77A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232243 | 2199 | - | F | Update inter-band NR CA PC3 reference sensitivity test configuration and test requirement tables | 17.9.0 |
| 2023-06 | RAN#100 | R5-232276 | 2203 | - | F | Addition of refsence sensitivity for n28A-n77A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232278 | 2205 | - | F | Addition of refsence sensitivity for n3A-n77A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232341 | 2207 | - | F | Corrections for certain FR1 combos in section 7.3A.1\_1 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232348 | 2211 | - | F | p-Max conditions corrections in 6.5A.3.1.1 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232353 | 2212 | - | F | Test configuration table update for NS 46 in A-MPR test | 17.9.0 |
| 2023-06 | RAN#100 | R5-232355 | 2214 | - | F | K1 and number of HARQ processes for CA exceptions updates | 17.9.0 |
| 2023-06 | RAN#100 | R5-232410 | 2221 | - | F | General updates of clause 5 for R17 new CBW configurations | 17.9.0 |
| 2023-06 | RAN#100 | R5-232411 | 2222 | - | F | Addition of 7.3A.1 for CA\_n1A-n8A and CA\_n3A-n8A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232413 | 2224 | - | F | Addition of general spurious emissions for CA\_n1A-n3A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232414 | 2225 | - | F | Addition of Spurious emissions for UE co-existence for CA\_n1A-n3A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232444 | 2226 | - | F | Adding UE maximum output power for new NR band n13 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232445 | 2227 | - | F | Adding UE maximum output power reduction for new NR band n13 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232579 | 2229 | - | F | Addition of test case 6.5F.2.4.2, Shared spectrum channel access ACLR with additional requirement for NS\_29 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232611 | 2230 | - | F | General SE for CA\_n5A-n48A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232612 | 2231 | - | F | TX SE\_Co\_exist for CA\_n5A-n48A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232613 | 2232 | - | F | Update 7.3A.1 for CA\_n5A-n48A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232614 | 2233 | - | F | Update 6.2A.1.1 for CA\_n5A-n48A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232616 | 2234 | - | F | Update 6.2A.4.0.2.3 for CA\_n5A-n48A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232625 | 2235 | - | F | Update 6.2A.4.0.2.3 for CA\_n2A-n5A and CA\_n2A-n48A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232636 | 2236 | - | F | Update 7.1 for NR-U | 17.9.0 |
| 2023-06 | RAN#100 | R5-232637 | 2237 | - | F | Update 5.2 note 14 for NR-U | 17.9.0 |
| 2023-06 | RAN#100 | R5-232695 | 2238 | - | F | Update 6.5F.3.1 General SE for NR-U | 17.9.0 |
| 2023-06 | RAN#100 | R5-232697 | 2239 | - | F | Update 6.5F.2.4.1 ACLR for NR-U | 17.9.0 |
| 2023-06 | RAN#100 | R5-232726 | 2242 | - | F | Addition of abbreviation and clause 4 general description for Tx diversity | 17.9.0 |
| 2023-06 | RAN#100 | R5-232732 | 2243 | - | F | Addition of new test case 6.2D.2\_1 UE MPR for SUL with UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-232733 | 2244 | - | F | Addition of new test case 6.2D.3\_1 UE A-MPR for SUL with UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-232734 | 2245 | - | F | Addition of new test case 6.4D.2.2\_1 Carrier leakage for SUL with UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-232735 | 2246 | - | F | Addition of new test case 6.4D.2.3\_1 In-band emissions for SUL with UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-232736 | 2247 | - | F | Addition of new test case 6.5D.2.4.1\_1 NR ACLR for SUL with UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-232737 | 2248 | - | F | Addition of new test case 6.5D.2.4.2\_1 UTRA ACLR for SUL with UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-232738 | 2249 | - | F | Addition of new test case 6.5D.3\_2.1 General spurious emissions | 17.9.0 |
| 2023-06 | RAN#100 | R5-232739 | 2250 | - | F | Addition of new test case 6.5D.3\_2.2 Spurious emissions for UE co-existence | 17.9.0 |
| 2023-06 | RAN#100 | R5-232740 | 2251 | - | F | Addition of new test case 6.5D.3\_2.3 Additional spurious emissions | 17.9.0 |
| 2023-06 | RAN#100 | R5-232741 | 2252 | - | F | Addition of Annex F for new test cases for SUL with UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-232747 | 2254 | - | F | Update of PC2 UE maximum output power for inter-band CA configurations | 17.9.0 |
| 2023-06 | RAN#100 | R5-232750 | 2256 | - | F | Addition of UL MIMO SEM and NR ACLR test cases for Power Class 1.5 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232751 | 2257 | - | F | Editorial correction of reference table numbers for SUL test cases | 17.9.0 |
| 2023-06 | RAN#100 | R5-232791 | 2259 | - | F | Update of delta TIB,c for CA\_n39A-n41A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232792 | 2260 | - | F | Update of delta RIB,c for CA\_n39A-n41A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232796 | 2262 | - | F | Update of delta TIB,c for CA\_n28A-n41A-n79A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232797 | 2263 | - | F | Update of delta RIB,c for CA\_n28A-n41A-n79A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232804 | 2265 | - | F | Update for PC2 n39 A-SE | 17.9.0 |
| 2023-06 | RAN#100 | R5-232874 | 2268 | - | F | Correction of delta RIB,c , Core spec alignment | 17.9.0 |
| 2023-06 | RAN#100 | R5-232879 | 2269 | - | F | Addition of Delta RIB,c for CA\_n41A-n66A-n71A | 17.9.0 |
| 2023-06 | RAN#100 | R5-232880 | 2270 | - | F | Addition of CA\_n41A-n66A-n71A in Table 7.3A.2.5-1 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232897 | 2271 | - | F | Update of applicability of simultaneous RxTx capability for CA\_n28-n79 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232978 | 2273 | - | F | Adding additional spectrum emission mask requirement for new NR band n13 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232979 | 2274 | - | F | Adding spurious emissions for UE co-existence for new NR band n13 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232980 | 2275 | - | F | Adding additional spurious emissions for new NR band n13 | 17.9.0 |
| 2023-06 | RAN#100 | R5-232993 | 2276 | - | F | Correction to inter-band test frequencies exceptions in Rx CA test cases | 17.9.0 |
| 2023-06 | RAN#100 | R5-232996 | 2279 | - | F | Update of Annex D.2 for interference signals lower than 2700 MHz | 17.9.0 |
| 2023-06 | RAN#100 | R5-233023 | 2281 | - | F | Removing redundant parameter setting from time mask testing | 17.9.0 |
| 2023-06 | RAN#100 | R5-233036 | 2283 | - | F | Correction of P-max in AMPR for CA | 17.9.0 |
| 2023-06 | RAN#100 | R5-233037 | 2284 | - | F | Adding PC2 intra-band contiguous testing to 6.5A.3.2.1 | 17.9.0 |
| 2023-06 | RAN#100 | R5-233083 | 2286 | - | F | Updating test case UTRA ACLR for UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-233084 | 2287 | - | F | Updating test case AMPR for UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-233085 | 2288 | - | F | Updating test requirement of test case AMPR for UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-233090 | 2292 | - | F | Correction to NS\_04 test configuration for Additional spurious emissions for UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-233092 | 2293 | - | F | Correction to test frequency description for intra-band UL non-contiguous CA | 17.9.0 |
| 2023-06 | RAN#100 | R5-233100 | 2295 | - | F | Updating test case AMPR for UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-233101 | 2296 | - | F | Updating PUCCH configuration in Aggregate power tolerance for SUL with UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-233102 | 2297 | - | F | Updating MOP for PC2 configuration CA\_n78C | 17.9.0 |
| 2023-06 | RAN#100 | R5-233103 | 2298 | - | F | Updating MPR for PC2 configuration CA\_n78C | 17.9.0 |
| 2023-06 | RAN#100 | R5-233186 | 2302 | - | F | Correction to clauses using void table 5.5A.3-x | 17.9.0 |
| 2023-06 | RAN#100 | R5-233193 | 2303 | - | F | Editorial correction to TC6.2.3 configuration table for NS\_06 | 17.9.0 |
| 2023-06 | RAN#100 | R5-233207 | 2304 | - | F | Corrections on blocking characteristics requirements for V2X | 17.9.0 |
| 2023-06 | RAN#100 | R5-233210 | 2305 | - | F | Corrections on intermodulation characteristics requirements for V2X | 17.9.0 |
| 2023-06 | RAN#100 | R5-233211 | 2306 | - | F | Corrections on NR V2X reference sensitivity test requirements | 17.9.0 |
| 2023-06 | RAN#100 | R5-233212 | 2307 | - | F | Corrections on NR V2X spurious response requirements | 17.9.0 |
| 2023-06 | RAN#100 | R5-233218 | 2309 | - | F | Corrections on the minimum guardband calculation for FR1 | 17.9.0 |
| 2023-06 | RAN#100 | R5-233236 | 2310 | - | F | Clarification of UL Tx Switching in SA RF test case | 17.9.0 |
| 2023-06 | RAN#100 | R5-233510 | 2191 | 1 | F | Introduction of additional maximum output power reduction for CA\_n28A-n78A | 17.9.0 |
| 2023-06 | RAN#100 | R5-233511 | 2193 | 1 | F | Introduction of Spurious emissions for UE co-existence requirements for CA\_n28A-n78A | 17.9.0 |
| 2023-06 | RAN#100 | R5-233515 | 2294 | 1 | F | Updating Transmit ON/OFF time mask for CA for intra-band non-contiguous CA | 17.9.0 |
| 2023-06 | RAN#100 | R5-233517 | 2195 | 1 | F | Adding Reference sensitivity exceptions due to UL harmonic interference for CA\_n28A-n78A | 17.9.0 |
| 2023-06 | RAN#100 | R5-233524 | 2272 | 1 | F | Adding UE additional maximum output power reduction for new NR band n13 | 17.9.0 |
| 2023-06 | RAN#100 | R5-233525 | 2291 | 1 | F | Correction to REFSENS exceptions testing for CA\_n7A-n78A | 17.9.0 |
| 2023-06 | RAN#100 | R5-233532 | 2299 | 1 | F | Correction for CA\_n66A-n71A | 17.9.0 |
| 2023-06 | RAN#100 | R5-233533 | 2206 | 1 | F | Update for CA\_n2A-n48A and CA\_n2A-n77A combos in section 7.3A.0 | 17.9.0 |
| 2023-06 | RAN#100 | R5-233534 | 2267 | 1 | F | Editorial changes in Table 7.3A.1.5-1 | 17.9.0 |
| 2023-06 | RAN#100 | R5-233536 | 2308 | 1 | F | Corrections on supported channel bandwidths for SUL configurations | 17.9.0 |
| 2023-06 | RAN#100 | R5-233537 | 2311 | 1 | F | Addition of new FR1 phase continuity test | 17.9.0 |
| 2023-06 | RAN#100 | R5-233538 | 2200 | 1 | F | Update inter-band NR CA PC2 MOP configurations for 2UL CA\_n2A-n77A, CA\_n5A-n77A, and CA\_n66A-n77A | 17.9.0 |
| 2023-06 | RAN#100 | R5-233539 | 2261 | 1 | F | Addition of R17 new CA PC2 configs for Ref sens exceptions TC 7.3A.0 | 17.9.0 |
| 2023-06 | RAN#100 | R5-233540 | 2301 | 1 | F | Correction of ON/OFF time mask for Tx Diversity | 17.9.0 |
| 2023-06 | RAN#100 | R5-233541 | 2213 | 1 | F | NS\_27 - corrections for 30MHz RBStart for condition A1 | 17.9.0 |
| 2023-06 | RAN#100 | R5-233542 | 2280 | 1 | F | Addition of BW condition to 6.5D.2.3 A-SEM for UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-233543 | 2282 | 1 | F | Clarification of spurious emission testing configuration - Part 1 | 17.9.0 |
| 2023-06 | RAN#100 | R5-233547 | 2285 | 1 | F | Updating FR1 test case Additional spectrum emission mask for UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-233548 | 2289 | 1 | F | Updating PUCCH aggregated power tolerance test case for SUL and for MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-233549 | 2290 | 1 | F | Updating MU values for NR FR1 Relative power tolerance for UL MIMO | 17.9.0 |
| 2023-06 | RAN#100 | R5-233555 | 2312 | - | F | General updates of clause 5 for R16 CA configurations | 17.9.0 |
| 2023-06 | RAN#100 | R5-233556 | 2313 | - | F | General updates of clause 5 for R17 CA configurations | 17.9.0 |
| 2023-06 | RAN#100 | R5-233705 | 2198 | 1 | F | Update minimum requirement table for reference sensitivity exceptions and uplink/downlink configurations due to harmonic mixing from a PC3 aggressor | 17.9.0 |
| 2023-06 | RAN#100 | R5-233706 | 2228 | 1 | F | Correction UL RB configuration for CA\_n1-n3-n78 | 17.9.0 |
| 2023-06 | RAN#100 | R5-233711 | 2201 | 1 | F | Update inter-band NR CA PC2 reference sensitivity minimum requirements for a few 2DL band configurations | 17.9.0 |
| 2023-06 | RAN#100 | R5-233712 | 2202 | 1 | F | Update PC2 information for 2DL test configuration exception table and test requirement table for a few NR CA 2DL 2UL combos | 17.9.0 |
| 2023-06 | RAN#100 | R5-233720 | 2240 | 1 | F | Update of 6.4G.2.4 EVM equalizer spectrum flatness for Tx Diversity | 17.9.0 |
| 2023-06 | RAN#100 | R5-233721 | 2264 | 1 | F | Update for PC2 PC3 n39 A-MPR | 17.9.0 |
| 2023-06 | RAN#100 | R5-233722 | 2277 | 1 | F | Correction to transmission power in 7.6.3 Out-of-band blocking | 17.9.0 |
| 2023-09 | RAN#101 | R5-233946 | 2314 | - | F | Introduction of Output power requirements for CA\_n20A-n78A | 17.10.0 |
| 2023-09 | RAN#101 | R5-233962 | 2318 | - | F | Introduction of Out-of-band blocking requirements for new NR band n13 | 17.10.0 |
| 2023-09 | RAN#101 | R5-233965 | 2319 | - | F | Editorial correction to UE additional maximum output power reduction for new NR band n13 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234044 | 2320 | - | F | Adding FRC configurations for 1024QAM | 17.10.0 |
| 2023-09 | RAN#101 | R5-234119 | 2326 | - | F | Correction of table number in NOTE 4 of Table 6.2I.1.5-1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234163 | 2336 | - | F | CA n48A-n66A PCC SCC swap in 7.3A.1\_1 needed for 2 UL exception case | 17.10.0 |
| 2023-09 | RAN#101 | R5-234164 | 2337 | - | F | CA n48A-n77A PCC frequency correction for n77 in 7.8A.2.1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234165 | 2338 | - | F | FR1 ACS and IBB 2DL CA - Corrections for n48-n77 case | 17.10.0 |
| 2023-09 | RAN#101 | R5-234168 | 2341 | - | F | n5 asymmetric band declaration missing in section 5.3.6 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234169 | 2342 | - | F | Pending MU and TT update for FR1 RedCap | 17.10.0 |
| 2023-09 | RAN#101 | R5-234177 | 2349 | - | F | Missing MU definition for 7.6C.2 in annex F.1.3 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234179 | 2350 | - | F | Missing REFSENS requirements for certain n7 BWs | 17.10.0 |
| 2023-09 | RAN#101 | R5-234180 | 2351 | - | F | Pending BW addition in 6.5D.2.3 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234197 | 2353 | - | F | Update Clause 6 common requirements for additional 3DL inter-band NR CA configurations | 17.10.0 |
| 2023-09 | RAN#101 | R5-234199 | 2355 | - | F | Update test configurations and test requirements for interband reference sensitivity of additional three band configurations | 17.10.0 |
| 2023-09 | RAN#101 | R5-234201 | 2356 | - | F | Update common clause requirements for high power support for some inter-band NR CA configurations | 17.10.0 |
| 2023-09 | RAN#101 | R5-234203 | 2357 | - | F | Update inter-band NR CA PC2 reference sensitivity minimum requirements and test cases for a few 3DL band configurations | 17.10.0 |
| 2023-09 | RAN#101 | R5-234296 | 2359 | - | F | Addition of delta TIBc and UE maximum output power for new NRCA comb within FR1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234533 | 2364 | - | F | Addition of spur emission requirements of CA\_n5A-n66A. | 17.10.0 |
| 2023-09 | RAN#101 | R5-234591 | 2370 | - | F | Update Transmit intermod for NR-U | 17.10.0 |
| 2023-09 | RAN#101 | R5-234637 | 2374 | - | F | Remove duplicated AMPR test configurations for NS\_24 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234639 | 2375 | - | F | Editorial correction for 7.8A.2.1 wideband intermodulation for 2DL CA in FR1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234641 | 2376 | - | F | update for 6.5F.1 Occupied bandwidth for NR-U | 17.10.0 |
| 2023-09 | RAN#101 | R5-234707 | 2377 | - | F | Update of IE p-Max value for MPR and SEM for inter-band CA Power Class 3 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234708 | 2378 | - | F | Addition of MPR test requirements for inter-band CA Power Class 2 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234709 | 2379 | - | F | Addition of A-MPR test requirements for inter-band CA Power Class 2 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234710 | 2380 | - | F | Update of IE p-Max value for SEM for inter-band CA Power Class 2 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234712 | 2381 | - | F | Addition of MPR requirements for UEs supporting higher power limit | 17.10.0 |
| 2023-09 | RAN#101 | R5-234713 | 2382 | - | F | Addition of A-MPR requirements for UEs supporting higher power limit | 17.10.0 |
| 2023-09 | RAN#101 | R5-234746 | 2387 | - | F | Addition of PC2 n40 MOP | 17.10.0 |
| 2023-09 | RAN#101 | R5-234773 | 2392 | - | F | Clear-up CR for misalignment Ref Sense table | 17.10.0 |
| 2023-09 | RAN#101 | R5-234787 | 2394 | - | F | Update of 6.2G.2 MPR for Power Class 1.5 for TxD | 17.10.0 |
| 2023-09 | RAN#101 | R5-234829 | 2398 | - | F | Correction of 5.2A.1 intra-band CA operating bands | 17.10.0 |
| 2023-09 | RAN#101 | R5-234836 | 2402 | - | F | Update to 6.3A.3.1\_1 of 1Tx-2Tx UL switching for inter-band CA | 17.10.0 |
| 2023-09 | RAN#101 | R5-234843 | 2407 | - | F | Addition of AMPR for CA\_n28-n79 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234844 | 2408 | - | F | Adding DeltaTIB for CA\_n28-n79 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234845 | 2409 | - | F | Addition of spurious emission co-existence for CA\_n28-n79 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234847 | 2410 | - | F | Addition of AMPR for PC2 CA\_n28A-n79A | 17.10.0 |
| 2023-09 | RAN#101 | R5-234848 | 2411 | - | F | Update to 6.3A.3.3 of 2Tx-2Tx UL switching for inter-band CA | 17.10.0 |
| 2023-09 | RAN#101 | R5-234863 | 2412 | - | F | Addition of additional test frequencies for AMPR NS\_50 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234907 | 2415 | - | F | Correction to title of Reference sensitivity for RedCap | 17.10.0 |
| 2023-09 | RAN#101 | R5-234908 | 2416 | - | F | Correction to A-MPR for NS\_44 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234909 | 2417 | - | F | Correction to message contents of 6.5A.2.2.1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234910 | 2418 | - | F | Correction to REFSENS formula for n41, n77, n78 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234911 | 2419 | - | F | Correction to A-MPR for UL MIMO | 17.10.0 |
| 2023-09 | RAN#101 | R5-235012 | 2421 | - | F | Addition of TC 6.5A.3.1.1 general spurious emissions for CA\_n3A-n8A | 17.10.0 |
| 2023-09 | RAN#101 | R5-235038 | 2425 | - | F | Editorial: Removing editor’s Note in test case 6.5D.2.2\_1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235048 | 2428 | - | F | Editorial: Removing editor’s note in test case 6.3C.3.2 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235049 | 2429 | - | F | Updating REFSENS for CA test case for CA\_n39A-n41A | 17.10.0 |
| 2023-09 | RAN#101 | R5-235142 | 2443 | - | F | Correction of A-MPR test case | 17.10.0 |
| 2023-09 | RAN#101 | R5-235149 | 2445 | - | F | Correction of ACS for CA test case | 17.10.0 |
| 2023-09 | RAN#101 | R5-235151 | 2446 | - | F | Editorial correction of PRACH time mask test case | 17.10.0 |
| 2023-09 | RAN#101 | R5-235163 | 2448 | - | F | Rel-15 Alignment of channel bandwidth between 38.521-1 and 38.101-1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235236 | 2458 | - | F | Introducing modification for NS\_43 A-MPR region | 17.10.0 |
| 2023-09 | RAN#101 | R5-235237 | 2459 | - | F | Adding missing channel bandwidth for NS\_01 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235619 | 2315 | 1 | F | Introduction of spurious emissions test requirements for CA\_n20A-n78A | 17.10.0 |
| 2023-09 | RAN#101 | R5-235624 | 2362 | 1 | F | Addition of several NR CA combos to reference sensitivity cases | 17.10.0 |
| 2023-09 | RAN#101 | R5-235625 | 2430 | 1 | F | Updating REFSENS for CA testing for CA\_n28A-n41A-n79A | 17.10.0 |
| 2023-09 | RAN#101 | R5-235627 | 2431 | 1 | F | Updating PC2 REFSENS testing for CA configurations | 17.10.0 |
| 2023-09 | RAN#101 | R5-235628 | 2404 | 1 | F | Addition of intra-band non-contiguous CA to spurious emission for CA | 17.10.0 |
| 2023-09 | RAN#101 | R5-235630 | 2372 | 1 | F | Update ACLR for NR-U | 17.10.0 |
| 2023-09 | RAN#101 | R5-235631 | 2396 | 1 | F | Addition of 6.2F.2 UE maximum output power reduction for shared spectrum access | 17.10.0 |
| 2023-09 | RAN#101 | R5-235634 | 2414 | 1 | F | Update for FR1 EVM including symbols with transient period | 17.10.0 |
| 2023-09 | RAN#101 | R5-235636 | 2366 | 1 | F | Addition of delta TIB for CA\_n5-n66. | 17.10.0 |
| 2023-09 | RAN#101 | R5-235637 | 2406 | 1 | F | Addition of minimum requirement of AMPR for CA\_n77(2A) | 17.10.0 |
| 2023-09 | RAN#101 | R5-235638 | 2335 | 1 | F | Addition of CA\_n3A-n8A into TC 7.3A Reference sensitivity for CA | 17.10.0 |
| 2023-09 | RAN#101 | R5-235639 | 2323 | 1 | F | Adding REFSENS exception requirements for CA\_n3A-n78A PC2 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235640 | 2403 | 1 | F | Update to 6.2A.1.1 MOP for CA | 17.10.0 |
| 2023-09 | RAN#101 | R5-235641 | 2405 | 1 | F | Correction of minimum requirement of 7.3A.0.2.2 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235642 | 2393 | 1 | F | Update of 6.2G.1 MOP test requirements for TxD | 17.10.0 |
| 2023-09 | RAN#101 | R5-235643 | 2451 | 1 | F | Add max UE power for ULCA with NR-U | 17.10.0 |
| 2023-09 | RAN#101 | R5-235644 | 2399 | 1 | F | Editorial correction of AMPR for CA test requirements | 17.10.0 |
| 2023-09 | RAN#101 | R5-235645 | 2348 | 1 | F | Core specs alignment in FR1 test case 7.6.4 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235646 | 2400 | 1 | F | Correction to test requirements of EVM for CA | 17.10.0 |
| 2023-09 | RAN#101 | R5-235647 | 2449 | 1 | F | Rel-16 Alignment of channel bandwidth between 38.521-1 and 38.101-1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235648 | 2360 | 1 | F | Addition of spurious emissions for CA\_n3A-n77A | 17.10.0 |
| 2023-09 | RAN#101 | R5-235650 | 2361 | 1 | F | Addition of spurious emissions for CA\_n28A-n77A | 17.10.0 |
| 2023-09 | RAN#101 | R5-235651 | 2432 | 1 | F | Removal of the delta RIB values for configuration CA\_n66-n70-n71 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235652 | 2434 | 1 | F | Corrections on notation for SUL CA configuration for transmitter power | 17.10.0 |
| 2023-09 | RAN#101 | R5-235653 | 2437 | 1 | F | Alignments on the terms for NR DC configured maximum UE output power | 17.10.0 |
| 2023-09 | RAN#101 | R5-235654 | 2435 | 1 | F | Corrections on notation for SUL CA configuration for reference sensitivity | 17.10.0 |
| 2023-09 | RAN#101 | R5-235655 | 2438 | 1 | F | Corrections on the delta TIB values for NR DC configurations | 17.10.0 |
| 2023-09 | RAN#101 | R5-235656 | 2439 | 1 | F | Corrections on the maximum output power tolerance | 17.10.0 |
| 2023-09 | RAN#101 | R5-235657 | 2440 | 1 | F | Corrections on channel bandwidth for wide band intermodulation test | 17.10.0 |
| 2023-09 | RAN#101 | R5-235658 | 2442 | 1 | F | FRC corrections for maximum input level receiver requirements | 17.10.0 |
| 2023-09 | RAN#101 | R5-235659 | 2333 | 1 | F | General updates of TS 38.521-1 clause 5 for R16 CA configurations | 17.10.0 |
| 2023-09 | RAN#101 | R5-235660 | 2352 | 1 | F | Update delta TIB,c for CA\_n2A-n66A | 17.10.0 |
| 2023-09 | RAN#101 | R5-235661 | 2354 | 1 | F | Update Clause 7 common requirements for additional 3DL inter-band NR CA configurations | 17.10.0 |
| 2023-09 | RAN#101 | R5-235662 | 2339 | 1 | F | n66 4Rx requirements missing for certain combos in 7.3A.1\_1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235663 | 2334 | 1 | F | General updates of TS 38.521-1 clause 5 for R17 CA configurations | 17.10.0 |
| 2023-09 | RAN#101 | R5-235664 | 2317 | 1 | F | Introduction of Reference sensitivity requirements for new NR band n13 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235813 | 2365 | 2 | F | Addition of spur emission co-existence requirements of CA\_n5A-n66A. | 17.10.0 |
| 2023-09 | RAN#101 | R5-235821 | 2427 | 1 | F | Updating RB allocations in table 6.1A-1b | 17.10.0 |
| 2023-09 | RAN#101 | R5-235828 | 2363 | 1 | F | Update of UL MIMO Maximum Output Power TC | 17.10.0 |
| 2023-09 | RAN#101 | R5-235829 | 2426 | 1 | F | Updating REFSENS for 2DL CA exceptions test case for PC3 UE | 17.10.0 |
| 2023-09 | RAN#101 | R5-235830 | 2450 | 1 | F | Rel-17 Alignment of channel bandwidth between 38.521-1 and 38.101-1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235847 | 2316 | 1 | F | Adding Reference sensitivity power level test requirements for CA\_n20A-n78A | 17.10.0 |
| 2023-09 | RAN#101 | R5-235849 | 2422 | 1 | F | Addition of TC 6.5A.3.2 Spurious emissions UE co-existence for CA\_n3A-n8A | 17.10.0 |
| 2023-09 | RAN#101 | R5-235850 | 2343 | 1 | F | TT and editor note update in NR-U Tx test cases for FR1 bands above 6GHz | 17.10.0 |
| 2023-09 | RAN#101 | R5-235851 | 2344 | 1 | F | TT and editor note update in NR-U Rx test cases for FR1 bands above 6GHz | 17.10.0 |
| 2023-09 | RAN#101 | R5-235852 | 2345 | 1 | F | MU and TT definition for FR1 bands above 6GHz - Annex F update | 17.10.0 |
| 2023-09 | RAN#101 | R5-235853 | 2371 | 1 | F | Update SEM for NR-U | 17.10.0 |
| 2023-09 | RAN#101 | R5-235859 | 2453 | 1 | F | Corrections on the higher power limit requirements for CA band combinations | 17.10.0 |
| 2023-09 | RAN#101 | R5-235863 | 2369 | 1 | F | Update 6.2.2 for 38.521-1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235864 | 2401 | 1 | F | Clarification of unwanted emission testing configuration - Part 1 | 17.10.0 |
| 2023-09 | RAN#101 | R5-235867 | 2329 | 1 | F | Correction of requirements of Spurious emissions for UE co-existence for NR | 17.10.0 |
| 2023-09 | RAN#101 | R5-235935 | 2454 | 1 | F | Updates to FR1 phase continuity test | 17.10.0 |
| 2023-09 | RAN#101 | R5-235938 | 2321 | 1 | F | Update 7.4 max input level for 1024QAM | 17.10.0 |
| 2023-09 | RAN#101 | R5-235939 | 2322 | 1 | F | Update 7.4A max input level for 1024QAM | 17.10.0 |
| 2023-09 | RAN#101 | R5-235957 | 2433 | 1 | F | Removal of the delta RIB values for configuration CA\_n26-n66-n70 | 17.10.0 |
| 2023-09 | RAN#101 | R5-234742 | 2383 | - | F | Addition of PC1.5 n34 and n40 MOP | 18.0.0 |
| 2023-09 | RAN#101 | R5-234743 | 2384 | - | F | Addition of PC1.5 n34 and n40 MPR | 18.0.0 |
| 2023-09 | RAN#101 | R5-234744 | 2385 | - | F | Update of PC1.5 n34 Configured tx power requirements | 18.0.0 |
| 2023-09 | RAN#101 | R5-234747 | 2388 | - | F | Addition of n28 UL MIMO Operating band | 18.0.0 |
| 2023-09 | RAN#101 | R5-234748 | 2389 | - | F | Addition of n28 UL MIMO MOP | 18.0.0 |
| 2023-09 | RAN#101 | R5-234749 | 2390 | - | F | Addition of n28 UL MIMO MPR | 18.0.0 |
| 2023-09 | RAN#101 | R5-234828 | 2397 | - | F | Update of Operating bands for UL MIMO band n8 and n80 | 18.0.0 |
| 2023-09 | RAN#101 | R5-235016 | 2423 | - | F | Addition of n1 n3 and n8 into TC 6.2D.1 MOP for UL MIMO | 18.0.0 |
| 2023-09 | RAN#101 | R5-235154 | 2447 | - | F | Addition of PC2 configuration n80 and n84 into TC 6.2D.1\_1 | 18.0.0 |
| 2023-09 | RAN#101 | R5-235180 | 2452 | - | F | Addition of n8 into TC 6.2D.2 MPR for UL MIMO | 18.0.0 |
| 2023-09 | RAN#101 | R5-235617 | 2373 | 2 | F | Updates to spurious emissions UE coexistence test cases as part of introduction of LTE Band 54 | 18.0.0 |
| 2023-09 | RAN#101 | R5-235861 | 2358 | 1 | F | Introduction of PC1 transmitter requirements for railway bands n100 and n101 | 18.0.0 |
| 2023-12 | RAN#102 | R5-236083 | 2464 | - | F | Add general spurious emissions for UE co-existence requirements for CA\_n25A-n66A, CA\_n25A-n77A, CA\_n25A-n78A, CA\_n66A-n78A | 18.1.0 |
| 2023-12 | RAN#102 | R5-236084 | 2465 | - | F | Add Spurious emissions for UE co-existence test requirements for CA\_n25A-n66A, CA\_n25A-n77A, CA\_n25A-n78A, CA\_n66A-n78A, CA\_n78(2A) | 18.1.0 |
| 2023-12 | RAN#102 | R5-236141 | 2470 | - | F | Error correction for 7.8 Intermodulation characteristics | 18.1.0 |
| 2023-12 | RAN#102 | R5-236142 | 2471 | - | F | Correction of message contents for some receiver test cases | 18.1.0 |
| 2023-12 | RAN#102 | R5-236279 | 2473 | - | F | Correction of RB allocation for ChBW 40 MHz and SCS 30 kHz in Table 6.2.3.4.1-16a | 18.1.0 |
| 2023-12 | RAN#102 | R5-236286 | 2474 | - | F | Adding PC2 allowed indication for completed inter-band and intra-band CA combinations | 18.1.0 |
| 2023-12 | RAN#102 | R5-236326 | 2475 | - | F | UL frequency correction for n66 in CA\_n48A-n66A combo in test 7.3A.1\_1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236329 | 2476 | - | F | IBNC CA - n2 and n71 - undefined frequencies for custom Wgap | 18.1.0 |
| 2023-12 | RAN#102 | R5-236334 | 2477 | - | F | Incorrect table reference in FR1 test case 7.6A.4.1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236335 | 2478 | - | F | Editorial correction in FR1 test case 6.2.4 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236336 | 2479 | - | F | DL frequency correction for n78 in CA\_n3A-n78A combo in test 7.3A.1\_1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236337 | 2480 | - | F | Update applicability for NS\_47 in FR1 test case 6.5.3.3 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236338 | 2481 | - | F | Test procedure update in test case 6.5A.4.1 to skip IMPs overlapping with UL signal | 18.1.0 |
| 2023-12 | RAN#102 | R5-236344 | 2482 | - | F | Editorial correction for referred tables for NS\_04 in FR1 test 6.5G.2.2 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236354 | 2485 | - | F | Addition of spurious emissions test for several NR CA combos | 18.1.0 |
| 2023-12 | RAN#102 | R5-236379 | 2489 | - | F | Test configuration table modification due to core specification alignments and CR implementation mismatch | 18.1.0 |
| 2023-12 | RAN#102 | R5-236445 | 2493 | - | F | Corrections to Spurious emissions for UE co-existence requirements | 18.1.0 |
| 2023-12 | RAN#102 | R5-236494 | 2494 | - | F | Aligning test configuration for SEM, ACLR and MPR test cases with TP analysis | 18.1.0 |
| 2023-12 | RAN#102 | R5-236497 | 2496 | - | F | Addition of test case 6.3F.4.2, Absolute power tolerance for shared spectrum access | 18.1.0 |
| 2023-12 | RAN#102 | R5-236498 | 2497 | - | F | Addition of test case 6.2F.4, Configured transmitted power for shared spectrum access | 18.1.0 |
| 2023-12 | RAN#102 | R5-236510 | 2499 | - | F | Correction of test requirement for absolute power tolerance test case | 18.1.0 |
| 2023-12 | RAN#102 | R5-236517 | 2500 | - | F | Correction of prach-ConfigurationIndex for time mask and EVM | 18.1.0 |
| 2023-12 | RAN#102 | R5-236519 | 2501 | - | F | Editorial correction in test case 7.4A.3 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236529 | 2503 | - | F | Correction to relative power tolerance test cases | 18.1.0 |
| 2023-12 | RAN#102 | R5-236650 | 2505 | - | F | Update for PC3 n39 A-MPR | 18.1.0 |
| 2023-12 | RAN#102 | R5-236668 | 2506 | - | F | Update of MOP for PC3 n28 UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-236677 | 2508 | - | F | Addition of PC1.5 n34 and n40 Modified MPR behaviour | 18.1.0 |
| 2023-12 | RAN#102 | R5-236803 | 2509 | - | F | Correction to message exception for TDD UL DL pattern in 6.2.1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236804 | 2510 | - | F | Editorial correction to 6.5A.2.2.1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236806 | 2512 | - | F | Correction to UL assignment for different SCS in 6.3A.3.1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236807 | 2513 | - | F | Editorial correction to 7.3A.1\_1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236808 | 2514 | - | F | Correction to test requirements of A-MPR for NS\_44 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236809 | 2515 | - | F | Correction to RB allocation of A-MPR for NS\_07 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236810 | 2516 | - | F | Correction to RB allocation of A-MPR for NS\_27 | 18.1.0 |
| 2023-12 | RAN#102 | R5-236902 | 2521 | - | F | Addition of new test case 6.2H.1.1 MOP for intra-band UL contiguous CA with UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-236908 | 2527 | - | F | Addition of new test case 6.5H.1.2.1 SEM for CA with UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-236910 | 2529 | - | F | Addition of Annex F measurement uncertainties for CA with UL MIMO test cases | 18.1.0 |
| 2023-12 | RAN#102 | R5-236914 | 2530 | - | F | Correction to test configuration for 6.3D.1 minimum output power for UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-236915 | 2531 | - | F | Correction to test procedure for 6.5D.2.4 NR ACLR for UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-236926 | 2532 | - | F | Corrections to 6.3A.1 on minimum output power for CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-236927 | 2533 | - | F | Corrections to 6.3A.2 on Transmit OFF power for CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-236928 | 2534 | - | F | Corrections to 6.3A.3 on Transmit ON OFF time mask for CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-236929 | 2535 | - | F | Corrections to 7.6A.2.1.5 on In-band blocking test for 2DL CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-236930 | 2536 | - | F | Corrections to 7.6A.2.2.5 on In-band blocking test for 3DL CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-236932 | 2537 | - | F | Corrections to 5.5B on inter-band NR DC configuration table | 18.1.0 |
| 2023-12 | RAN#102 | R5-236935 | 2539 | - | F | Corrections to 7.3I on reference sensitivity power level test for RedCap | 18.1.0 |
| 2023-12 | RAN#102 | R5-236936 | 2540 | - | F | Editorial corrections to 7.2 on diversity characteristics for RedCap | 18.1.0 |
| 2023-12 | RAN#102 | R5-236941 | 2541 | - | F | Corrections to 7.6.2 and 7.6A.2 on symbols for In-band blocking | 18.1.0 |
| 2023-12 | RAN#102 | R5-236942 | 2542 | - | F | Editorial corrections to 7.3A.5 on symbols for CA reference sensitivity | 18.1.0 |
| 2023-12 | RAN#102 | R5-236949 | 2543 | - | F | Update delta TIB for NR CA configuration CA\_n1A-n3A-n78A | 18.1.0 |
| 2023-12 | RAN#102 | R5-236950 | 2544 | - | F | Update test configuration and test requirement for 3DL CA reference sensitivity exceptions for CA\_n1A-n3A-n78A | 18.1.0 |
| 2023-12 | RAN#102 | R5-236951 | 2545 | - | F | Update delta RIB for NR CA configuration CA\_n1A-n3A-n78A | 18.1.0 |
| 2023-12 | RAN#102 | R5-236952 | 2546 | - | F | Update minimum requirements of REFSENS exceptions due to intermodulation interference for 3D2U CA configuration of CA\_n1A-n3A-n78A | 18.1.0 |
| 2023-12 | RAN#102 | R5-237039 | 2551 | - | F | Removing n85 in Narrow band blocking test case | 18.1.0 |
| 2023-12 | RAN#102 | R5-237040 | 2552 | - | F | Removing test case Narrow band blocking for SUL with UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-237042 | 2553 | - | F | Core specification alignment for almost contiguous RB allocation | 18.1.0 |
| 2023-12 | RAN#102 | R5-237043 | 2554 | - | F | Cleaning up mentioned standardization groups name in specification | 18.1.0 |
| 2023-12 | RAN#102 | R5-237044 | 2555 | - | F | Correcting wrong RB allocations for NS\_05 and NS\_05U | 18.1.0 |
| 2023-12 | RAN#102 | R5-237045 | 2556 | - | F | Correcting wrong RB allocations for NS\_46 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237046 | 2557 | - | F | Correcting wrong RB allocations for NS\_48 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237047 | 2558 | - | F | Correcting wrong RB allocations for NS\_49 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237057 | 2564 | - | F | Updating additional spurious emissions for MIMO for n39 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237064 | 2568 | - | F | Updating In-band emissions for intra-band UL CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-237072 | 2571 | - | F | Removing unnecessary testing details for not testable V2X cases | 18.1.0 |
| 2023-12 | RAN#102 | R5-237091 | 2572 | - | F | Addition of PC2 configuration n80 and n84 into TC 6.2D.2\_1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237147 | 2574 | - | F | Editorial correction to 6.2D.2.5 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237238 | 2576 | - | F | Updates to Annex for FR1 RF Phase continuity test | 18.1.0 |
| 2023-12 | RAN#102 | R5-237248 | 2579 | - | F | Correction of TDD configuration in SRS time mask test case | 18.1.0 |
| 2023-12 | RAN#102 | R5-237251 | 2581 | - | F | Correction of almost contiguous allocation in A-MPR test | 18.1.0 |
| 2023-12 | RAN#102 | R5-237262 | 2583 | - | F | Correction of maximum input power test cases | 18.1.0 |
| 2023-12 | RAN#102 | R5-237263 | 2584 | - | F | Update for DC location in carrier leakage test cases | 18.1.0 |
| 2023-12 | RAN#102 | R5-237473 | 2518 | 1 | F | Correction to average count for EVM including transient period | 18.1.0 |
| 2023-12 | RAN#102 | R5-237614 | 2461 | 1 | F | Adding Reference sensitivity test requirements for CA\_n1A-n3A-n28A-n78A | 18.1.0 |
| 2023-12 | RAN#102 | R5-237616 | 2468 | 1 | F | Addition of delta RIBc and reference sensitivity for new R16 NR CA comb within FR1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237618 | 2462 | 1 | F | Adding Reference sensitivity test requirements for CA\_n25A-n66A-n77(2A) and CA\_n25A-n66A-n78(2A) | 18.1.0 |
| 2023-12 | RAN#102 | R5-237620 | 2469 | 1 | F | Addition of delta RIBc and reference sensitivity for new R17 NR CA comb within FR1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237621 | 2487 | 1 | F | Update requirements for additional NR CA configurations | 18.1.0 |
| 2023-12 | RAN#102 | R5-237624 | 2522 | 1 | F | Addition of new test case 6.2H.1.2 MPR for CA with UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-237625 | 2523 | 1 | F | Addition of new test case 6.2H.1.4 configured transmitted power for CA with UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-237626 | 2524 | 1 | F | Addition of new test case 6.3H.1.1 minimum output power for CA with UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-237627 | 2525 | 1 | F | Addition of new test case 6.3H.1.2 Transmit OFF power for CA with UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-237628 | 2526 | 1 | F | Addition of new test case 6.3H.1.3 Transmit ON/OFF time mask for CA with UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-237629 | 2528 | 1 | F | Addition of new test case 6.5H.1.2.3 NR ACLR for CA with UL MIMO | 18.1.0 |
| 2023-12 | RAN#102 | R5-237631 | 2562 | 1 | F | Updating Frequency error for CA test case for intra-band UL CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-237632 | 2565 | 1 | F | Updating Transmit intermodulation testing for intra-band UL CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-237634 | 2502 | 1 | F | Update of 6.2F.3 UE additional maximum output power reduction for shared spectrum access | 18.1.0 |
| 2023-12 | RAN#102 | R5-237637 | 2550 | 1 | F | Addition of PC2 configuration n1 and n3 into MPR UL MIMO TC 6.2D.2 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237638 | 2547 | 1 | F | Update 6.2A.4.0.2.3 delta TIB for NR CA configuration CA\_n1A-n8A-n78A | 18.1.0 |
| 2023-12 | RAN#102 | R5-237639 | 2548 | 1 | F | Update 7.3A.0.3.2.3 delta RIB for NR CA configuration CA\_n1A-n8A-n78A | 18.1.0 |
| 2023-12 | RAN#102 | R5-237640 | 2549 | 1 | F | Update 7.3A.0.5 reference sensitivity exceptions due to intermodulation interference for 3DL/2UL NR CA configuration of CA\_n1A-n8A-n78A | 18.1.0 |
| 2023-12 | RAN#102 | R5-237641 | 2520 | 1 | F | Addition the missing 6.5A.3.1.1.5 general spurious emissions test requirements for CA\_n1A-n78A | 18.1.0 |
| 2023-12 | RAN#102 | R5-237642 | 2490 | 1 | F | General updates of TS 38.521-1 clause 5 for R16 CA configurations | 18.1.0 |
| 2023-12 | RAN#102 | R5-237643 | 2463 | 1 | F | Add UE maximum power requirements for CA\_n25A-n66A, CA\_n25A-n77A, CA\_n25A-n78A, CA\_n66A-n78A, CA\_n78(2A) | 18.1.0 |
| 2023-12 | RAN#102 | R5-237644 | 2467 | 1 | F | Addition of delta TIBc for new R17 NR CA comb within FR1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237645 | 2484 | 1 | F | Addition of max power requirements for several NR CA combos | 18.1.0 |
| 2023-12 | RAN#102 | R5-237647 | 2486 | 1 | F | Update minimum requirements for additional four bands NR CA configurations | 18.1.0 |
| 2023-12 | RAN#102 | R5-237648 | 2488 | 1 | F | Remove Editors Notes which are no longer needed and core specification alignment | 18.1.0 |
| 2023-12 | RAN#102 | R5-237649 | 2491 | 1 | F | General updates of TS 38.521-1 clause 5 for R17 CA configurations | 18.1.0 |
| 2023-12 | RAN#102 | R5-237650 | 2560 | 1 | F | Updating AMPR for MIMO for band n39 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237651 | 2483 | 1 | F | TxDiversity - in-band emissions test procedure correction | 18.1.0 |
| 2023-12 | RAN#102 | R5-237652 | 2511 | 1 | F | Correction to message contents for P-max in ACLR and Transmit intermodulation for CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-237653 | 2573 | 1 | F | Clarification of number of measured UL connectors for Tx requirements | 18.1.0 |
| 2023-12 | RAN#102 | R5-237654 | 2517 | 1 | F | Correction to DL RB allocation for ChBW 45 MHz | 18.1.0 |
| 2023-12 | RAN#102 | R5-237655 | 2580 | 1 | F | Correction of single carrier Refsens test case | 18.1.0 |
| 2023-12 | RAN#102 | R5-237828 | 2466 | 1 | F | Addition of spurious emissions, delta TIBc and UE maximum output power for new R16 NR CA comb within FR1 | 18.1.0 |
| 2023-12 | RAN#102 | R5-237849 | 2495 | 1 | F | Addition of general clause 6.1F | 18.1.0 |
| 2023-12 | RAN#102 | R5-237861 | 2492 | 1 | F | Corrections to spurious emissions co-existence for 2 UL Inter-band CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-237902 | 2559 | 1 | F | Updating Configured output power for intra-band non-contiguous CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-237903 | 2561 | 1 | F | Updating minimum output power for UL non-contiguous CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-237904 | 2563 | 1 | F | Updating Spurious emission testing for intra-band non-contiguous CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-237905 | 2566 | 1 | F | Updating EVM testing for intra-band UL CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-237906 | 2567 | 1 | F | Updating carrier leakage testing for intra-band UL CA | 18.1.0 |
| 2023-12 | RAN#102 | R5-237907 | 2569 | 1 | F | Updating annexF MU and TT for intra-band UL CA testing | 18.1.0 |
| 2023-12 | RAN#102 | R5-237910 | 2498 | 1 | F | MU ad TT values for newly introduced NR-U test cases | 18.1.0 |
| 2023-12 | RAN#102 | R5-237911 | 2570 | 1 | F | Updating AMPR for CA test case for CA\_n28A-n41A | 18.1.0 |
| 2023-12 | RAN#102 | R5-237912 | 2575 | 1 | F | Updates to FR1 RF phase continuity test | 18.1.0 |
| 2023-12 | RAN#102 | R5-237940 | 2582 | 1 | F | Tx signal quality for UL MIMO per layer | 18.1.0 |
| 2023-12 | RAN#102 | R5-237949 | 2519 | 1 | F | Correction to minimum conformance requirements of A-MPR for NS\_07 | 18.1.0 |
| 2024-03 | RAN#103 | R5-240049 | 2585 | - | F | Introduction of common parts for ATG UE RF test cases | 18.2.0 |
| 2024-03 | RAN#103 | R5-240053 | 2589 | - | F | Introduction of General description of Occupied bandwidth for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-240055 | 2591 | - | F | Introduction of General description of Out of band emission for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-240056 | 2592 | - | F | Introduction of General description of Spurious emissions for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-240058 | 2594 | - | F | Introduction of General description of Rx TCs for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-240059 | 2595 | - | F | Introduction of Diversity characteristics description for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-240060 | 2596 | - | F | Introduction of General description of Reference sensitivity for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-240061 | 2597 | - | F | Introduction of General description of Blocking characteristics for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-240063 | 2599 | - | F | Introduction of General description of Intermodulation characteristics for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-240080 | 2602 | - | F | Addition of PC1.5 n39 MOP | 18.2.0 |
| 2024-03 | RAN#103 | R5-240081 | 2603 | - | F | Addition of PC2 n40 MOP | 18.2.0 |
| 2024-03 | RAN#103 | R5-240082 | 2604 | - | F | Addition of PC1.5 n39 MPR | 18.2.0 |
| 2024-03 | RAN#103 | R5-240083 | 2605 | - | F | Addition of PC1.5 n39 Configured tx power requirements | 18.2.0 |
| 2024-03 | RAN#103 | R5-240084 | 2606 | - | F | Addition of PC1.5 n39 Modified MPR behavior | 18.2.0 |
| 2024-03 | RAN#103 | R5-240228 | 2609 | - | F | General updates of TS 38.521-1 clause 5 for R16 CA configurations | 18.2.0 |
| 2024-03 | RAN#103 | R5-240232 | 2612 | - | F | Update 3DL CA reference sensitivity exceptions TC for CA\_n1A-n8A-n78A | 18.2.0 |
| 2024-03 | RAN#103 | R5-240273 | 2620 | - | F | Addition of asymmetric UL and DL channel bandwidth combinations of band n8 in 5.3.6 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240279 | 2621 | - | F | Addition of PC2 for n8 into TC 6.2.1 MOP | 18.2.0 |
| 2024-03 | RAN#103 | R5-240281 | 2623 | - | F | Addition of PC2 for n8 into TC 7.3.2 Reference Sensitivity | 18.2.0 |
| 2024-03 | RAN#103 | R5-240307 | 2624 | - | F | Updating test case AMPR for inter-band CA | 18.2.0 |
| 2024-03 | RAN#103 | R5-240310 | 2625 | - | F | Updating test frequency range for SUL band n83 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240315 | 2628 | - | F | Editorial correction to test requirement of MPR for CA test case | 18.2.0 |
| 2024-03 | RAN#103 | R5-240319 | 2630 | - | F | Updating AMPR testing for SUL band n81 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240320 | 2631 | - | F | Updating UTRA ACLR testing for SUL band n81 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240333 | 2636 | - | F | Updating PC2 test requirements in MPR test case for band n1 and n3 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240336 | 2638 | - | F | Addition of new test case 6.3G.4.1 Absolute power tolerance for Tx Diversity | 18.2.0 |
| 2024-03 | RAN#103 | R5-240375 | 2640 | - | F | Addition of new test case 6.2H.3.2 MPR for inter-band CA with UL MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-240443 | 2641 | - | F | Corrections to spurious emissions for CA\_n3A-n28A | 18.2.0 |
| 2024-03 | RAN#103 | R5-240454 | 2642 | - | F | Editorial correction to UE Power Class for n100 and n101 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240465 | 2646 | - | F | Add UE maximum power requirements for CA\_n71A-n78A | 18.2.0 |
| 2024-03 | RAN#103 | R5-240466 | 2647 | - | F | Add general spurious emissions for UE co-existence requirements for CA\_n71A-n77A and CA\_n71A-n78A | 18.2.0 |
| 2024-03 | RAN#103 | R5-240469 | 2648 | - | F | Addition of reference sensitivity channel bandwidths for n25 and n71 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240470 | 2649 | - | F | Addition of 35 MHz CBW for transmitter requirements | 18.2.0 |
| 2024-03 | RAN#103 | R5-240619 | 2650 | - | F | FR1 CA - Test requirement correction for n2-n48 combo in test 7.3A.1\_1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240620 | 2651 | - | F | Corrections for combo n48A-n66A in test case 7.3A.1\_1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240621 | 2652 | - | F | TT Formula vs MU to be added for FR1 EVM test as in FR2 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240623 | 2654 | - | F | MBW table reference corrected for inter-band case in test case 6.5A.4.1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-240772 | 2657 | - | F | Addition of new test case 7.4A.4 Maximum input level for CA (5DL CA) | 18.2.0 |
| 2024-03 | RAN#103 | R5-240773 | 2658 | - | F | Addition of new test case 7.5A.4 Adjacent channel selectivity for (5DL CA) | 18.2.0 |
| 2024-03 | RAN#103 | R5-240777 | 2659 | - | F | Adding Reference sensitivity test requirements for CA\_n1A-n28A-n78A and CA\_n3A-n28A-n78A | 18.2.0 |
| 2024-03 | RAN#103 | R5-240817 | 2663 | - | F | Addition of test case 6.3F.4.3 relative power tolerance for shared spectrum channel access | 18.2.0 |
| 2024-03 | RAN#103 | R5-240819 | 2664 | - | F | Addition of MU and TT for NR-U test cases | 18.2.0 |
| 2024-03 | RAN#103 | R5-240821 | 2665 | - | F | Updates of test case 6.2F.4 Configured transmitted power for shared spectrum access | 18.2.0 |
| 2024-03 | RAN#103 | R5-240826 | 2666 | - | F | Editorial, correcting Test case title for 7.3I.2 in Annex A | 18.2.0 |
| 2024-03 | RAN#103 | R5-240828 | 2667 | - | F | Addition of RMC tables for shared spectrum access in Annex A | 18.2.0 |
| 2024-03 | RAN#103 | R5-240835 | 2668 | - | F | Update of 6.3C.1 for minimum output power for SUL bands | 18.2.0 |
| 2024-03 | RAN#103 | R5-240836 | 2669 | - | F | Update of 6.3C.2 for transmit OFF power for SUL bands | 18.2.0 |
| 2024-03 | RAN#103 | R5-240888 | 2671 | - | F | Update reference sensitivity requirement table for additional band configurations | 18.2.0 |
| 2024-03 | RAN#103 | R5-240894 | 2673 | - | F | Addition of PC2 max power requirements for bands CA\_n77(2A) and CA\_n14A-n77A | 18.2.0 |
| 2024-03 | RAN#103 | R5-241002 | 2679 | - | F | Update to ASEM test cases for V2X | 18.2.0 |
| 2024-03 | RAN#103 | R5-241003 | 2680 | - | F | Update to ASE test case for V2X | 18.2.0 |
| 2024-03 | RAN#103 | R5-241007 | 2681 | - | F | Adding the support of NS\_47 for PC 1.5 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241010 | 2683 | - | F | Addition of 6.3H.1.4 power control for CA with UL MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241023 | 2696 | - | F | Update to minimum requirement of 6.4D.4 for UL switching | 18.2.0 |
| 2024-03 | RAN#103 | R5-241099 | 2706 | - | F | Correction to UL configuration for intra-band contiguous CA | 18.2.0 |
| 2024-03 | RAN#103 | R5-241101 | 2708 | - | F | Correction to Rel-16 A-MPR | 18.2.0 |
| 2024-03 | RAN#103 | R5-241103 | 2710 | - | F | Correction to applicability of powerBoosting for PC3 UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-241104 | 2711 | - | F | Addition of CBW 35 MHz and 45 MHz to OBW for inter-band CA | 18.2.0 |
| 2024-03 | RAN#103 | R5-241105 | 2712 | - | F | Addition of CBW 35 MHz, 45 MHz, 70 MHz to ACS for CA | 18.2.0 |
| 2024-03 | RAN#103 | R5-241154 | 2716 | - | F | Editorial correction in FR1 test case 6.4G.2.1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241156 | 2718 | - | F | Editorial correction in FR1 test case 6.2A.2.1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241208 | 2722 | - | F | Correction to test case 6.4E.2.4.1D In-band emissions for V2X / non-concurrent operation / SL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241210 | 2723 | - | F | Correction to test case 6.4E.2.4.2 In-band emissions for V2X / con-current operation | 18.2.0 |
| 2024-03 | RAN#103 | R5-241260 | 2725 | - | F | Update of Operating bands for UL MIMO band n5 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241263 | 2727 | - | F | Addition of n5 into TC 6.2D.2 MPR for UL MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241354 | 2730 | - | F | Correction in A-MPR test case | 18.2.0 |
| 2024-03 | RAN#103 | R5-241369 | 2732 | - | F | Update of Refsens TC for RedCap UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-241683 | 2586 | 2 | F | Introduction of General description for ATG UE Tx TCs | 18.2.0 |
| 2024-03 | RAN#103 | R5-241727 | 2608 | 1 | F | Update test configuration table for NS\_13 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241728 | 2632 | 1 | F | Addition of delta TIBc and UE maximum output power for new R16 NR CA combos within FR1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241729 | 2660 | 1 | F | Add UE maximum power requirements for CA\_n1A-n28A and CA\_n3A-n28A | 18.2.0 |
| 2024-03 | RAN#103 | R5-241730 | 2661 | 1 | F | Add spurious emissions for UE co-existence requirements for CA\_n1A\_n28A | 18.2.0 |
| 2024-03 | RAN#103 | R5-241731 | 2634 | 1 | F | Addition of delta RIBc and reference sensitivity for new R16 NR CA combos within FR1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241732 | 2703 | 1 | F | Correction to Reference sensitivity for Rel-16 CA | 18.2.0 |
| 2024-03 | RAN#103 | R5-241733 | 2678 | 1 | F | Adding AMPR test cases for V2X | 18.2.0 |
| 2024-03 | RAN#103 | R5-241734 | 2633 | 1 | F | Addition of spurious emissions, delta TIBc and UE maximum output power for new R17 NR CA combos within FR1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241735 | 2635 | 1 | F | Addition of delta RIBc and reference sensitivity for new R17 NR CA combos within FR1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241736 | 2645 | 1 | F | Adding Reference sensitivity test requirements for CA\_n66A-n71A-n77(2A) and CA\_n66A-n71A-n78(2A) | 18.2.0 |
| 2024-03 | RAN#103 | R5-241737 | 2704 | 1 | F | Correction to Reference sensitivity for CA\_n28A-n41A-n79A | 18.2.0 |
| 2024-03 | RAN#103 | R5-241738 | 2705 | 1 | F | Clarification of asymmetric BW in Rx test cases for CA | 18.2.0 |
| 2024-03 | RAN#103 | R5-241739 | 2662 | 1 | F | Updates to NR-U Tx test cases | 18.2.0 |
| 2024-03 | RAN#103 | R5-241740 | 2719 | 1 | F | Addition of test case 6.5F.3.3 Additional spurious emissions for shared spectrum channel access | 18.2.0 |
| 2024-03 | RAN#103 | R5-241741 | 2720 | 1 | F | Updates of test case 6.2F.3 UE additional maximum output power reduction for shared spectrum access | 18.2.0 |
| 2024-03 | RAN#103 | R5-241742 | 2724 | 1 | F | Updates of test case 6.5F.2.4.2, Shared spectrum channel access ACLR with additional requirement for NS\_29 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241745 | 2726 | 1 | F | Addition of n5 into TC 6.2D.1 MOP for UL MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241746 | 2674 | 1 | F | Addition of band CA\_n14A-n77A PC2 reference sensitivity test | 18.2.0 |
| 2024-03 | RAN#103 | R5-241747 | 2672 | 1 | F | Addition of CA\_n14A-n77A PC2 and CA\_n77(2A) PC2 to Ch 5 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241751 | 2587 | 1 | F | Introduction of MOP TC for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-241752 | 2588 | 1 | F | Introduction of Configured transmitted power TC for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-241753 | 2590 | 1 | F | Introduction of Occupied bandwidth TC for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-241754 | 2593 | 1 | F | Introduction of General Spurious emissions TC for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-241755 | 2614 | 1 | F | Addition of new test case 6.3J.2 Transmit OFF power for ATG | 18.2.0 |
| 2024-03 | RAN#103 | R5-241756 | 2615 | 1 | F | Addition of new test case 6.3J.1 Minimum output power for ATG | 18.2.0 |
| 2024-03 | RAN#103 | R5-241757 | 2598 | 1 | F | Introduction of Spurious response TC for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-241758 | 2600 | 1 | F | Introduction of Wide band intermodulation TC for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-241759 | 2601 | 1 | F | Introduction of Spurious emissions TC for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-241760 | 2616 | 1 | F | Addition of new test case 7.4J Maximum input level for ATG | 18.2.0 |
| 2024-03 | RAN#103 | R5-241761 | 2617 | 1 | F | Addition of new test case 7.5J Adjacent channel selectivity for ATG | 18.2.0 |
| 2024-03 | RAN#103 | R5-241762 | 2618 | 1 | F | Addition of new test case 7.6J.2 In-band blocking for ATG | 18.2.0 |
| 2024-03 | RAN#103 | R5-241763 | 2619 | 1 | F | Addition of new test case 7.6J.3 Out-of-band blocking for ATG | 18.2.0 |
| 2024-03 | RAN#103 | R5-241764 | 2637 | 1 | F | Addition of Measurement Uncertainties and Test Tolerances for ATG UE | 18.2.0 |
| 2024-03 | RAN#103 | R5-241766 | 2656 | 1 | F | p-Max and p-NR-FR1 adjustment when higherPowerLimit-r17 applies | 18.2.0 |
| 2024-03 | RAN#103 | R5-241767 | 2675 | 1 | F | Clarification of trace mode in emission testing\_FR1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241768 | 2677 | 1 | F | Update to AMPR, ASEM and ASE for intra-band CA for CA\_NS\_04 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241769 | 2717 | 1 | F | Editorial correction in FR1 test case 6.5A.2.4.1.1 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241772 | 2643 | 1 | F | Correction to Reference sensitivity power level test configuration for CA\_n28A-n78A | 18.2.0 |
| 2024-03 | RAN#103 | R5-241773 | 2713 | 1 | F | Addition of CBW 35 MHz, 45 MHz, 70 MHz to Narrow band blocking for inter-band CA | 18.2.0 |
| 2024-03 | RAN#103 | R5-241774 | 2721 | 1 | F | Correction of 7.6A.2 for inband blocking for CA | 18.2.0 |
| 2024-03 | RAN#103 | R5-241775 | 2611 | 1 | F | General updates of clause 5 for R17 new CBW configurations | 18.2.0 |
| 2024-03 | RAN#103 | R5-241776 | 2655 | 1 | F | Added 30kHz SCS for SSB in n53 to be aligned with core specs | 18.2.0 |
| 2024-03 | RAN#103 | R5-241779 | 2735 | 1 | F | Corrections for 6.3G.3.3 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241868 | 2610 | 1 | F | General updates of TS 38.521-1 clause 5 for R17 CA configurations | 18.2.0 |
| 2024-03 | RAN#103 | R5-241870 | 2626 | 2 | F | Updating FR1 PC2 REFSENS exceptions testing | 18.2.0 |
| 2024-03 | RAN#103 | R5-241871 | 2627 | 2 | F | Correcting errors in REFSENS for CA test case for PC3 CA configurations | 18.2.0 |
| 2024-03 | RAN#103 | R5-241872 | 2629 | 2 | F | Updating REFSENS testing for SUL configuration | 18.2.0 |
| 2024-03 | RAN#103 | R5-241879 | 2639 | 1 | F | Removal of square brackets for Tx Diversity capability | 18.2.0 |
| 2024-03 | RAN#103 | R5-241880 | 2731 | 1 | F | General updates of Spurious emissions for UE co-existence for Inter-band CA | 18.2.0 |
| 2024-03 | RAN#103 | R5-241907 | 2728 | 1 | F | Update of 4DL CA test cases | 18.2.0 |
| 2024-03 | RAN#103 | R5-241922 | 2707 | 1 | F | Correction to Rel-15 A-MPR | 18.2.0 |
| 2024-03 | RAN#103 | R5-241941 | 2613 | 1 | F | Addition of DL interruption allowed indication for CA\_n1-n3-n78 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241945 | 2714 | 1 | F | Correction to note for inter-band CA including n48 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241947 | 2733 | 1 | F | Updates to FR1 RF phase continuity test | 18.2.0 |
| 2024-03 | RAN#103 | R5-241948 | 2734 | 1 | F | Updates and corrections to Annex in FR1 RF spec | 18.2.0 |
| 2024-03 | RAN#103 | R5-241969 | 2709 | 1 | F | Correction to test configuration in 6.2D.2 | 18.2.0 |
| 2024-03 | RAN#103 | R5-241970 | 2682 | 1 | F | Addition of 6.2H.1.3 AMPR for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241971 | 2684 | 1 | F | Addition of 6.4H.1.1 frequency error for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241972 | 2685 | 1 | F | Addition of 6.4H.1.2.1 EVM for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241973 | 2686 | 1 | F | Addition of 6.4H.1.2.2 Carrier leakage for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241974 | 2687 | 1 | F | Addition of 6.4H.1.2.3 In-band emission for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241975 | 2688 | 1 | F | Addition of 6.4H.1.3 time alignment error for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241976 | 2689 | 1 | F | Addition of 6.4H.1.4 Coherent requirement for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241977 | 2690 | 1 | F | Addition of 6.5H.1.1 Occupied bandwidth for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241978 | 2691 | 1 | F | Addition of 6.5H.1.2.2 ASEM for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241979 | 2692 | 1 | F | Addition of 6.5H.1.3.1 General spurious emission for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241980 | 2693 | 1 | F | Addition of 6.5H.1.3.2 Spurious emission UE co-existence for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241981 | 2694 | 1 | F | Addition of 6.5H.1.3.3 Additional spurious emission for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241982 | 2695 | 1 | F | Addition of 6.5H.1.4 Transmit intermodulation for CA with UL-MIMO | 18.2.0 |
| 2024-03 | RAN#103 | R5-241983 | 2697 | 1 | F | Addition of 6.3A.3.4 1Tx-2Tx UL switching between two bands | 18.2.0 |
| 2024-03 | RAN#103 | R5-241984 | 2698 | 1 | F | Addition of 6.3A.3.5 2Tx-2Tx UL switching between two bands | 18.2.0 |
| 2024-03 | RAN#103 | R5-241985 | 2699 | 1 | F | Addition of 6.3C.3.3 2Tx-2Tx UL switching between two uplink carriers in SUL configuration | 18.2.0 |
| 2024-03 | RAN#103 | R5-241986 | 2700 | 1 | F | Addition of 6.3C.3.4 1Tx-2Tx UL switching between two bands in SUL configuration | 18.2.0 |
| 2024-03 | RAN#103 | R5-241987 | 2701 | 1 | F | Addition of 6.3C.3.5 2Tx-2Tx UL switching between two bands in SUL configuration | 18.2.0 |
| 2024-03 | RAN#103 | R5-242015 | 2715 | 1 | F | Correction to Reference sensitivity for CA\_n26A-n70A | 18.2.0 |