



**5G;
NR;
Derivation of test points for radio transmission and reception
User Equipment (UE) conformance test cases
(3GPP TR 38.905 version 17.6.0 Release 17)**



Reference

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Keywords

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Foreword

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- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies and contains the derivation of Test Points for NR RF test cases, thereby 3GPP TSG RAN WG5 will have a way of storing the input contributions provided. The test cases are described in TS38.521-1[2], TS38.521-2[3] and TS38.521-3[4],

The test cases which have been analysed to determine Test Points are included as .zip files.

The present document is applicable from Release 15 up to the release indicated on the front page of the present Terminal conformance specifications.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
 - [2] 3GPP TS 38.521-1: "NR; UE conformance specification; Radio transmission and reception; Part 1: NR range 1".
 - [3] 3GPP TS 38.521-2: "NR; UE conformance specification; Radio transmission and reception; Part 2: NR range 2".
 - [4] 3GPP TS 38.521-3: "NR; UE conformance specification; Radio transmission and reception; Part 3: NR interworking between NR range1 + NR range2 and between NR and LTE".
 - [5] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".
 - [6] 3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone".
 - [7] 3GPP TS 38.101-3: "NR; User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios".
 - [8] 3GPP TS 36.101: Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception".
 - [9] R5-206841: "Discussion on test points in Receiver test cases for EN-DC configurations with exception requirements".
-

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

Other definitions used in the present document are listed in 3GPP TS 38.521-1 [2], 3GPP TS 38.521-2 [3] or 3GPP TS 38.521-3 [4].

Editor's note: intended to capture definitions

3.2 Symbols

Symbols used in the present document are listed in 3GPP TR 21.905 [1], 3GPP TS 38.521-1 [2], 3GPP TS 38.521-2 [3] or 3GPP TS 38.521-3 [4].

Editor's note: intended to capture definitions

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

Other abbreviations used in the present document are listed in 3GPP TS 38.521-1 [2], or 3GPP, 3GPP TS 38.521-1 [2], 3GPP TS 38.521-2 [3] or 3GPP TS 38.521-3 [4].

| | |
|-------|-------------------------------|
| A-SE | Additional spurious emissions |
| A-SEM | Spectrum Emission Mask |

4 Test coverage analysis

This clause contains information on test point analysis and test point selection for RX and TX test configuration tables in [2], [3] and [4]. The test point analysis should include selection of:

- Test environment
- Test frequencies
- Test channel bandwidth
- Test Subcarrier Spacing (SCS)
- Downlink configuration including modulation and RB allocation
- Uplink configuration including modulation and RB allocation
- Number of test points

4.1 Test point analysis for FR1 test cases in TS 38.521-1

4.1.1 Test point analysis per test case

4.1.1.1 FR1 single carrier, NR CA and UL MIMO test cases

This clause contains information on test point analysis and test point selection for single carrier, NR CA and UL MIMO test cases in [2] clause 6 and 7 with information about transmitting test point selection for FR1 listed in table 4.1.1.1-1 and receiver test point selection in table 4.1.1.1-2.

Table 4.1.1.1-1: NR UE transmitter test point selection for FR1

| Subclause | Number of test points | Justification in attachment | Comments |
|---|--|--|---------------------|
| 6.2.1 UE maximum output power | 540 | "38.521-1_TPanalysis_6.2.1_MaxOP_v3.zip" | RAN5#89-e |
| 6.2.2 Maximum Output Power Reduction (MPR) | contiguous allocation: 920 (1040 ¹ ,1000 ^{2,3}) almost contiguous allocation: 120 | "38.521-1_TPanalysis_6.2.2_MPR_6.5.2.2_SEM_6.5.2.4.1_NR_ACLR_v4.zip" | RAN5#95-e |
| 6.2.3 UE A-MPR | See clause 4.1.2.1 | See clause 4.1.2.1 | See clause 4.1.2.1 |
| 6.2.4 Configured Transmitted Power | 30 | "38.521-1_TPanalysis_6.2.4_ConfigTP_v1.zip" | RAN5#91-e |
| 6.2A.1.1 UE maximum output power for CA (2UL CA) | 240 | "38.521-1_TPanalysis_6.2A.1_MOP" | RAN5#83 |
| 6.2A.2.1 Maximum power reduction (MPR) for CA (2UL CA) | For inter-band CA:1440 For intra-band contiguous CA: 720 (contiguous RB allocation) 720 (non-contiguous RB allocation) For intra-band non-contiguous CA: 2520 | "38.521-1_TPanalysis_6.2A.2_MPR_v3.zip" | RAN5#96-e |
| 6.2A.4 Configured transmitted power for CA | Inter-band CA:20 Intra-band contiguous CA (contiguous RB allocation): 20 | "38.521-1_TPanalysis_6.2A.4_ConfigTP_v1.zip" | RAN5#88-e |
| 6.2C.1 Configured UE transmitted Output Power | 270 | "38.521-1_TPanalysis_6.2C.1_ConfigOPSUL.zip" | RAN5#80 |
| 6.2D.1 UE maximum output power for UL-MIMO | UL MIMO with ULFPTx: 540 UL MIMO with 2-layer: 0 | "38.521-1_TPanalysis_6.2.1_MaxOP_v3.zip" | RAN5#89-e |
| 6.2D.2 Maximum Power Reduction (MPR) for UL MIMO | power class 3 supporting ULFPTx: 920 power class 2 supporting ULFPTx: 920 UL MIMO with 2-layer: 400 UL MIMO with ULFPTx: 920 | "38.521-1_TPanalysis_6.2.2_MPR_6.5.2.2_SEM_6.5.2.4.1_NR_ACLR_v4.zip" | RAN5#95-e |
| 6.2D.3 UE additional maximum output power reduction for UL-MIMO | Table 4.1.2.1-1 | Table 4.1.2.1-1 | See Table 4.1.2.1-1 |
| 6.2D.4 Configured Transmitted Power for UL-MIMO | 15 | "38.521-1_TPanalysis_6.2.4_ConfigTP_v1.zip" | RAN5#91-e |
| 6.3.1 Minimum output power | 45 | "38.521-1_TPanalysis_6.3.1_MinOP_v3.zip" | RAN5#5-5G-NR Adhoc |
| 6.3.3.2 General ON/OFF time mask | 180 | "38.521-1_TPanalysis_6.3.3.2_OnOff_M_v2.zip" | RAN5#5-5G-NR Adhoc |
| 6.3.3.4 PRACH time mask | | "38.521-1_TPanalysis_6.3.3.4_PRACH.zip" | RAN5#96-e |
| 6.3.3.6 SRS time mask | 30 | "38.521-1_TPanalysis_6.3.3.3_SRS.zip" | RAN5#82 |
| 6.3.4.2 Absolute power tolerance | 6 | "38.521-1_TPanalysis_6.3.4.2_AbsPtol_v2.zip" | RAN5#83 |

| | | | |
|---|--|--|--------------------|
| 6.3.4.3 Relative power tolerance | TBD | "38.521-1_TPanalysis_6.3.4.3_RelPtol_v2.zip" | RAN5#83 |
| 6.3.4.4 Aggregate power tolerance | PUCCH: 6 PUSCH: 6 | "38.521-1_TPanalysis_6.3.4.4_AggPtol_v2.zip" | RAN5#83 |
| 6.3A.1.1 Minimum output power for CA (2UL CA) | 20 | 38.521-1_TPanalysis_6.3A.1.1_MinOP_CA.zip | RAN5#83 |
| 6.3A.3.1 Transmit ON/OFF time mask for CA (2UL CA) | 40 | "38.521-1_TPanalysis_6.3A.3.1_OnOff_M_CA.zip" | RAN5#83 |
| 6.3A.3.1_1 Time mask for switching between two uplink carriers | 1 | "38.521-1_TPanalysis_6.3A.3.1_1_TxSwitch_M_v1.zip" | RAN5#96-e |
| 6.3A.4.1 Absolute power tolerance for CA (2UL CA) | Intra-band contiguous CA:4 Intra-band non-contiguous CA:2 | "38.521-1_TPanalysis_6.3A.4.1_Abs_PTol_CA_v3.zip" | RAN5#95-e |
| 6.3A.4.2 Relative power tolerance for CA (2UL CA) | TBD | "38.521-1_TPanalysis_6.3A.4.2_Rel_PTol_CA_v1.zip" | RAN5#92-e |
| 6.3A.4.3 Aggregate power tolerance for CA (2UL CA) | PUCCH:4 PUSCH:4 | "38.521-1_TPanalysis_6.3A.4.3_Agg_PTol_CA_v1.zip" | RAN5#92-e |
| 6.3D.1 Minimum output power for UL-MIMO | 45 | "38.521-1_TPanalysis_6.3.1_MinOP_v3.zip" | RAN5#5-5G-NR Adhoc |
| 6.3D.3 Transmit ON/OFF time mask for UL-MIMO | TBD | "38.521-1_TPanalysis_6.3.3.2_OnOff_M_v2.zip" | RAN5#5-5G-NR Adhoc |
| 6.3D.4.1 Absolute Power tolerance for UL-MIMO | 6 | "38.521-1_TPanalysis_6.3.4.2_AbsPtol_v2.zip" | RAN5#83 |
| 6.3D.4.2 Relative Power Tolerance for UL-MIMO | TBD | "38.521-1_TPanalysis_6.3.4.3_RelPtol_v2.zip" | RAN5#83 |
| 6.3D.4.3 Aggregate Power tolerance for UL-MIMO | PUCCH: 6 PUSCH: 6 | "38.521-1_TPanalysis_6.3.4.4_AggPtol_v2.zip" | RAN5#83 |
| 6.4.1 Frequency error | 5 | "38.521-1_TPanalysis_6.4.1_FreqErr_v3.zip" | RAN5#84 |
| 6.4.2.1 Error Vector Magnitude | PUSCH: 252 PUCCH: 36 PRACH: 36 | "38.521-1_TPanalysis_6.4.2.1_EVM_v3.zip" | RAN5#94-e |
| 6.4.2.1a Error Vector Magnitude including symbols with transient period | PUSCH: 36 | "38.521-1_TPanalysis_6.4.2.1_EVM_v3.zip" | RAN5#94e |
| 6.4.2.2 Carrier leakage | 3 | "38.521-1_TPanalysis_6.4.2.2_CarrLeak_v2.zip" | RAN5#84 |
| 6.4.2.3 In-band emissions | 36 | "38.521-1_TPanalysis_6.4.2.3_IE_2.zip" | RAN5#84 |
| 6.4.2.4 EVM equalizer spectrum flatness | 90 | "38.521-1_TPanalysis_6.4.2.4_EVMequalizerSpectrumFlatness_v3.zip" | RAN5#84 |
| 6.4.2.5 EVM equalizer spectrum flatness for Pi/2 BPSK | 9 | "38.521-1_TPanalysis_6.4.2.5_EVMequalizerSpectrumFlatness_BPSK_v2.zip" | RAN5#92-e |
| 6.4A.1.1 Frequency error for CA (2UL CA) | 5 | "38.521-1_TPanalysis on 6.4A.1.1_FreqErr.zip" | RAN5#82 |
| 6.4A.2.1.1 Error Vector Magnitude for CA (2UL CA) | 168 | "38.521-1_TPanalysis on 6.4A.2.1.1_EVM.zip" | RAN5#82 |
| 6.4A.2.2.1 Carrier leakage for CA (2UL CA) | 2 | "38.521-1_TPanalysis on 6.4A.2.2.1_CarrLeak.zip" | RAN5#82 |
| 6.4A.2.3.1 In-band emissions for CA (2UL CA) | | "38.521-1_TPanalysis on 6.4A.2.2.1_IBE.zip" | RAN5#82 |
| 6.4D.1 Frequency error | 5 | "38.521-1_TPanalysis_6.4.1_FreqErr_v3.zip" | RAN5#84 |
| 6.4D.2.1 Error Vector Magnitude for UL MIMO | PUSCH: 108 | "38.521-1_TPanalysis on 6.4.2.1_EVM_v3.zip" | RAN5#94-e |

| | | | |
|--|--|--|---------------------|
| 6.4D.2.2 Carrier leakage for UL MIMO | 3 | "38.521-1_TPanalysis on 6.4.2.2_CarrLeak_v2.zip" | RAN5#84 |
| 6.4D.2.3 In-band emissions for UL MIMO | 18 | "38.521-1_TPanalysis_6.4.2.3_IE_2.zip" | RAN5#84 |
| 6.4D.2.4 EVM equalizer spectrum flatness for UL MIMO | 45 | "38.521-1_TPanalysis_6.4.2.4_EVMequalizerSpectrumFlatness_v3.zip" | RAN5#84 |
| 6.4D.3 Time alignment error for UL-MIMO | 6 | "38.521-1_TPanalysis_6.4D.3_TAE_MIMO.zip" | RAN5#82 |
| 6.5.1 Occupied bandwidth | 10 | "38.521-1_TPanalysis_6.5.1_OccBW_v3.zip" | RAN5#92-e |
| 6.5.2.2 Spectrum Emission Mask | contiguous allocation: 144 (168 ¹ , 160 ^{2,3}) almost contiguous allocation: 24 | "38.521-1_TPanalysis_6.2.2_MPR_6.5.2.2_SEM_6.5.2.4.1_NR_ACLR_v4.zip" | RAN5#95-e |
| 6.5D.2.3 Additional spectrum emission mask for UL-MIMO | Table 4.1.2.1-1 | Table 4.1.2.1-1 | See Table 4.1.2.1-1 |
| 6.5.2.4.1 NR Adjacent channel leakage ratio | contiguous allocation: 920 (1040 ¹ , 1000 ^{2,3}) almost contiguous allocation: 120 | "38.521-1_TPanalysis_6.2.2_MPR_6.5.2.2_SEM_6.5.2.4.1_NR_ACLR_v4.zip" | RAN5#95-e |
| 6.5.2.4.2 UTRA ACLR | Same as NS_3U, NS_5U, NS_43 U, and NS_100 in Table 4.1.1.1-1 | "38.521-1_TPanalysis_6.5.2.4.2_UTRA ACLR_v3.zip" | RAN5#91-e |
| 6.5.3.1 General spurious emissions | 27 | "38.521-1_TPanalysis_6.5.3.1_TX_Spurious_Emission_v1.zip" | RAN5#89-e |
| 6.5.3.2 Spurious emissions for UE co-existence | 27 | "38.521-1_TPanalysis_6.5.3.1_TX_Spurious_Emission_v1.zip" | RAN5#89-e |
| 6.5.3.3 Additional spurious emissions | See Table 4.1.2.1-1 | See Table 4.1.2.1-1 | See Table 4.1.2.1-1 |
| 6.5.4 Transmit intermodulation | 8 | "38.521-1_TPanalysis_6.5.4_TxIm.zip" | RAN5#80 |
| 6.5A.1.1 Occupied bandwidth for CA (2UL CA) | Inter-band: 2 Intra-band contiguous: 1 Intra-band non-contiguous: 1 | "38.521-1_TPanalysis_6.5A.1.1_OccBW_v2.zip" | RAN5#92-e |
| 6.5A.2.2.1 Spectrum emission mask for CA (2UL CA) | Inter-band CA:112 Intra-band CA:72 | "38.521-1_TPanalysis on 6.5A.2.2.1_SEM_v1.zip" | RAN5#94-e |
| 6.5A.2.4.1.1 NR ACLR for CA (2UL CA) | For inter-band CA:1440 For intra-band contiguous CA: 720 (contiguous RB allocation) 720 (non-contiguous RB allocation) For intra-band non-contiguous CA: 2520 | "38.521-1_TPanalysis on 6.5A.2.4.1.1_NR ACLR_v2.zip" | RAN5#95-e |
| 6.5A.2.4.2.1 UTRA ACLR for CA (2UL CA) | 840 | "38.521-1_TPanalysis on 6.5A.2.4.2.1 UTRA ACLR .zip" | RAN5#82 |
| 6.5A.3.1.1 General spurious emissions for CA (2UL CA) | 12 | "38.521-1_TPanalysis on 6.5A.3.1.1_Spurious_v1.zip" | RAN5#90 |

| | | | |
|--|---|---|--------------------|
| 6.5A.3.2.1 Spurious emissions for UE co-existence for CA (2UL CA) | See table 4.1.3.2-1 | "38.521-1_TPanalysis on 6.5A.3.2.1_SECoex_v1.zip" | RAN5#91-e |
| 6.5A.4.1 Transmit intermodulation for CA (2UL CA) | 840 | "38.521-1_TPanalysis on 6.5A.4.1_TxIM.zip" | RAN5#82 |
| 6.5D.1 Occupied bandwidth for UL-MIMO | 10 | 38.521-1_TPanalysis_6.5.1_OBW_v3.zip | RAN5#92-e |
| 6.5D.2.2 Spectrum emission mask for UL MIMO | UL MIMO with 2-layer: 64 UL MIMO with ULFPTx: 144 | "38.521-1_TPanalysis_6.2.2_MPR_6.5.2.2_SEM_6.5.2.4.1_NR_ACLR_v4.zip" | RAN5#95-e |
| 6.5D.2.4.1 NR ACLR for UL-MIMO | power class 3: 400 power class 2: 400 power class 3 supporting ULFPTx: 920 power class 2 supporting ULFPTx: 920 UL MIMO with 2-layer: 400 UL MIMO with ULFPTx: 920 | "38.521-1_TPanalysis_6.2.2_MPR_6.5.2.2_SEM_6.5.2.4.1_NR_ACLR_v3/v4.zip" | RAN5#95-e |
| 6.5D.2.4.2 UTRA ACLR for UL-MIMO | 96 for NS_3U | "38.521-1_TPanalysis_6.5D.2.4.2_UTRA ALCR_NS_3U_v1.zip" "38.521-1_TPanalysis_6.5.2.4.2_UTRA ACLR_v3.zip" | RAN5#5-5G-NR Adhoc |
| 6.5D.2.1.4.2 UTRA ACLR for UL MIMO (Rel-16 onward) | 216 for NS_3U | "38.521-1_TPanalysis_6.5D.2.4.2_UTRA ALCR_NS_3U_v1.zip" "38.521-1_TPanalysis_6.5.2.4.2_UTRA ACLR_v3.zip" | RAN5#90-e |
| 6.5D.3.1 General spurious emissions | 27 | "38.521-1_TP analysis_6.5.3.1_TX_Spurious_Emission_v1.zip" | RAN5#89-e |
| 6.5D.3.2 Spurious emissions for UE co-existence for UL-MIMO | 27 | "38.521-1_TP analysis_6.5.3.1_TX_Spurious_Emission_v1.zip" | RAN5#89-e |
| 6.5D.3.3 Additional spurious emissions for UL-MIMO | Table 4.1.2.1-1 | Table 4.1.2.1-1 | RAN5#5-5G-NR Adhoc |
| 6.5D.3.1.1 General spurious emissions (Rel-16 onward) | 27 | "38.521-1_TP analysis_6.5.3.1_TX_Spurious_Emission_v1.zip" | RAN5#89-e |
| 6.5D.3.1.2 Spurious emissions for UE co-existence for UL-MIMO (Rel-16 onward) | 27 | "38.521-1_TP analysis_6.5.3.1_TX_Spurious_Emission_v1.zip" | RAN5#89-e |
| 6.5D.3.1.3 Additional spurious emissions for UL-MIMO (Rel-16 onward) | Table 4.1.1.1-1 | Table 4.1.1.1-1 | RAN5#89-e |
| 6.5D.4 Transmit intermodulation for UL-MIMO | | "38.521-1_TPanalysis_6.5.4_TxIm_v2.zip" | RAN5#82 |
| NOTE 1: For power class 3 UE operating in bands n40, n41, n77, n78 and n79. NOTE 2: UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79, or in TDD mode the IE powerBoostPi2BPSK is set to 0 for bands n40, n41, n77, n78 and n79. NOTE 3: UEs supporting pi/2 BPSK DMRS and the corresponding IE [DMRSPi2BPSK] is set to 1. NOTE 4: The maximum number of test point is 24 if only default points are applied. | | | |

Table 4.1.1.1-2: NR UE receiver test point selection for FR1

| Subclause | Number of test points | Justification in attachment | Comments |
|--|---|---|------------------|
| 7.3 Reference sensitivity power level | symmetric channel bandwidths: 45 asymmetric channel bandwidths: 30 | "38.521-1_TPanalysis_7.3_RefSense_v4.zip" | RAN5#95-e |
| 7.3A Reference sensitivity for CA | See clause 4.1.3 | See clause 4.1.3 | See clause 4.1.3 |
| 7.3D.2 Reference sensitivity power level for UL-MIMO | 45 | "38.521-1_TPanalysis_7.3_RefSense_v4.zip" | RAN5#95-e |
| 7.4 Maximum input level | symmetric channel bandwidths: 6 asymmetric channel bandwidths: 4 | "38.521-1_TPanalysis_7.4_Maximun input level_v3.zip" | RAN5#96-e |
| 7.4A Maximum input level for CA | 2CC:2 3CC:2 | "38.521-1_TPanalysis 7.4A maxIL for CA_v1.zip" | RAN5#89-e |
| 7.4D Maximum input level for UL-MIMO | 6 | "38.521-1_TPanalysis_7.4_Maximun input level_v3.zip" | RAN5#96-e |
| 7.5 Adjacent Channel Selectivity | symmetric channel bandwidths: 3 asymmetric channel bandwidths: 2 | "38.521-1_TPanalysis_7.5_ACS_v3.zip" | RAN5#96-e |
| 7.5A Adjacent channel selectivity for DL CA | intra-band contiguous CA: 2 inter-band CA: 1 | "38.521-1_TPanalysis_7.5A.1_ACS_2CA.zip" | RAN5#83 |
| 7.5D Adjacent Channel Selectivity for UL-MIMO | 3 | "38.521-1_TPanalysis_7.5_ACS_v2.zip" | RAN5#82 |
| 7.6.2 In Band Blocking | symmetric channel bandwidths: 3 asymmetric channel bandwidths: 2 | "38.521-1_TPanalysis_7.6.2_InB_Block_v3.zip" | RAN5#96-e |
| 7.6.3 Out-of-band blocking | symmetric channel bandwidths: 3 asymmetric channel bandwidths: 2 | "38.521-1_TPanalysis_7.6.3_OobBlocking_v3.zip" | RAN5#96-e |
| 7.6.4 Narrow band blocking | symmetric channel bandwidths: 3 asymmetric channel bandwidths: 2 | "38.521-1_TPanalysis_7.6.4_NarrowbBlocking_v3.zip" | RAN5#96-e |
| 7.6A.2 Inband blocking for CA 2CC: 3CC:1 | 1 | "38.521-1_TPanalysis 7.6A.2 IBB for CA_v1.zip" | RAN5#89-e |
| 7.6A.3 Out-of-band blocking for CA | 1 | "38.521-1_TPanalysis_7.6A.3 Out-of-band blocking for CA_v1.zip" | RAN5#86-e |
| 7.6A.4 Narrow band blocking for CA | 1 | "38.521-1_TPanalysis_7.6A.4 Narrow band blocking for CA_v1.zip" | RAN5#86-e |
| 7.6D.2 Inband blocking for UL-MIMO | 3 | "38.521-1_TPanalysis_7.6.2_InB_Block_v3.zip" | RAN5#96-e |
| 7.6D.3 Out-of-band blocking for UL-MIMO | 3 | "38.521-1_TPanalysis_7.6.3_OobBlocking_v3.zip" | RAN5#96-e |

| | | | |
|--|---|--|-----------|
| 7.6D.4 Narrow band blocking for UL-MIMO | 3 | "38.521-1_TPanalysis_7.6.4_NarrowbBlocking_v3.zip" | RAN5#96-e |
| 7.7 Spurious response | symmetric channel bandwidths: 3 asymmetric channel bandwidths: 2 | "38.521-1_TPanalysis_7.7_Spurious response_v2.zip" | RAN5#96-e |
| 7.7D Spurious response for UL-MIMO | 3 | "38.521-1_TPanalysis_7.7_Spurious response_v2.zip" | RAN5#96-e |
| 7.8.2 Wide band Intermodulation | symmetric channel bandwidths: 3 asymmetric channel bandwidths: 2 | "38.521-1_TPanalysis_7.8.2_WidebandIntermod_v3.zip" | RAN5#96-e |
| 7.8A Wide band Intermodulation for CA | 1 | "38.521-1_TPanalysis_7.8A Wide band Intermodulation for CA_v1.zip" | RAN5#86-e |
| 7.8D.2 Wide band Intermodulation for UL-MIMO | 3 | "38.521-1_TPanalysis_7.8.2_WidebandIntermod_v3.zip" | RAN5#96-e |
| 7.9 Spurious emissions | 3 | "38.521-1_TPanalysis_7.9_RxSpurious.zip" | RAN5#81 |

4.1.1.2 FR1 SUL test cases

This section contains information on test point selection for SUL test cases in [2]. The basic principle is following the same rules for test point selection in single carrier test cases. In these SUL test cases, there are default test points to be used unless SUL configuration specific test points are over-ruling.

Basic rules for Tx SUL test cases:

For Test environment: Adopt the same selection of test environment in corresponding single carrier test cases.

For Test frequency: Considering that Non-SUL carrier should have no impact on SUL carrier testing results, for any SUL configurations, Mid range is chosen as default for Non-SUL carrier. Select the same test frequency in corresponding single carrier test cases for SUL carrier.

For Test SCS: Considering lowest supported SCS can obtain minimum guardband and maximum spectrum utilization, and only 15 kHz SCS is supported for SUL band in SUL configurations, it's reasonable to select 15 kHz SCS for SUL carrier and lowest supported SCS for Non-SUL carrier regardless of SUL configurations.

For Test channel bandwidths: Under the limit of 15 kHz SCS, only the lowest channel bandwidth is supported for current Non-SUL bands in SUL configurations, which are band n78 and n79. Select the lowest channel bandwidth that support 15kHz SCS for Non-SUL carrier. Select the same test channel bandwidths as in corresponding single carrier test cases for SUL carrier.

For waveform, modulation and RB allocations: Adopt the same selection of test configurations as in corresponding single carrier test cases for SUL carrier.

Basic rules for Rx SUL test cases:

In Rx testing for SUL, test point selection in clause 7.3C and 7.6C need to be defined. Considering the focus of Rx test cases is testing DL bands, the configuration of SUL carrier shall be selected to ensure the test coverage without costing too much testing time. The configuration of Non-SUL carrier shall be selected based on the same principle as single carrier test cases. The basic test point selection rule for Rx SUL test cases is specified as below:

For Test environment: Adopt the same selection of test environment in corresponding single carrier test cases.

For Test frequency: The Non-SUL carrier should select the same test frequency as corresponding single carrier test cases. Select Mid range as default for SUL carrier.

For Test SCS: Since the REFSENS requirement for SUL is specified for 15 kHz SCS for SUL band and the test point selection of clause 7.6C is also based on that of clause 7.3C, 15 kHz SCS should be selected for SUL carrier. For the Non-SUL carrier the SCS should be selected following the same rule as single carrier testing.

For test channel bandwidths: Highest channel bandwidth when SCS =15 kHz for SUL shall be selected for SUL carrier. For the Non-SUL carrier the channel bandwidth should be selected following the same rule as single carrier testing.

For waveform, modulation and RB allocations: Adopt the same selection of test configurations as single carrier test cases for Non-SUL carrier. SUL carrier select DFT-s-OFDM QPSK. The RB allocation of SUL carrier shall fulfill the requirement in clause 7.3C.0 in TS 38.521-1.

Number of test points for SUL test cases in FR1 are listed in table 4.1.1.2-1 and table 4.1.1.2-2.

Table 4.1.1.2-1: Number of test points for SUL test cases in FR1 (NR UE Transmitter test)

| Subclause | Number of test points | Comments |
|---|-------------------------------------|----------|
| 6.2C.1 Configured transmitted power for SUL | 30 | RAN5#86e |
| 6.2C.3 UE maximum output power for SUL | 270 | RAN5#86e |
| 6.2C.4 UE maximum output power reduction for SUL | 460 (500 ¹) | RAN5#90e |
| 6.2C.5 UE additional maximum output power reduction for SUL | Table 4.1.1.1-1 | RAN5#87e |
| 6.3C.1 Minimum output power for SUL | 45 | RAN5#87e |
| 6.3C.3.1 Transmit ON/OFF time mask for SUL | 45 | RAN5#87e |
| 6.3C.3.2 General transmit ON/OFF time mask for switching between two uplink carriers | 1 | RAN5#96e |
| 6.3C.4.1 Absolute power tolerance for SUL | 3 | RAN5#87e |
| 6.3C.4.2 Power Control Relative power tolerance for SUL | TBD | RAN5#87e |
| 6.3C.4.3 Aggregate power tolerance for SUL | PUCCH: 3 PUSCH: 3 | RAN5#87e |
| 6.4C.1 Frequency error for SUL | 5 | RAN5#86e |
| 6.4C.2.1 Error Vector Magnitude for SUL | PUSCH: 84 PUCCH: 24 PRACH: 12 | RAN5#86e |
| 6.4C.2.2 Carrier leakage for SUL | 3 | RAN5#90e |
| 6.4C.2.3 In-band emissions for SUL | 36 | RAN5#90e |
| 6.4C.2.4 EVM equalizer spectrum flatness for SUL | 90 | RAN5#90e |
| 6.4C.2.5 EVM equalizer spectrum flatness for Pi/2 BPSK for SUL | 9 | RAN5#90e |
| 6.5C.1 Occupied bandwidth for SUL | 18 | RAN5#86e |
| 6.5C.2.2 Spectrum Emission Mask for SUL | 72 (80 ¹) | RAN5#90e |
| 6.5C.2.3 Additional spectrum emission mask for SUL | 27 | RAN5#86e |
| 6.5C.2.4.1 NR ACLR for SUL | 460 (500 ¹) | RAN5#90e |
| 6.5C.2.4.2 UTRA ACLR for SUL | Table 4.1.1.1-1 | RAN5#86e |
| 6.5C.3.1 General spurious emissions for SUL | 27 | RAN5#86e |
| 6.5C.3.2 Spurious emission for UE co-existence for SUL | 27 | RAN5#86e |
| 6.5C.3.3 Additional spurious emissions for SUL | 115 for NS_05 28 for NS_43 | RAN5#87e |
| 6.5C.4 Transmit intermodulation for SUL | 4 | RAN5#86e |
| NOTE 1: UEs supporting pi/2 BPSK DMRS and the corresponding IE [DMRSPi2BPSK] is set to 1. | | |

Table 4.1.1.2-2: Number of test points for SUL test cases in FR1 (NR UE Receiver test)

| Subclause | Number of test points | Comments |
|--|---|----------|
| 7.3C.2 Reference sensitivity power level for SUL | General test points:45 SUL configuration specific test points: SUL_n78-n80: 2 | RAN5#90e |
| 7.6C.2 Inband Blocking for SUL | 3 | RAN5#87e |
| 7.6C.3 Out-of-band blocking for SUL | 3 | RAN5#87e |

4.1.1.3 FR1 V2X test cases

This section contains information on test point selection for V2X test cases 6.2E, 6.3E, 6.4E, 6.5E, 7.3E, 7.4E, 7.5E, 7.6E, 7.7E and 7.8E in [2].

Number of test points for V2X test cases in FR1 are listed in table 4.1.1.3-1 and table 4.1.1.3-2.

Table 4.1.1.3-1: Number of test points for V2X test cases in FR1 (NR UE Transmitter test)

| Subclause | Number of test points | Justification in attachment | Comments |
|--|-----------------------|---|-----------|
| 6.2E.2 UE maximum output power reduction for V2X | 440 | '38.521-1_TP analysis_V2X_6.2E.2_MPR_6.5E.2.2_SEM_6.5E.2.4_ACLR_v3.zip' | RAN5#95-e |
| 6.3E.1 Minimum output power for V2X | 360 | '38.521-1_TP analysis_V2X_6.3E.1_MinOP_v1.zip' | RAN5#92-e |
| 6.5E.2.2 Spectrum emission mask for V2X | 88 | '38.521-1_TP analysis_V2X_6.2E.2_MPR_6.5E.2.2_SEM_6.5E.2.4_ACLR_v3.zip' | RAN5#95-e |
| 6.5E.2.4 Adjacent channel leakage ratio for V2X | 440 | '38.521-1_TP analysis_V2X_6.2E.2_MPR_6.5E.2.2_SEM_6.5E.2.4_ACLR_v3.zip' | RAN5#95-e |

Table 4.1.1.3-2: Number of test points for V2X test cases in FR1 (NR UE Receiver test)

| Subclause | Number of test points | Justification in attachment | Comments |
|-----------|-----------------------|-----------------------------|----------|
| FFS | | | |

4.1.1.4 FR1 RedCap test cases

This section contains information on test point selection for RedCap test cases in [2]. The general rule in this section apply to all the RedCap test cases. Separate analysis is not provided for each single test case.

For the Tx requirements, basic PC3 requirements apply with the exception that the maximum channel bandwidth is 20MHz. Regarding test point selection, the same test points for PC3 non-RedCap UE apply for RedCap UE, except that the Low, Mid, High test channel bandwidth shall be selected among channel bandwidths up to 20MHz.

For the Rx REFSSENS requirements, TDD/FDD 2Rx, TDD/FDD 1Rx, HD-FDD 2Rx and HD-FDD 1Rx requirements are specified separately. For test cases other than REFSSENS, no exception requirements are specified, but considering those requirements have dependency on REFSSENS, the UL/DL RB allocation would follow that of REFSSENS.

- For TDD/FDD 2Rx capable RedCap UE, the basic 2Rx REFSSENS requirements apply with the exception that the maximum channel bandwidth is 20MHz. For all the Rx test cases, the same test points for non-RedCap UE apply except that the Low, Mid, High test channel bandwidth shall be selected among channel bandwidths up to 20MHz.
- For TDD/FDD 1Rx capable RedCap UE, the exceptional REFSSENS requirements are specified for channel bandwidth up to 20MHz. The UL/DL configuration required for 1Rx are the same for 2Rx requirements. For all the Rx test cases, the same test points for non-RedCap UE apply except that the Low, Mid, High test channel bandwidth shall be selected among channel bandwidths up to 20MHz.

- For HD-FDD 2Rx and 1Rx capable RedCap UE, the exceptional REFSENS requirements are specified for channel bandwidth up to 20MHz, with specific UL configuration specified along. For all the Rx test cases, the same test points for non-RedCap UE apply except that the Low, Mid, High test channel bandwidth shall be selected among channel bandwidths up to 20MHz, and the UL configuration shall follow Table 7.3I.2-5 in TS 38.101-1[2].

4.1.1.5 FR1 TxD test cases

This section contains information on test point selection for TxD test cases [2]. Except for test cases listed in Table 4.1.1.5-1, the test point selection principle in single carrier test cases applies to all TxD test cases in term of Test environment, Test SCS, Test channel bandwidths, modulation and RB allocations.

Table 4.1.1.5-1: NR UE transmitter test point selection for TxD test cases in FR1 (test)

| Subclause | Number of test points | Justification in attachment | Comments |
|--|---|--|--------------------|
| 6.2G.1 UE maximum output power for Tx Diversity | Power Class 2: 270 Power Class 1.5: 0 | "38.521-1_TPanalysis_6.2G.1_MaxOP_TxD.zip" | RAN5#95-e |
| 6.2G.2 Maximum Output Power Reduction for Tx Diversity | power class 2: 920 (contiguous allocation), 120 (almost contiguous allocation) power class 1.5: 1080 | "38.521-1_TPanalysis_6.2G.2_MPR_6.5G.2.1_SEM_6.5G.2.3.1_NR_ACLR_TxD.zip" | RAN5#95-e |
| 6.2G.3 UE additional maximum output power reduction for Tx Diversity | See clause 4.1.2.1 | See clause 4.1.2.1 | See clause 4.1.2.1 |
| 6.5G.2.3.1 NR ACLR for Tx diversity | power class 2: 920 (contiguous allocation), 120 (almost contiguous allocation) power class 1.5: 1080 | "38.521-1_TPanalysis_6.2G.2_MPR_6.5G.2.1_SEM_6.5G.2.3.1_NR_ACLR_TxD.zip" | RAN5#95-e |

4.1.1.6 FR1 shared spectrum channel access test cases

This section contains information on test point selection for shared spectrum channel access test cases in TS 38.521-1[2]. The general rule in this section apply to all test cases for shared spectrum channel access test cases. Separate analysis for each FR1 shared spectrum channel access test case is not provided.

From the latest core requirement for NR band with shared spectrum channel access, the frequency range are 5150 MHz – 5925 MHz for n46, and 5925 MHz – 7125 MHz for n96. Both bands support power class 5 operations with various channel bandwidths.

For all Tx and Rx test requirements of NR unlicensed band, the selections of test point shall be the same as for regular NR band for Test Environment, Test frequency, Test channel bandwidths, Test Subcarrier Spacing, Test uplink/downlink modulations and Test RB configurations.

4.1.2 Test point analysis per NS value

4.1.2.1 A-MPR, A-SEM and A-SE FR1 test cases for single carrier and UL MIMO

This section contains information on test point selection for single carrier test cases 6.2.3, Additional Maximum Power Reduction (A-MPR), 6.5.2.3 Additional spectrum emission mask (A-SEM) and 6.5.3.3 Additional spurious emissions (A-SE); and for correspondent UL-MIMO test cases in 6.2D.3 and 6.5D.3.3 in [2].

Selection of test points should include some possible worst combinations based on the A-MPR characteristics specified for each NS value and these shall be selected so that they match with corresponding spectrum emission requirements test points. The number of test points should be realistic.

For $\pi/2$ BPSK with Rel-16 DMRS, the correspondent A-MPR requirements are the same as that for Rel-15 DMRS but the PAPR is lower. Given the UE can pass the requirements using Rel-15 DMRS, it can be expected that the UE can pass the requirements using Rel-16 DMRS. Therefore there is no need to additionally test A-MPR, A-SEM and A-SE for Rel-16 DMRS.

Table 4.1.2.1-1 lists number of test points for A-MPR, A-SEM and A-SE single carrier test cases and for different NS values.

Table 4.1.2.1-1: NS value specific test points for A-MPR, A-SEM and A-SE single carrier

| NS label | Number of test points for A-MPR | Number of test points A-SEM | Number of test points A-SE | Justification | Comments |
|------------------|---|-----------------------------|----------------------------|--|------------------------|
| NS_03 | 6.2.3: 80 40 for SUL testing | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_03.zip" | RAN5#85 |
| NS_04 | 6.2.3: 120 6.2D.3: 112 6.5D.3.3:112 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_04_v3.zip" | RAN5#93-e |
| NS_05 | 6.5.3.3: 432 | | | "38.521-1_TP analysis_6.5.3.3_TX_Additional_Spurious_Emission_NS_05.zip" | RAN5#87-e |
| NS_05, NS_05U | 6.2.3: 288 for PC3 6.2.3: 396 for PC2 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_05_v3.zip" | RAN5#96-e |
| NS_06 | 6.2.3: PC1 160 PC3 144 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_06_v2.zip" | RAN5#92-e |
| NS_12 | 48 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_12_13_14_15.zip" | RAN5#90-e |
| NS_13 | 21 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_12_13_14_15.zip" | RAN5#90-e |
| NS_14 | 6.2.3: 50 6.5.3.3: 25 | | 25 | "38.521-1_TPanalysis_6.2.3_AMPR_NS_12_13_14_15.zip" "38.521-1_TPanalysis_6.5.3.3_TX_Additional_Spurious_Emission_NS_14.zip" | RAN5#90-e RAN5#96-e |
| NS_15 | 102 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_12_13_14_15.zip" | RAN5#90-e |
| NS_17 | 6.5.3.3: 4 | | | "38.521-1_TPanalysis_6.5.3.3_TX_Additional_Spurious_Emission_NS_17_v2.zip" | RAN5#92-e |
| NS_18 | 88 6.2.3: 108 6.5.3.3: 54 | | | "38.521-1_TPanalysis_6.2.3_AMPR_6.5.3.3_ASE_NS_18_v3.zip" | RAN5#89-e |
| NS_21 | 180 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_21.zip" | RAN5#89-e |
| NS_24 | 6.2.3: 300 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_24.zip" | RAN5#87 |
| NS_27 | 6.2.3: 360 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_27_v4.zip" | RAN5#96-e |
| NS_35 | 6.2.3: 144 6.2.3: 72 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_35_v2.zip" | RAN5#5-5G-NR-Adhoc |
| NS_37 | 6.2.3: 48 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_37.zip" | RAN5#86 |
| NS_38 | 6.2.3: 96 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_38.zip" | RAN5#86 |
| NS_39 | 6.2.3: 54 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_39.zip" | RAN5#86 |
| NS_40 | 6.2.3: 24 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_40.zip" | RAN5#87 |
| NS_41 | 6.2.3: 72 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_41.zip" | RAN5#87 |
| NS_42 | 6.2.3: 108 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_42.zip" | RAN5#87 |
| NS_43 | 6.2.3: 28 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_43_v2.zip" | RAN5#86 |
| | 6.5.3.3: 81 | | | "38.521-1_TP analysis_6.5.3.3_TX_Additional_Spurious_Emission_NS_43.zip" | RAN5#87-e |
| NS_43U | 6.2.3: 72 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_43U.zip" | RAN5#85 |
| NS_44 | 360 | N/A | 180 | "38.521-1_TPanalysis_6.2.3_AMPR_6.5.3.3_ASE_NS_44.zip" | RAN5#90-e |
| NS_45 | 24 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_45.zip" | RAN5#89-e |
| NS_46 | 176 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_46.zip" | RAN5#89-e |
| NS_47 | 70 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_47.zip" | RAN5#87 |

| | | | | | |
|--------|----------------------------|-----|-----|---|-----------|
| NS_48 | 240 for PC3 384 for PC2 | N/A | 96 | "38.521-1_TPanalysis_6.2.3_AMPR_6.5.3.3_ASE_NS_48_v3.zip" | RAN5#96-e |
| NS_49 | 224 | N/A | 112 | "38.521-1_TPanalysis_6.2.3_AMPR_6.5.3.3_ASE_NS_49.zip" | RAN5#90-e |
| NS_56 | 175 | | 175 | 38.521-1_TPanalysis_6.2.3_AMPR_6.5.3.3_ASE_NS_56.zip | RAN5#93-e |
| NS_100 | 72 | | | "38.521-1_TPanalysis_6.2.3_AMPR_NS_100.zip" | RAN5#85 |

4.1.2.2 A-MPR test cases for FR1 UL CA

This section contains information on test point selection for test case 6.2A.3.1 in [2], UE additional maximum output power reduction for CA.

TS 38.101 [3] specifies band dependent NS-values, which in the inter-band UL CA test cases become a combination of two NS-values. Testing all possible combinations would lead to too excessive testing and the combinations that are realistic should therefore be prioritized. This selection is documented in table 4.1.1.1-1.

Table 4.1.2.2-1: A-MPR test coverage per CA configuration for inter-band CA with 2 CC

| CA config with UL CA support (Note 1) | NS values in same order as Uplink CA Configuration column | | Number of test points | Applicable test case | Justification | Comment |
|---------------------------------------|---|-------|-----------------------|----------------------|---|-----------|
| CA_n3-n78 CA_n8-n78 | NS_100 | NS_01 | 24 | N/A | "38.521-1_TPanalysis_6.2A.3_NS_100+NS_01.zip" | RAN5#87-e |
| CA_n8-n78 | NS_43 | NS_01 | 12 | N/A | "38.521-1_TPanalysis_6.2A.3_NS_43+NS_01.zip" | RAN5#88-e |
| CA_n8-n78 | NS_43U | NS_01 | 12 | N/A | "38.521-1_TPanalysis_6.2A.3_NS_43U+NS_01.zip" | RAN5#88-e |
| CA_n24-n41 | NS_56 | NS_04 | 24 | N/A | "38.521-1_TPanalysis_6.2A.3_NS_56+NS_04.zip" | RAN5#96-e |
| CA_n24-n48 | NS_56 | NS_27 | 24 | N/A | "38.521-1_TPanalysis_6.2A.3_NS_56+NS_27.zip" | RAN5#96-e |
| CA_n24-n77 | NS_56 | NS_55 | 24 | N/A | "38.521-1_TPanalysis_6.2A.3_NS_56+NS_55.zip" | RAN5#96-e |
| CA_n41A-n79A | NS_47 | NS_01 | 3 | N/A | "38.521-1_TPanalysis_6.2A.3_NS_47+NS_01.zip" | RAN5#94-e |
| Note 1: As per TS 38.101. | | | | | | |

The analyses are performed per NS-value and are stored as zip-files as defined in annex A. The general principle for selection of test points is:

- Test the minimum Total power backoff value
- Test the maximum Total power backoff value
- Test the maximum unbalanced Total power backoff among CCs (max $P_{C_{MAX,c}}$ difference).

Where the Total power backoff value means: MAX[MPR, A-MPR]

4.1.3 Test point analysis per NR CA configuration

4.1.3.1 Reference Sensitivity test cases for FR1 NR CA

Editor's note:

- Not all CA configurations completed in TS 38.521-1 refsens test cases are listed in Table 4.1.3.1-1 through Table 4.1.3.1-5.

This clause contains information on test point analysis, test frequency selection and status for FR1 NR CA test cases in TS 38.521-1 [2] clause 7. The analyses are performed per CA configuration in Table 4.1.3.1-1 through Table 4.1.3.1 4. The principles for selection of reference sensitivity test points for NR CA is given in Annex B including a test point analysis check list in B.9.

Table 4.1.3.1-1: Reference Sensitivity test cases per CA configuration (single band)

| CA config | Single band refsens exception, victim band (Note 2) | Requirement coverage (Note 2) | Test point analysis updated |
|------------|---|-------------------------------|-----------------------------|
| CA_n41C | – | NE | RAN5#89-e |
| CA_n48B | – | NE | RAN5#94-e |
| CA_n66B | – | NE | RAN5#86-e |
| CA_n66(2A) | – | NE | RAN5#86-e |
| CA_n71(2A) | – | NE | RAN5#94-e |
| CA_n78C | – | NE | RAN5#87-e |

NOTE 1: Void.
NOTE 2: Notations used:
NE: Non-exception as defined in TS 38.101-1 [5], meaning single carrier NR requirements apply.
HD: UL Harmonic Distortion, as defined in TS 38.101-1 [5], 7.3A.4
HM: RX Harmonic Mixing, as defined in TS 38.101-1 [5], 7.3A.4
IMD: Intermodulation Distortion, as defined in TS 38.101-1 [5], 7.3A.5
CBI: Cross Band Isolation, as defined in TS 38.101-1 [5], 7.3A.6

Table 4.1.3.1-2: Reference Sensitivity test cases per CA configuration (two bands)

| CA config | Two band refsens exception, victim band (Note 1) | Requirement coverage (Note 1) | Test point analysis updated |
|--------------------|---|-------------------------------|-----------------------------|
| CA_n1A-n3A | n1 (IMD3) n3(CBI) | IMD,CBI | RAN5#95-e |
| CA_n1A-n8A | n1 (IMD4) | IMD | RAN5#95-e |
| CA_n1A-n77A | n77 (HD2) | HD | RAN5#89-e |
| CA_n1A-n78A | n1 (IMD4) | IMD | RAN5#94 |
| CA_n2A-n48A | n48 (HD2), n2(IMD4) | HD, IMD | RAN5#96-e |
| CA_n2A-n66A | n2(IMD3), n66(IMD5) | IMD | RAN5#96-e |
| CA_n2A-n77A | n77 (HD2), n2 (HM), n2(IMD2), n2(IMD4), n2(IMD5), n2(IMD7) | HD, HM, IMD | RAN5#96-e |
| CA_n3A-n5A | n3 (IMD4 2*fn3-2*fn5) n5 (IMD2 fn3-fn5) | IMD | RAN5#95-e |
| CA_n3A-n77A | n78 (HD2) | HD | RAN5#84 |
| CA_n3A-n78A | n3 (IMD2 fn78-fn3) n3 (IMD4 fn78-3*fn3) n78 (HD2) | HD, IMD | RAN5#87-e |
| CA_n5A-n66A | n5(IMD2) | IMD | RAN5#96-e |
| CA_n5A-n77A | n77 (HD4), n77 (HD5), n5 (HM), n5(IMD4), n5(IMD5) | HD, HM,, IMD | RAN5#96-e |
| CA_n5A-n78A | n78 (HD2) | HD | RAN5#94-e |
| CA_n7A-n78A | n7 and n78 (CBI) | CBI | RAN5#94-e |
| CA_n8A-n78A | n8 (IMD4 fn78-3*fn8) n78 (HD4) | HD, IMD | RAN5#87-e |
| CA_n26A-n66A | n26 (IMD2) | IMD | RAN5#94-e |
| CA_n26A-n70A | n26 (IMD2) | IMD | RAN5#94-e |
| CA_n28A-n41A | - | NE | RAN5#91-e |
| CA_n28A-n79A | - | NE | RAN5#91-e |
| CA_n29A-n66A | - | NE | RAN5#94-e |
| CA_n29A-n70A | - | NE | RAN5#94-e |
| CA_n29A-n71A | n29 (CBI) | CBI | RAN5#95-e |
| CA_n41A-n79A | - | NE | RAN5#83 |
| CA_n48A-n66A | n48 (HD2), n66 (IMD5) | HD, IMD | RAN5#94-e |
| CA_n48A-n66(2A) | (NOTE 2) | NE | RAN5#95-e |
| CA_n48A-n70A | n70 (IMD2) | IMD | RAN5#94-e |
| CA_n48A-n71A | - | NE | RAN5#94-e |
| CA_n48A-n71(2A) | - | NE | RAN5#95-e |
| CA_n48B-n66A | (NOTE 2) | NE | RAN5#95-e |
| CA_n48B-n70A | (NOTE 2) | NE | RAN5#95-e |
| CA_n48B-n71A | - | NE | RAN5#95-e |
| CA_n48(2A)-n66A | (NOTE 2) | NE | RAN5#95-e |
| CA_n48(2A)-n66(2A) | (NOTE 2) | NE | RAN5#96-e |
| CA_n48(2A)-n70A | (NOTE 2) | NE | RAN5#95-e |
| CA_n48(2A)-n71A | - | NE | RAN5#95-e |
| CA_n48(2A)-n71(2A) | - | NE | RAN5#96-e |
| CA_n66A-n70A | - | NE | RAN5#94-e |
| CA_n66A-n71A | n66 (IMD4) | IMD | RAN5#87-e |
| CA_n70A-n71A | n70 (HD3), n70 (IMD4) | HD, IMD | RAN5#85 |

NOTE 1: Notations used

NE: Non-exception as defined in TS 38.101-1 [5], meaning single carrier NR requirements apply.

HD: UL Harmonic Distortion, as defined in TS 38.101-1 [5], 7.3A.4

HM: RX Harmonic Mixing, as defined in TS 38.101-1 [5], 7.3A.4

IMD: Intermodulation Distortion, as defined in TS 38.101-1 [5], 7.3A.5

CBI: Cross Band Isolation, as defined in TS 38.101-1 [5], 7.3A.6

NOTE 2: Exception for this band is tested with two carrier case

Table 4.1.3.1-3: Reference Sensitivity test cases per CA configuration (three bands)

| CA config | Three band refsens exception, victim band (Note 1) | Requirement coverage (Note 1) | Test point analysis updated |
|----------------------|--|-------------------------------|-----------------------------|
| CA_n26A-n66A-n70A | – | NE | RAN5#94-e |
| CA_n26A-n66(2A)-n70A | – | NE | RAN5#96-e |
| CA_n29A-n66A-n70A | – | NE | RAN5#89-e |
| CA_n48A-n66A-n71(2A) | - | NE | RAN5#96-e |
| CA_n48A-n66(2A)-n70A | - | NE | RAN5#96-e |
| CA_n48A-n66(2A)-n71A | - | NE | RAN5#96-e |
| CA_n48A-n70A-n71(2A) | - | NE | RAN5#96-e |
| CA_n48B-n66A-n70A | - | NE | RAN5#96-e |
| CA_n48B-n66A-n71A | - | NE | RAN5#96-e |
| CA_n48B-n70A-n71A | - | NE | RAN5#96-e |
| CA_n48(2A)-n66A-n70A | - | NE | RAN5#96-e |
| CA_n48(2A)-n66A-n71A | - | NE | RAN5#96-e |
| CA_n48(2A)-n70A-n71A | - | NE | RAN5#96-e |
| CA_n66A-n70A-n71A | – | NE | RAN5#87-e |

NOTE 1: Notations used
 NE: Non-exception as defined in TS 38.101-1 [5], meaning single carrier NR requirements apply.
 HD: UL Harmonic Distortion, as defined in TS 38.101-1 [5], 7.3A.4
 HM: RX Harmonic Mixing, as defined in TS 38.101-1 [5], 7.3A.4
 IMD: Intermodulation Distortion, as defined in TS 38.101-1 [5], 7.3A.5
 CBI: Cross Band Isolation, as defined in TS 38.101-1 [5], 7.3A.6

Table 4.1.3.1-4: Reference Sensitivity test cases per CA configuration (four bands)

| CA config | Four band refsens exception, victim band (Note 1) | Requirement coverage (Note 1) | Test point analysis updated |
|-----------|---|-------------------------------|-----------------------------|
| TBD | – | TBD | TBD |

NOTE 1: No exceptions can occur for four bands.

Table 4.1.3.1-5: Reference Sensitivity test cases per CA configuration (five bands)

| CA config | Five band refsens exception, victim band (Note 1) | Requirement coverage (Note 1) | Test point analysis updated |
|-----------|---|-------------------------------|-----------------------------|
| TBD | – | TBD | TBD |

NOTE 1: No exceptions can occur for five bands.

Table 4.1.3.1-6: Test frequency selection per band pair for UL harmonics exception

| Band pair (Note 2) | Frequency | Channel BW [MHz] | Comment |
|---|------------------------------|---------------------|--|
| n1A / n77A | Mid / Low | Highest/Highest | Non-exception. To be used in test cases 7.3A.1 to 7.3A.4 |
| | Mid / 3900 | 20/ Highest | Exception Note 2 of TS 38.101 table 7.3A.4-1 |
| | Mid / 3870 | 20/20 | Exception Note 3 of TS 38.101 table 7.3A.4-1 |
| n2A /n48A | UL 1860 MHz / DL 3700 MHz | 20/20 | Exception Note 3 of TS 38.521 Table 7.3A.0.4-1 |
| | UL 1860 MHz / DL 3400 MHz | 20/100 | HD avoid |
| n2A /n77A | UL 1860 MHz / DL 3720 MHz | 20/100 | Exception Note 2 of TS 38.101 Table 7.3A.4-1 |
| | UL 1860 MHz / DL 3700 MHz | 20/20 | Exception Note 3 of TS 38.521 Table 7.3A.0.4-1 |
| | UL 1860 MHz / DL 3800 MHz | 20/100 | HD avoid |
| n3A / n77A | TBD/TBD | Highest/Highest | Non-exception. To be used in test cases 7.3A.1 to 7.3A.4 |
| | TBD/TBD | Highest/Highest | Exception Note 2 of TS38.101 table 7.3A.4-1 |
| | TBD/TBD | 20/20 | Exception Note 3 of TS38.101 table 7.3A.4-1 |
| n3A / n78A | Mid/High | Highest/Highest | Non-exception. To be used in test cases 7.3A.1 to 7.3A.4 |
| | Mid/3495 MHz | Highest/Highest | Exception Note 2 of TS38.101 table 7.3A.4-1 |
| | Mid/3465 MHz | 20/20 | Exception Note 3 of TS38.101 table 7.3A.4-1 |
| n5A /n77A | UL 834 MHz / DL 3336 MHz | 20/100 | Exception Note 4 of TS 38.101-1 table 7.3A.4-1 |
| | UL 834 MHz / DL 4170 MHz | 20/100 | Exception Note 5 TS 38.101-1 table 7.3A.4-1 |
| | UL 834 MHz/DL 3800 MHz | 20/100 | HD Avoid |
| n5A / n78A | Mid/High | Highest/Highest | Non-exception. To be used in test cases 7.3A.1 to 7.3A.4 in TS 38.521-1 [2] |
| | Mid/3346 MHz | Highest/Highest | Exception Note 4 of TS 38.101 [5] table 7.3A.4-1 |
| | Mid/3316 MHz | 20/20 | Exception Note 5 of TS 38.101 [5] table 7.3A.4-1 |
| n8A / n78A | Mid/High | Highest/Highest | Non-exception. To be used in test cases 7.3A.1 to 7.3A.4 |
| | Mid/3590 MHz | Highest/Highest | Exception Note 5 of TS38.101 table 7.3A.4-1 |
| n70A / n71A | Mid/High | Highest/Highest | Non-exception. To be used in test cases 7.3A.1 to 7.3A.4 |
| | Low/Low | Highest / 10 | Exception Note 9 of TS38.101 table 7.3A.4-1 n71 UL RB allocation 20@10 |
| | Low/Low | 5 / 5 | Exception Note 9 of TS38.101 table 7.3A.4-1 n71 UL RB allocation 8@10 |
| NOTE 1: This selection is used in test case 7.3A.1_1 unless otherwise stated. | | | |
| NOTE 2: Aggressor band in bold. | | | |

4.1.3.2 Spurious emissions test cases for FR1 UL CA

In this case, it is sufficient to verify the minimum requirements in frequency ranges affected by 2nd and 3rd order intermodulation products. The frequency ranges and UL RB allocations used in the test are calculated here.

The analyses are performed per CA configuration and are stored as zip-files as defined in annex A.

Table 4.1.3.2-1: Frequency range analysis availability per CA configuration

| CA config | Number of test point | Justification | Comments |
|--------------|----------------------|--|-------------------|
| CA_n1A-n78A | 5 | 38.521-1_TpAnalysisSpur(CA_n1A-n78A)v2.zip | RAN5#88e |
| CA_n2A-n77A | 3 | 38.521-1_TpAnalysisSpur(CA_n2A-n77A)_r1.zip | Added at RAN5#96e |
| CA_n3A-n78A | 3 | TpAnalysisSpur(n3A-n78A).zip | RAN5#82 |
| CA_n5A-n77A | 7 | 38.521-1_TpAnalysisSpur(CA_n5A-n77A)_r1.zip | Added at RAN5#96e |
| CA_n8A-n78A | 4 | TpAnalysisSpur(n8A-n78A).zip | RAN5#82 |
| CA_n24A-n41A | 5 | 38.521-1_TpAnalysisSpur(CA_n24A-n41A).zip | RAN5#95e |
| CA_n24A-n48A | 2 | 38.521-1_TpAnalysisSpur(CA_n24A-n48A).zip | RAN5#95e |
| CA_n24A-n77A | 4 | 38.521-1_TpAnalysisSpur(CA_n24A-n77A).zip | RAN5#95e |
| CA_n26A-n66A | 1 | 38.521-1_TpAnalysisSpur(CA_n26A-n66A).zip | Added at RAN5#96e |
| CA_n26A-n70A | 1 | 38.521-1_TpAnalysisSpur(CA_n26A-n70A).zip | Added at RAN5#96e |
| CA_n28A-n41A | 4 | 38.521-1_TpAnalysisSpur(CA_n28A-n41A).zip | RAN5#91e |
| CA_n41A-n79A | 7 | TpAnalysisSpur(n41A-n79A).zip | RAN5#83 |
| CA_n48A-n66A | 1 | 38.521-1_TpAnalysisSpur(CA_n48A-n66A).zip | Added at RAN5#96e |
| CA_n48A-n70A | 2 | 38.521-1_TpAnalysisSpur(CA_n48A-n70A).zip | Added at RAN5#96e |
| CA_n48A-n71A | 2 | 38.521-1_TpAnalysisSpur(CA_n48A-n71A).zip | Added at RAN5#96e |
| CA_n66A-n71A | 1 | 38.521-1_TpAnalysisSpur(CA_n66A-n71A).zip | Added at RAN5#96e |
| CA_n66A-n77A | 10 | 38.521-1_TpAnalysisSpur(CA_n66A-n77A)_r1.zip | Added at RAN5#96e |
| CA_n70A-n71A | 1 | 38.521-1_TpAnalysisSpur(CA_n70A-n71A).zip | Added at RAN5#96e |

4.2 Test point analysis for FR2 test cases in TS 38.521-2

4.2.1 Test point analysis per test case

4.2.1.1 FR2 single carrier, NR CA and UL MIMO test cases

This clause contains information on test point analysis and test point selection for single carrier, NR CA and UL MIMO test cases in [3] clause 6 and 7 with information about transmitting test point selection for FR2 listed in table 4.2.1.1-1 and receiver test point selection in table 4.2.1.1-2.

Table 4.2.1.1-1: NR UE transmitter test point selection for FR2

| Subclause | Number of test points | Justification in attachment | Comments |
|--|--|--|--|
| 6.2.1 UE maximum output power | x | "38.521-2_TPanalysis_6.2.1_MOP_v3.zip" | RAN5#94-e |
| 6.2.2 UE maximum output power reduction | power class 1: 90 power class 2&3&4: 84 | "38.521-2_TPanalysis_6.2.2_MPR_6.5.2.1_SEM_6.5.2.3_NR_ACLR_v5.zip" | RAN5#89-e RAN5#90-e RAN5#91-e RAN5#92-e RAN5#94-e RAN5#95-e |
| 6.2.4_1 Configured transmitted power with Power Boost | x | "38.521-2_TPanalysis_6.2.1_MOP_v3.zip" | RAN5#96-e |
| 6.2A.1.1 UE maximum output power - EIRP and TRP for CA | TRP: 4 EIRP: 20 | "38.521-2_TPanalysis_6.2A.1.x_MOP_Spherical Coverage_CA_v1" | RAN5#84 |
| 6.2A.1.2 UE maximum output power - Spherical coverage for CA | 20 | "38.521-2_TPanalysis_6.2A.1.x_MOP_Spherical Coverage_CA_v1" | RAN5#84 |
| 6.2A.2 UE maximum output power reduction for CA | FFS | "38.521-2_TPanalysis_6.2A.2_MPR_v2.zip" | RAN5#84 RAN5#96-e |
| 6.2D.1 UE maximum output power for UL MIMO | x | "38.521-2_TPanalysis_6.2.1_MOP_v3.zip" | RAN5#94-e |
| 6.2D.2 UE maximum output power reduction for UL MIMO | x | "38.521-2_TPanalysis_6.2.2_MPR_6.5.2.1_SEM_6.5.2.3_NR_ACLR_v5.zip" | RAN5#91-e RAN5#92-e RAN5#94-e RAN5#95-e |
| 6.3.1 Minimum output power | 9 | "38.521-2_TPanalysis_6.3.1_MinOP_v2.zip" | RAN5#84 |
| 6.3.2 Transmit OFF power | 3 | "38.521-2_TPanalysis_6.3.2_Tx_OFF_power" | RAN5#83 |
| 6.3.3.2 General ON/OFF time mask | 9 | "38.521-2_TPanalysis_6.3.3.2_OnOff.zip" | RAN5#92-e |
| 6.3.4.2 Absolute power tolerance | 8 | "38.521-2_TPanalysis_6.3.4.2_AbsPtol.zip" | RAN5#91-e |
| 6.3.4.3 Relative power tolerance | Ramp up: 1 Ramp down: 1 Alternating: 1 | "38.521-2_TPanalysis_6.3.4.3_RelPtol_v3.zip" | RAN5#82 RAN5#91-e RAN5#93-e |
| 6.3.4.4 Aggregate power tolerance | PUCCH: 6 PUSCH: 6 | "38.521-2_TPanalysis_6.3.4.4_AggPtol_2.zip" | RAN5#82 RAN5#91-e |
| 6.3A.1.1 Minimum output power for CA (2UL CA) | 4 | "38.521-2_TPanalysis_6.3A.1.1_MinOP.zip" | RAN5#83 |
| 6.3A.2.1 Transmit OFF power for CA (2UL CA) | 3 | "38.521-2_TPanalysis_6.3A.2.1_Tx_OFF_Power_CA.zip" | RAN5#88-e |

| | | | |
|--|---|---|------------------------|
| 6.3A.4.2.1 Absolute power tolerance for CA (2UL CA) | 6 | 38.521-2_TPanalysis_6.3A.4.2.1_AbsPCTol_CA.zip | RAN5#85 |
| 6.3A.4.2.2 Absolute power tolerance for CA (3UL CA) | 6 | 38.521-2_TPanalysis_6.3A.4.2.1_AbsPCTol_CA.zip | RAN5#85 |
| 6.3A.4.2.3 Absolute power tolerance for CA (4UL CA) | 6 | 38.521-2_TPanalysis_6.3A.4.2.1_AbsPCTol_CA.zip | RAN5#85 |
| 6.3A.4.2.4 Absolute power tolerance for CA (5UL CA) | 6 | 38.521-2_TPanalysis_6.3A.4.2.1_AbsPCTol_CA.zip | RAN5#85 |
| 6.3A.4.2.5 Absolute power tolerance for CA (6UL CA) | 6 | 38.521-2_TP analysis_6.3A.4.2.1_AbsPCTol_CA.zip | RAN5#85 |
| 6.3A.4.2.6 Absolute power tolerance for CA (7UL CA) | 6 | 38.521-2_TP analysis_6.3A.4.2.1_AbsPCTol_CA.zip | RAN5#85 |
| 6.3A.4.2.7 Absolute power tolerance for CA (8UL CA) | 6 | 38.521-2_TPanalysis_6.3A.4.2.1_AbsPCTol_CA.zip | RAN5#85 |
| 6.3A.4.4 Aggregate power tolerance for CA | 1 | 38.521-2_TPanalysis_6.3A.4.4_Aggregate power tolerance for CA.zip | RAN5#92-e |
| 6.3D.1 Minimum output power for UL MIMO | 9 | "38.521-2_TPanalysis_6.3.1_MinOP_v2.zip" | RAN5#84 |
| 6.3D.3.4 SRS time mask for UL-MIMO | 18 | "38.521-2_TPanalysis_6.3.3.2_SRS_M_UL-MIMO.zip" | RAN5#85 |
| 6.4.1 Frequency error | 1 | "38.521-2_TPanalysis_6.4.1_FreqErr.zip" | RAN5#80 |
| 6.4.2.1 Error Vector Magnitude | PUSCH: 168 PUCCH: 24 PRACH: 24 | "38.521-2_TPanalysis_6.4.2.1_EVM.zip" | RAN5#3-5G-NR Adhoc |
| 6.4.2.2 Carrier leakage | 3 | "38.521-2_TPanalysis_6.4.2.2_CarrLeak_v3.zip" | RAN5#93-e |
| 6.4.2.3 In-band emissions | PUSCH: 36 PUCCH: 18 | "38.521-1_TPanalysis_6.4.2.3_IE_v2.zip" | RAN5#89-e |
| 6.4.2.4 EVM equalizer spectrum flatness | 18 | "38.521-2_TP analysis_6.4.2.4_6.4.2.5_EVMequalizerSpectrumFlatness.zip" | RAN5#3-5G-NR Adhoc |
| 6.4.2.5 EVM spectral flatness for pi/2 BPSK modulation with spectrum shaping | 9 | "38.521-2_TP analysis_6.4.2.4_6.4.2.5_EVMequalizerSpectrumFlatness.zip" | RAN5#3-5G-NR Adhoc |
| 6.4A.1 Frequency error for CA | N (1 test point per UL carrier) | "38.521-2_TPanalysis_6.4A.1_FreqErr_CA_v2.zip" | RAN5#87-e RAN5#90-e |
| 6.4A.2.1 Error Vector Magnitude for CA | 224 | "38.521-2_TPanalysis_6.4A.2.1_EVM_CA.zip" | RAN5#91-e |

| | | | |
|---|----------------------|--|---|
| 6.4A.2.2 Carrier leakage for CA | 2 | "38.521-2_TPanalysis_6.4A.2.2_CarrLeak_CA_v3.zip" | RAN5#93-e |
| 6.4D.3 Time alignment error for UL MIMO | 6 | "38.521-2_TPanalysis_6.4D.3_TAE_MIMO.zip" | RAN5#92-e |
| 6.5.1 Occupied Bandwidth | 12 | "38.521-2_TPanalysis_6.5.1_OccBW_v3.zip" | RAN5#89-e RAN5#91-e |
| 6.5.2.1 Spectrum Emission Mask | 90 | "38.521-2_TPanalysis_6.2.2_MPR_6.5.2.1_SEM_6.5.2.3_NR_ACLR_v5.zip" | RAN5#2-5G-NR Adhoc RAN5#79 RAN5#80 RAN5#89-e RAN5#90-e RAN5#91-e RAN5#92-e RAN5#94-e RAN5#95-e |
| 6.5.2.3 Adjacent Channel Leakage Ratio | TBD | "38.521-2_TPanalysis_6.2.2_MPR_6.5.2.1_SEM_6.5.2.3_NR_ACLR_v5.zip" | RAN5#2-5G-NR Adhoc RAN5#89-e RAN5#90-e RAN5#91-e RAN5#92-e RAN5#94-e RAN5#95-e |
| 6.5.3.1 Spurious emissions | 4 | "38.521-2_TPanalysis_6.5.3_TxSpurious_v3.zip" | RAN5#94-e |
| 6.5.3.2 Spurious emissions UE band co-existence | 4 | "38.521-2_TPanalysis_6.5.3_TxSpurious_v3.zip" | RAN5#94-e |
| 6.5.3.3 Additional spurious emission | NS202: 4 NS203: 4 | "38.521-2_TPanalysis_6.2.3_AMPR_NS_202.zip" "38.521-2_TPanalysis_6.2.3_AMPR_NS_203.zip" | RAN5#90-e |
| 6.5A.2.1 Spectrum Emission Mask for CA | 30 | "38.521-2_TPanalysis_6.5A.2.1_SEM_CA.zip" | RAN5#89-e |
| 6.5A.2.2 Adjacent channel leakage ratio for CA | 52 | "38.521-2_TPanalysis_6.5A.2.2_ACLR_CA.zip" | RAN5#89-e |
| 6.5A.3.1 Spurious emissions for CA | 4 | 38.521-2_TPanalysis_6.5A.3_Spur_CA.zip | RAN5#91-e |
| 6.5A.3.2 Spurious emissions for CA | 4 | 38.521-2_TPanalysis_6.5A.3_SpurCoEx_CA.zip | RAN5#93-e |

| | | | |
|---|----------------------|--|--|
| 6.5D.1 Occupied Bandwidth for UL MIMO | 12 | "38.521-2_TPanalysis_6.5.1_OccBW_v3.zip" | RAN5#91-e |
| 6.5D.2.1 Spectrum Emission Mask for UL MIMO | x | "38.521-2_TPanalysis_6.2.2_MPR_6.5.2.1_SEM_6.5.2.3_NR_ACLR_v5.zip" | RAN5#91-e RAN5#92-e RAN5#94-e RAN5#95-e |
| 6.5D.2.2 Adjacent channel leakage ratio for UL MIMO | x | "38.521-2_TPanalysis_6.2.2_MPR_6.5.2.1_SEM_6.5.2.3_NR_ACLR_v5.zip" | RAN5#91-e RAN5#92-e RAN5#94-e RAN5#95-e |
| 6.5D.3.1 Transmitter Spurious emissions for UL MIMO | 4 | "38.521-2_TPanalysis_6.5.3_TxSpurious_v3.zip" | RAN5#94-e |
| 6.5D.3.2 Spurious emission band UE co-existence for UL MIMO | 4 | "38.521-2_TPanalysis_6.5.3_TxSpurious_v3.zip" | RAN5#94-e |
| 6.5D.3.3 Additional spurious emissions for UL MIMO | NS202: 4 NS203: 4 | "38.521-2_TPanalysis_6.2.3_AMPR_NS_202.zip" "38.521-2_TPanalysis_6.2.3_AMPR_NS_203.zip" | RAN5#94-e |
| 6.6 Beam Correspondence | 6 | "38.521-2_TPanalysis_6.6_Beam_Correspond_v1.zip" | RAN5#85 |

Table 4.2.1.1-2: NR UE receiver test point selection for FR2

| Subclause | Number of test points | Justification in attachment | Comments |
|-----------------------------------|-----------------------|--|-----------|
| 7.3 Reference sensitivity | 9 | "38.521-2_TPanalysis_7.3_RefSense.zip" | RAN5#80 |
| 7.3A Reference sensitivity for CA | 9 | "38.521-2_TPanalysis_7.3A_RefSenseCA.zip" | RAN5#86-e |
| 7.4 Maximum input level | 6 | "38.521-2_TPanalysis_7.4_Maximum input level_v1.zip" | RAN5#93-e |
| 7.4A Maximum input level for CA | 2 | "38.521-2_TPanalysis_7.4A_Maximum input level_for_CA_v1.zip" | RAN5#93-e |
| 7.5 Adjacent channel selectivity | 3 | "38.521-2_TPanalysis_7.5_ACS_v1.zip" | RAN5#83 |
| 7.6.2 In Band Blocking | 3 | "38.521-2_TPanalysis_7.6.2_InB_Block_v1.zip" | RAN5#83 |

4.2.2 Test point analysis per NS value

4.2.2.1 A-MPR and A-SE FR2 test cases for single carrier

This section contains information on test point selection for test case 6.2.3 in [3] Additional Maximum Power Reduction (A-MPR) as well as the related spectrum emissions test case 6.5.3.3 in [3] Additional Spurious emission (A-SE). Selection of test points should include some possible worst combinations based on the A-MPR and spectrum emissions characteristics specified for each NS value. The number of test points should be realistic.

Since A-MPR is defined by RAN4 together with A-Spurious requirements, a combined analysis is required. In general, the following non-compliant UE behaviours need to be checked:

- UE apply too much A-MPR (more than RAN4 allow)
- UE apply to little A-MPR (causing too much spectrum emissions)

Case A can be verified in A-MPR test case

Case B can be verified in A-SE test case if it is ensured that the same test point is tested inside A-MPR test. Therefore, the test points in spectrum emissions test case must be a subset of the test points in the A-MPR test case.

Note: Even if there are identical test points in the MPR test case the A-MPR test case is still needed to verify UE output power when NS-value is signalled.

Table 4.2.2.1-1: NS value specific test points for A-MPR single carrier

| NS label | Number of test points | Justification | Comments |
|----------|--|--|-----------|
| NS_202 | 6.2.3: 3 6.5.3.3: 3 6.2D.3: 3 6.5D.3.3: 3 | "38.521-2_TPanalysis_6.2.3_AMPR_NS_202_v3.zip" | RAN5#95-e |
| NS_203 | 6.2.3: 3 6.5.3.3: 3 6.2D.3: 3 6.5D.3.3: 3 | "38.521-2_TPanalysis_6.2.3_AMPR_NS_203_v3.zip" | RAN5#95-e |

4.2.3 Test point analysis per NR CA configuration

4.2.3.1 Reference Sensitivity test cases for FR2 NR CA

Editor's note: TP analyses for FR2 NR CA will be added to this clause.

4.3 Test point analysis for test cases in TS 38.521-3

4.3.1 Test point analysis per test case

4.3.1.1 EN-DC test cases

Table 4.3.1.1-1: NR UE transmitter test point selection for EN-DC

| Subclause | Number of test points | Justification in attachment | Comments |
|--|-----------------------|--|-----------|
| 6.2B.1.1 UE Maximum Output Power for Intra-Band Contiguous EN-DC | 20 | "38.521-3_TPanalysis_6.2B.1.1 _MOP_Intra_B_contig_v4.zip" | RAN5#88-e |
| 6.2B.1.2 UE Maximum Output Power for Intra-Band Non-Contiguous EN-DC | 40 | "38.521-3_TPanalysis_6.2B.1.2_MOP_Intra_B_non-contig_v2.zip" | RAN5#87-e |
| 6.2B.1.3 UE Maximum Output Power for Inter-Band EN-DC | 600 | "38.521-3_TPanalysis_6.2B.1.3 _MOP_Inter_B_Config_v2.zip" | RAN5#86-e |

| | | | |
|--|---|---|--------------------|
| 6.2B.1.3_1 UE Maximum Output Power for Inter-Band EN-DC within FR1 (2 E-UTRA CC, 1 NR CC) | 400 | "38.521-3_TPanalysis_6.2B.1.3_1_MOP_Inter_B_2 LTE_1NR.zip" | RAN5#95-e |
| 6.2B.2.1 UE Maximum Output Power reduction for Intra-Band Contiguous EN-DC | 1880 | "38.521-3_TPanalysis_6.2B.2.1_MPR_6.5B.2.1_SEM_6.5B.2.1.3_ACLR.zip" | RAN5#87-e |
| 6.2B.2.2 UE Maximum Output Power reduction for Intra-Band Non-Contiguous EN-DC | 1140 | " 38.521-3_TPanalysis_6.2B.2.2_MPR_6.5B.2.2.1_SEM_6.5B.2.2.3_ACLR_v1.zip" | RAN5#93-e |
| 6.2B.2.3 UE Maximum Output Power reduction for Inter-Band EN-DC within FR1 | Same as Table 4.1.1.1-1, test case 6.5.2 | Same as Table 4.1.1.1-1, test case 6.5.2. | RAN5#3-5G-NR Adhoc |
| 6.2B.2.4 UE Maximum Output Power reduction for Inter-Band EN-DC including FR2 | Same as Table 4.1.1.1-1, test case 6.2.2 | Same as Table 4.1.1.1-1, test case 6.2.2 | RAN5#5-5G-NR-Adhoc |
| 6.2B.3.1 UE Additional Maximum Output Power reduction for Intra-band contiguous EN-DC | 340 | "38.521-3_TPanalysis_6.2B.3.1_AMPR_NS_04_v3.zip" | RAN5#81 |
| | 8 | "38.521-3_TPanalysis_6.2B.3.1_AMPR_NS_35.zip" | RAN5#3-5G-NR Adhoc |
| 6.2B.4.1.1 Configured Output Power Level for Intra-Band Contiguous EN-DC | -UE not supporting DPS: 90 -UE supporting DPS: 120 | "38.521-3_TPanalysis_6.2B.4.1.1_ConfiguredTP_Intra_B_Contig_v2.zip" | RAN5#86-e |
| 6.2B.4.1.2 Configured Output Power for Intra-Band Non-Contiguous EN-DC | -UE not supporting DPS: 70 -UE supporting DPS: 100 | "38.521-3_TPanalysis_6.2B.4.1.2_ConfiguredTP_Intra_B_Non-contig_v2.zip" | RAN5#86-e |

| | | | |
|---|--|---|---------------------------|
| 6.2B.4.1.3 Configured Output Power for Inter-Band EN-DC within FR1 | -UE not supporting DPS: 100 -UE supporting DPS: 140 | "38.521- 3_TPanalysis_6.2B.4.1.3_ConfiguredTP_Inter_B_within_FR1_v3.zip" | RAN5#95- e |
| 6.2B.4.1.3_1 Configured Output Power for Inter-Band EN-DC within FR1 (2 E- UTRA CCs, 1 NR CC) | -UE not supporting DPS: 100 -UE supporting DPS: 140 | "38.521- 3_TPanalysis_6.2B.4.1.3_ConfiguredTP_Inter_B_within_FR1_v3.zip" | RAN5#95- e |
| 6.4B.2.1.3 In- band emissions for intra-band contiguous EN-DC | 36 | "38.521-3_TPanalysis_6.4B.2.1.3_IBE_Intra_B_contig_v1.zip" | RAN5#92- e |
| 6.5B.1.1 Occupied bandwidth for Intra-Band Contiguous EN-DC | X= intra- band ENDC channel BWs supported by UE | "38.521-3_TPanalysis_6.5B.1.1_OBW_Intra_B_contig.zip" | RAN5#3- 5G-NR adhoc |
| 6.5B.2.1.1 Spectrum emissions mask for intra-band contiguous EN-DC | 304 | "38.521- 3_TPanalysis_6.2B.2.1_MPR_6.5B.2.1_SEM_6.5B.2.1.3_ACLR.zip" | RAN5#87- e |
| 6.5B.2.1.3 Adjacent channel leakage ratio for intra-band contiguous EN-DC | 2160 | 38.521- 3_TPanalysis_6.2B.2.1_MPR_6.5B.2.1_SEM_6.5B.2.1.3_ACLR.zip" | RAN5#87- e |
| 6.5B.2.2.1 Spectrum emissions mask for intra-band non- contiguous EN-DC | 228 | 38.521- 3_TPanalysis_6.2B.2.2_MPR_6.5B.2.2.1_SEM_6.5B.2.2.3_ACLR_v1.zip | RAN5#93- e |
| 6.5B.2.2.3 Adjacent channel leakage ratio for intra-band non- contiguous EN-DC | 1140 | 38.521- 3_TPanalysis_6.2B.2.2_MPR_6.5B.2.2.1_SEM_6.5B.2.2.3_ACLR_v1.zip | RAN5#93- e |
| 6.5B.3.1.2 Spurious emission band UE co- existence for intra-band contiguous EN-DC | 8 | "38.521-3_TP analysis_6.5B.3_TX_SpurEmission_Intra_B_EN-DC" | RAN5#91- e |

| | | | |
|--|--------|---|-----------|
| 6.5B.3.2.2 Spurious emission band UE co-existence for intra-band non-contiguous EN-DC | 8 | "38.521-3_TP analysis_6.5B.3_TX_SpurEmission_Intra_B_EN-DC" | RAN5#91-e |
| 6.5B.3.3.1 General spurious emissions for Inter-band EN-DC within FR1 | 12 | "38.521-3_TP analysis_6.5B.3.3.1_TX_SpurEmission_Inter_B_EN-DC.zip" | RAN5#91-e |
| 6.5B.3.3.2 Spurious Emissions band UE co-existence for Inter-band within FR1 | Note 1 | "38.521-3_TP analysis_6.5B.3.3.2_TX_SpurEmission_Inter_B_EN-DC" | RAN5#91-e |
| Note 1: The maximum number of test point is 2 if only default points are applied. | | | |

Table 4.3.1.1-2: NR UE receiver test point selection for EN-DC

| Subclause | Number of test points | Justification in attachment | Comments |
|---|---------------------------------------|---|-----------|
| 7.3B Reference sensitivity for EN-DC | | "38.521-3_TPanalysis_7.3B_RxSense_EN-DC with FR1_v2.zip" | RAN5#89-e |
| 7.4B.1 Maximum Input Level for Intra-Band Contiguous EN-DC | 6 | "38.521-3_TP analysis_7.4B.1.1_MaxIL_Intra_B_contig.zip" | RAN5#82 |
| 7.4B.2 Maximum Input Level for Intra-Band Non-Contiguous EN-DC | 6 | "38.521-3_TP analysis_7.4B.2_MaxIL_Intra_B_noncontig.zip" | RAN5#82 |
| 7.5B.1 Adjacent Channel Selectivity for intra-band contiguous EN-DC (2 CCs) | 2 | "38.521-3_TP analysis_7.5B.1_ACS_Intra_B_contig.zip" | RAN5#94-e |
| 7.5B.2 Adjacent Channel Selectivity for intra-band non-contiguous EN-DC (2 CCs) | 2 | Same as Table 4.1.1-1, test case 7.5 | RAN5#94-e |
| 7.5B.3 Adjacent Channel Selectivity for inter-band EN-DC (1 NR CC) | 3 | Same as Table 4.1.1-1, test case 7.5 | RAN5#94-e |
| 7.6B.2.1 Inband blocking for intra-band contiguous EN-DC in FR1 (2 CCs) | 2 | "38.521-3_TP analysis_7.6B.2.1_IBB_Intra_B_contig.zip" | RAN5#87-e |
| 7.6B.2.2 Inband blocking for intra-band non-contiguous EN-DC in FR1 (2 CCs) | 1 | "38.521-3_TPanalysis_7.6B.2.2_IBB_Intra_B_non-contig.zip" | RAN5#87-e |
| 7.6B.2.3 Inband blocking for inter-band EN-DC within FR1 (2 CCs) | Same as Table 4.1-2, test case 7.6.2. | Same as Table 4.1-2, test case 7.6.2. | RAN5#87-e |

| | | | |
|--|--|---|-----------|
| 7.6B.3.1 Out-of-band blocking for intra-band contiguous EN-DC in FR1 (2 CCs) | 1 | "38.521-3_TP analysis_7.6B.3.1_OOBB_Intra_B_contig.zip" | RAN5#87-e |
| 7.6B.3.2 Out-of-band blocking for intra-band non-contiguous EN-DC in FR1 (2 CCs) | 1 | "38.521-3_TP analysis_7.6B.3.2_OOBB_Intra_B_non-contig.zip" | RAN5#87-e |
| 7.6B.3.3 Out-of-band blocking for inter-band EN-DC within FR1 (2 CCs) | 1 | "38.521-3_TP analysis_7.6B.3.3_OOBB_Inter_B_within FR1.zip" | RAN5#87-e |
| 7.6B.4.1 Narrow band blocking for intra-band contiguous EN-DC in FR1 (2 CCs) | 2 | "38.521-3_TP analysis_7.6B.4.1_NBB_Intra_B_contig.zip" | RAN5#87-e |
| 7.6B.4.2 Narrow band blocking for intra-band non-contiguous EN-DC in FR1 (2 CCs) | 1 | "38.521-3_TP analysis_7.6B.4.2_NBB_Intra_B_non-contig.zip" | RAN5#87-e |
| 7.6B.4.3 Narrow band blocking for inter-band EN-DC within FR1 (2 CCs) | Same as Table 4.1-2, test case 7.6.4. | Same as Table 4.1-2, test case 7.6.4. | RAN5#87-e |
| 7.7B.1 Spurious Response for intra-band contiguous EN-DC in FR1 (2 CCs) | Same as Table 4.3-2, test case 7.6B.3.1. | Same as Table 4.3-2, test case 7.6B.3.1. | RAN5#87-e |
| 7.7B.2 Spurious Response for intra-band non-contiguous EN-DC in FR1 (2 CCs) | Same as Table 4.3-2, test case 7.6B.3.2. | Same as Table 4.3-2, test case 7.6B.3.2. | RAN5#87-e |
| 7.7B.3 Spurious Response for inter-band EN-DC within FR1 (2 CCs) | Same as Table 4.3-2, test case 7.6B.3.3. | Same as Table 4.3-2, test case 7.6B.3.3. | RAN5#87-e |
| 7.8B.2.3 Wideband Intermodulation for inter-band EN-DC within FR1 | Same as Table 4.1-2, test case 7.8.2. | Same as Table 4.1-2, test case 7.8.2. | RAN5#81 |
| 7.9A.1 Spurious emission for 2DL CA | 3 | "38.521-1_TP analysis_7.9A_Spurious Emission_DL CA.zip" | RAN5#82 |
| 7.9B.3 Spurious Emissions for inter-band EN-DC within FR1 | Same as Table 4.1-2, test case 7.9. | Same as Table 4.1-2, test case 7.9. | RAN5#81 |

4.3.1.2 V2X test cases

Table 4.3.1.2-1: UE transmitter test point selection for E-UTRA-NR V2X

| Subclause | Number of test points | Justification in attachment | Comments |
|--|--|---|-----------|
| 6.2E.1 UE Maximum Output Power for V2X | Intra-band contiguous V2X: N/A Intra-band non-contiguous V2X: N/A Inter-band con-current V2X: 20 | "38.521-3_TPanalysis_V2X_6.2E.1_MOP.zip" | RAN5#93-e |
| 6.2E.2 UE maximum output power reduction for V2X | Intra-band contiguous V2X: N/A Intra-band non-contiguous V2X: N/A Inter-band con-current V2X: - 80 for E-UTRA Uu + NR SL - 220 for NR Uu + E-UTRA SL | "38.521-3_TPanalysis_V2X_6.2E.2_MPR_6.5E.2.1_SEM_6.5E.2.3_ACLR.zip" | RAN5#93-e |
| 6.5E.2.1 Spectrum emission mask for V2X | Intra-band contiguous V2X: N/A Intra-band non-contiguous V2X: N/A Inter-band con-current V2X: - 8 for E-UTRA Uu + NR SL - 28 for NR Uu + E-UTRA SL | "38.521-3_TPanalysis_V2X_6.2E.2_MPR_6.5E.2.1_SEM_6.5E.2.3_ACLR.zip" | RAN5#93-e |
| 6.5E.2.3 Adjacent channel leakage ratio for V2X | Intra-band contiguous V2X: N/A Intra-band non-contiguous V2X: N/A Inter-band con-current V2X: - 80 for E-UTRA Uu + NR SL - 220 for NR Uu + E-UTRA SL | "38.521-3_TPanalysis_V2X_6.2E.2_MPR_6.5E.2.1_SEM_6.5E.2.3_ACLR.zip" | RAN5#93-e |

4.3.2 Test point analysis per NS value

4.3.2.1 A-MPR and A-SE test cases for EN-DC

FFS

4.3.3 Test point analysis per EN-DC configuration

4.3.3.1 Reference sensitivity test cases for EN-DC

This clause contains information on test point analysis and status for FR1 EN-DC test cases in TS 38.521-3 [4] clause 7. The analyses are performed per EN-DC configuration in Table 4.3.3.1-1, Table 4.3.3.1-2 and Table 4.3.3.1-3.

Table 4.3.3.1-1: Reference Sensitivity test cases per EN-DC configuration (2CC)

| Band or band configuration | Single UL | Refsens exception, victim band (NOTE 2) | Requirement coverage (NOTE 2) | Comments |
|----------------------------|-------------------------------------|--|--|--------------------|
| DC_(n)XAA | | | | |
| 5 | Only single UL requirements defined | 5 | Exception | RAN5#92-e |
| 12 | Only single UL requirements defined | 12 | Exception | RAN5#92-e |
| 38 | Only single UL requirements defined | N/A | NE | RAN5#88-e |
| 41 | Yes | N/A | NE | RAN5#88-e |
| 48 | Only single UL requirements defined | N/A | NE | RAN5#88-e |
| 71 | Yes | 71 | Exception | RAN5#88-e |
| DC_XA_nXA | | | | |
| DC_2A_n2A | Only single UL requirements defined | N/A | NE | RAN5#88-e |
| DC_3A_n3A | Yes | 3 | Exception | RAN5#88-e |
| DC_5A_n5A | Only single UL requirements defined | N/A | NE | RAN5#88-e |
| DC_7A_n7A | Only single UL requirements defined | N/A | NE | RAN5#88-e |
| DC_41A_n41A | Only single UL requirements defined | N/A | NE | RAN5#88-e |
| DC_48A_n48A | Only single UL requirements defined | N/A | NE | RAN5#88-e |
| DC_66A_n66A | Only single UL requirements defined | N/A | NE | RAN5#88-e |
| DC_71A_n71A | Only single UL requirements defined | N/A | NE | RAN5#92-e |
| DC_XA-nYA (NOTE 1) | | | | |
| DC_1A_n3A | Yes | 1 (IMD3) CBI | NE IMD3 CBI, CBI avoid | RAN5#89-e |
| DC_1A_n7A | No | N/A | NE | RAN5#94-e |
| DC_1A_n8A | No | 1 (IMD4) | NE IMD4 | RAN5#95-e |
| DC_1A_n77A | No | n77 (HD2) B1 (IMD2) B1 (IMD4) | NE HD IMD2 IMD4 | Added at RAN5#96-e |
| DC_1A_n78A | No | 1 (IMD4) | NE IMD4 | RAN5#88-e |
| DC_2A_n41A | No | 2 (CBI) | NE CBI | Added at RAN5#96-e |
| DC_2A_n66A | No | 3 (IMD3) n66 (IMD5) | NE IMD3 IMD5 | RAN5#94-e |
| DC_2A_n71A | No | 2 (HD3) n71 (HM) | NE HD HM | RAN5#93-e |
| DC_2A_n77A | No | n77 (HD) 2 (HM) 2 (IMD2) 2 (IMD4) 2 (IMD5) | NE HD, HD avoid HM, HM avoid IMD2 PC2&PC3 IMD4 PC2&PC3 IMD5 PC3 | RAN5#94-e |
| DC_2A_n78A | No | n78 (HD2) 2 (IMD2) 2 (IMD4) | NE HD IMD2 IMD4 | RAN5#94-e |
| DC_3A_n1A | Yes | 1 (IMD3) CBI | NE IMD3 CBI, CBI avoid | RAN5#89-e |

| | | | | |
|-------------|-----|--|--|--------------------|
| DC_3A_n5A | Yes | 3 (IMD4) n5 (IMD2) | NE IMD2 IMD4 | RAN5#94-e |
| DC_3A_n8A | No | 3 (IMD5) n8 (IMD4) | NE IMD4 IMD5 | RAN5#96-e |
| DC_3A_n28A | No | N/A | NE | RAN5#95-e |
| DC_3A_n77A | No | n77 (HD2) B3 (HM) B3 (IMD2) B3 (IMD4) | NE HD HM IMD2 IMD4 | Added at RAN5#96-e |
| DC_3A_n78A | Yes | 3 (IMD2) 3 (IMD4) 3 (HD) n78 (HM) | NE IMD2 PC2&PC3 IMD4 PC2&PC3 HD HM, HM avoid | RAN5#89-e |
| DC_5A_n66A | Yes | 5 (IMD2) | NE (anchor agnostic) IMD2 | RAN5#93-e |
| DC_5A_n77A | No | n77 (HD) 5 (IMD4) 5 (IMD5) | NE HD, HD avoid IMD4 PC2&PC3 IMD5 PC3 | RAN5#94-e |
| DC_5A_n78A | No | n78 (HD4) B5 (IMD4) | NE HD, HD avoid IMD4 | Added at RAN5#96-e |
| DC_7A_n1A | No | N/A | NE | RAN5#90-e |
| DC_7A_n3A | No | 7 (IMD4 3*fB3- 1*fB7) | NE, IMD4 | RAN5#90-e |
| DC_7A_n5A | Yes | n5 (IMD3) | NE, IMD3 | RAN5#94-e |
| DC_7A_n8A | No | N/A | NE | RAN5#95-e |
| DC_7A_n28A | No | N/A | NE | RAN5#94-e |
| DC_7A_n78A | No | CBI | NE, CBI | RAN5#94-e |
| DC_8A_n1A | No | n1 (IMD4 2*fB1-2*fB8) | NE, IMD4 | RAN5#90-e |
| DC_8A_n3A | No | 8 (IMD4 3*fB8- 1*fB3), n3 (IMD5 4*fB8-1*fB3) | NE, IMD4, IMD5 | RAN5#90-e |
| DC_8A_n20A | Yes | 8 (IMD3) n20 (IMD3) | NE IMD3 | RAN5#94-e |
| DC_8A_n28A | No | N/A | NE | RAN5#95-e |
| DC_8A_n77A | No | 8 (HD4), 8 (IMD4) | NE HD, HD avoid IMD4 | RAN5#92-e |
| DC_8A_n78A | No | N78 (HD4), 8 (IMD4) | NE HD, HD avoid IMD4 | Added at RAN5#96-e |
| DC_8A_n79A | No | n79 (HD5), 8 (IMD5) | NE HD, HD avoid IMD5 | Added at RAN5#96-e |
| DC_11A_n77A | No | N/A | NE | RAN5#91-e |
| DC_11A_n78A | No | N/A | NE | RAN5#91-e |
| DC_11A_n79A | No | 11 (HM) | NE HM, HM avoid | RAN5#92-e |
| DC_13A_n77A | No | n77 (HD) 13 (HM) 13 (IMD5) | NE HD, HD avoid HM, HM avoid IMD5 PC2&PC3 | RAN5#94-e |

| | | | | |
|-------------------------|-------------------------------------|--|---|--------------------|
| DC_19A_n79A | No | 19 (HM [5*fB19DL-1*fB79]), | NE, HM, HM avoid | RAN5#90-e |
| DC_20A_n1A | No | N/A | NE | RAN5#90-e |
| DC_20A_n3A | No | n3 (IMD4), 20 (IMD4) | NE IMD4 | RAN5#89-e |
| DC_20A_n7A | DC_20_n7 | 20 (IMD3) | NE IMD3 | RAN5#94-e |
| DC_20A_n8A | DC_20_n8 | 20 (IMD3) n8 (IMD3) | NE IMD3 | RAN5#95-e |
| DC_20A_n78A | No | 20 (IMD4), n78 (HD) | NE IMD4, HD, HD avoid | RAN5#88-e |
| DC_21A_n79A | No | B21 HM B21 IMD3 | NE HM, HD avoid IMD3 | Added at RAN5#96-e |
| DC_25A_n41A | No | N/A | NE | RAN5#91-e |
| DC_26A_n41A | No | n41 (HD3), 26 (IMD3) | NE HD, HD avoid IMD | RAN5#92-e |
| DC_26A_n77A | No | n77 (HD4), 26 (IMD4) | NE HD, HD avoid IMD | RAN5#92-e |
| DC_26A_n78A | No | n78 (HD4), 26 (IMD4) | NE HD, HD avoid IMD | RAN5#92-e |
| DC_26A_n79A | No | 26 (HM [4*fB26DL-1*fB79]) | NE HM, HM avoid | RAN5#92-e |
| DC_28A_n5A | No | CBI | NE CBI, CBI avoid | RAN5#94-e |
| DC_28A_n7A | No | N/A | NE | RAN5#94-e |
| DC_28A_n77A | No | n77 (HD), n77 (HM), 28 (IMD5) | NE (HD avoid), HD, HM, IMD5 | RAN5#92-e |
| DC_28A_n78A | No | n78 (HD), 28 (IMD5) | NE (HD avoid), HD, IMD5 | RAN5#92-e |
| DC_40A_n1A | No | N/A | NE | RAN5#89-e |
| DC_40A_n78A | No | 40 (HM) | NE HM, HM avoid | RAN5#89-e |
| DC_40A_n79A | No | N/A | NE | RAN5#94-e |
| DC_41A_n77A (NOTE 3) | No | 41 (HM [3*fB41DL-2*fB77]), 41 (CBI), n77 (CBI) | NE HM CBI | RAN5#92-e |
| DC_41A_n78A (NOTE 3) | No | 41 (HM [3*fB41DL-2*fB77]), 41 (CBI), n78 (CBI) | NE HM CBI | RAN5#92-e |
| DC_42A_n77A | Only single UL requirements defined | N/A | NE | RAN5#91-e |
| DC_48A_n66A | No | 48 (HD2) 66 (IMD5) | NE (anchor agnostic) HD2 IMD5 | RAN5#92-e |
| DC_66A_n2A | DC_66_n2 | n2 (IMD3) 66 (IMD5) | NE (anchor agnostic) IMD3 IMD5 | RAN5#93-e |
| DC_66A_n71A | No | 66 (IMD4) | NE (anchor agnostic) IMD4 | RAN5#93-e |

| | | | | |
|---|----|------------------------------------|--|-----------|
| DC_66A_n77A | No | n77 (HD) 66 (IMD2) 66 (IMD5) | NE HD, HD avoid IMD2 PC2&PC3 IMD5 PC2&PC3 | RAN5#94-e |
| DC_66A_n78A | No | n78 (HD2) 66 (IMD5) | NE (anchor agnostic) HD2 IMD5 | RAN5#93-e |
| <p>NOTE 1: If single UL is allowed in a DC_XA_nYA configuration the IMD requirements does not apply for UEs supporting UE capability <i>singleUL-Transmission</i>.</p> <p>NOTE 2: Notations used NE: Non-exception as defined in TS 38.101-3 [7], meaning standalone LTE in TS 36.101 [8] and NR in 38.101-1 [5] requirements apply. HD: UL Harmonic Distortion, as defined in TS 38.101-3 [7], 7.3B.2.3.1 HM: RX Harmonic Mixing, as defined in TS 38.101-3 [7], 7.3B.2.3.2 IMD: Intermodulation Distortion, as defined in TS 38.101-3 [7], 7.3B.2.3.5 CBI: Cross Band Isolation, as defined in TS 38.101-3 [7], 7.3B.2.3.4 HD avoid: single carrier requirements apply with aggressor of UL Harmonic Distortion active. HM avoid: single carrier requirements apply with aggressor of RX Harmonic Mixing active. CBI avoid: single carrier requirements apply with aggressor of Cross Band Isolation active.</p> <p>NOTE 3: HM cannot be avoided with aggressor still active since CBI exception always exists. Therefore, no HM avoid test point is added.</p> | | | | |

Table 4.3.3.1-2: Reference Sensitivity test cases per EN-DC configuration (3CC)

| Band or band configuration | Single UL | UL config | Refsens exception, victim band | Requirement coverage (NOTE 2) | Fallback DC configurations | Comments |
|----------------------------|-------------------------------------|-------------|--------------------------------|-------------------------------|----------------------------|-----------|
| DC_(n)XCA | | | | | | |
| 41 | Yes | DC_(n)41AA | N/A | NE | DC_(n)41AA DC_41A_n41A | RAN5#89-e |
| 41 | Yes | DC_41A_n41A | N/A | NE | DC_(n)41AA DC_41A_n41A | RAN5#89-e |
| 48 | Only single UL requirements defined | DC_(n)48AA | N/A | NE | DC_(n)48AA DC_48A_n48A | RAN5#89-e |
| 48 | Only single UL requirements defined | DC_48A_n48A | N/A | NE | DC_(n)48AA DC_48A_n48A | RAN5#89-e |
| DC_XA_nYC | | | | | | |
| DC_3A_n78C | Yes | DC_3A_n78A | N/A | NE | | RAN5#93-e |
| DC_XA_nY(2A) | | | | | | |
| FFS | | | | | | |
| DC_XA_nYA-nZA | | | | | | |
| DC_1A_n28A-n78A | No | DC_1A_n28A | n78 (3 band IMD3) | NE, IMD3 | | RAN5#92-e |
| | No | DC_1A_n78A | n28 (3 band IMD5) | NE, IMD5 | | RAN5#92-e |
| DC_3A_n28A-n78A | No | DC_3A_n28A | n78 (3 band IMD5) | NE, IMD5 | | RAN5#92-e |
| | Yes | DC_3A_n78A | No 3CC exception | No test required | | |
| DC_7A_n5A-n78A | Yes | DC_7A_n5A | No 3CC exception | No test required | | RAN5#94-e |
| | No | DC_7A_n78A | No 3CC exception | No test required | | RAN5#94-e |
| DC_7A_n28A-n78A | No | DC_7A_n28A | n78 (3 band IMD2) | NE, IMD2 | | RAN5#92-e |
| | No | DC_7A_n78A | n28 (3 band IMD2) | NE, IMD2 | | |
| DC_20A_n28A-n78A | No | DC_20A_n28A | n78 (3 band IMD4) | NE, IMD4 | | RAN5#93-e |
| | No | DC_20A_n78A | n28 (3 band IMD4) | NE, IMD4 | | RAN5#93-e |
| DC_28A_n7A-n78A | No | DC_28A_n7A | n78 (3 band IMD2) | NE, IMD2 | | RAN5#94-e |
| | No | DC_28A_n78A | n7 (3 band IMD2) | NE, IMD2 | | RAN5#94-e |
| DC_XA-YA_nZA | | | | | | |
| DC_1A-3A_n28A | No | DC_1A_n28A | 3 (3 band IMD5) | IMD5 | | RAN5#92-e |
| | No | DC_3A_n28A | 1 (3 band IMD4) | IMD4 | | RAN5#92-e |
| DC_1A-7A_n3A | Yes | DC_1A_n3A | No 3CC exception | No test required | | |
| | No | DC_7A_n3A | | | | |
| DC_1A-7A_n28A | No | DC_1A_n28A | 7 (3 band IMD2) | IMD2 | | RAN5#92-e |
| | No | DC_7A_n28A | No 3 band exception | No test required | | RAN5#92-e |
| DC_1A-7A_n78A | No | DC_1A_n78A | 7 (IMD4 3*fB1-1*fB78) | IMD4 | | |
| | No | DC_7A_n78A | 1 (IMD4 2*fB7-2*fB78) | IMD4 | | |
| DC_1A-8A_n3A | Yes | DC_1A_n3A | No 3CC exception | No test required | | |
| | No | DC_8A_n3A | | | | |
| DC_1A-20A_n3A | Yes | DC_1A_n3A | No 3CC exception | No test required | | |
| | No | DC_20A_n3A | | | | |

| | | | | | | |
|----------------|----------------|-------------|-----------------------|-------------------------------|-------------|-----------|
| DC_1A-20A_n8A | No | DC_1A_n8A | 20 (3 band IMD4) | IMD4 | | RAN5#95-e |
| | Yes | DC_20A_n8A | No 3CC exception | - | | RAN5#95-e |
| DC_1A-20A_n28A | No | DC_1A_n28A | No 3CC exception | No test required | | RAN5#93-e |
| | No | DC_20A_n28A | No 3CC exception | No test required | | RAN5#93-e |
| DC_1A-20A_n78A | No | DC_1A_n78A | 20 (IMD5) | IMD5 | | |
| | No | DC_20A_n78A | 1 (IMD3) | IMD3 | | |
| DC_1A-28A_n3A | Yes | DC_1A_n3A | 1 (3 band IMD4) | IMD4 | Yes | RAN5#90-e |
| | No | DC_28A_n3A | No 3CC exception | - | No | |
| DC_1A-28A_n5A | No | DC_1A_n5A | No 3CC exception | No test required | | RAN5#95-e |
| | No | DC_28A_n5A | | | | |
| DC_1A-28A_n78A | No | DC_1A_n78A | 28 (3 band IMD3) | IMD3 | | RAN5#92-e |
| | No | DC_28A_n78A | 1 (3 band IMD5) | IMD5 | DC_28A_n78A | |
| DC_2A-66A_n41A | No | DC_2A_n41A | 2 (3 band IMD4) | IMD4 | | RAN5#96-e |
| | No | DC_66A_n41A | No 3CC exception | | | |
| DC_3A-7A_n1A | Yes | DC_3A_n1A | No 3CC exception | No test required | | RAN5#90-e |
| | No | DC_7A_n1A | No 3CC exception | | | |
| DC_3A-7A_n5A | Yes | DC_3A_n5A | 7 (3 band IMD2) | IMD2 | | RAN5#95-e |
| | Yes | DC_7A_n5A | No 3CC exception | - | | RAN5#95-e |
| DC_3A-7A_n8A | No | DC_3A_n8A | 7 (3 band IMD2, IMD3) | IMD2, IMD3 | | RAN5#96-e |
| | No | DC_7A_n8A | No 3CC exception | No test required | | RAN5#96-e |
| DC_3A-7A_n28A | No | DC_3A_n28A | 7 (3 band IMD3) | IMD3 | | RAN5#92-e |
| | No | DC_7A_n28A | 3 (3 band IMD2) | IMD2 | | RAN5#92-e |
| DC_3A-8A_n28A | No | DC_3A_n28A | No 3CC exception | No test required | | RAN5#95-e |
| | No | DC_8A_n28A | | | | |
| DC_3A-20A_n1 | Yes | DC_3A_n1A | No 3CC exception | No test required | | |
| | No | DC_20A_n1A | | | | |
| DC_3A-20A_n8A | No | DC_3A_n8A | No 3CC exception | No test required | | RAN5#96-e |
| | Yes (DC_20_n8) | DC_20A_n8A | 3 (3 band IMD4) | IMD4 | | RAN5#96-e |
| DC_3A-20A_n28A | No | DC_3A_n28A | No 3CC exception | No test required | | RAN5#92-e |
| | No | DC_20A_n28A | 3 (3 band IMD4) | IMD4 | | RAN5#92-e |
| DC_3A-20A_n78 | Yes | DC_3A_n78A | No 3CC exception | | | |
| | No | DC_20A_n78A | 3 (3 band IMD3) | IMD3 | | |
| DC_3A-28A_n78A | Yes | DC_3A_n78A | No 3CC exception | | DC_3A_n78A | RAN5#92-e |
| | No | DC_28A_n78A | 3 (3 band IMD3) | IMD3 | DC_28A_n78A | |
| DC_3A-40A_n1A | Yes | DC_3A_n1A | 40 (3 band IMD5) | IMD5 if UE supporting dual UL | | |

| | | | | | | |
|--|-----|-------------|--------------------------------------|------------------|-------------|-----------|
| | No | DC_40A_n1A | No 3CC exception | | | |
| DC_7A-8A_n3A | No | DC_7A_n3A | 8 (3 band IMD3) | IMD3 | | RAN5#95-e |
| | No | DC_8A_n3A | 7 (3 band IMD2) 7 (3 band IMD3) | IMD2, IMD3 | | RAN5#95-e |
| DC_7A-20A_n1A | No | DC_20A_n1A | 20 (3 band IMD5) | IMD5 | | RAN5#90-e |
| | No | DC_7A_n1A | No 3CC exception | - | | |
| DC_7A-20A_n3A | No | DC_7A_n3A | 20 (IMD2 1*fB7-1*fB3) | NE, IMD2 | | |
| | No | DC_20A_n3A | 7 (IMD2 1*fB3+1*fB20) | NE, IMD2 | | |
| DC_7A-20A_n8A | No | DC_7A_n8A | 20 (3 band IMD3) | IMD3 | | RAN5#95-e |
| | Yes | DC_20A_n8A | 7 (3 band IMD3) | IMD3 | | RAN5#95-e |
| DC_7A-20A_n28A | No | DC_7A_n28A | No 3CC exception | No test required | | RAN5#92-e |
| | No | DC_20A_n28A | 7 (3 band IMD5) | IMD 5 | | |
| DC_7A-20A_n78A | No | DC_7A_n78A | 20 (3 band IMD2) 20 (3 band IMD5) | IMD2, IMD5 | | |
| | No | DC_0A_n78A | 7 (3 band IMD2) | IMD2 | | |
| DC_7A-28A_n3A | No | DC_7A_n3A | 28 (3 band IMD2) | IMD2 | | RAN5#90-e |
| | No | DC_28A_n3A | 7 (3 band IMD3) | IMD3 | | |
| DC_7A-28A_n5A | Yes | DC_7A_n5A | 28 (3 band IMD5) | IMD5 | | RAN5#95-e |
| | No | DC_28A_n5A | 7 (3 band IMD5) | IMD5 | | RAN5#95-e |
| DC_7A-28A_n78A | No | DC_7A_n78A | 28 (3 band IMD2) 28 (3 band IMD5) | IMD2, IMD5 | | RAN5#92-e |
| | No | DC_28A_n78A | 7 (3 band IMD2) | IMD2 | DC_28A_n78A | |
| DC_(n)XAA-nYA | | | | | | |
| FFS | | | | | | |
| DC_XA_nXA_nYA | | | | | | |
| FFS | | | | | | |
| NOTE 1: If single UL is allowed in a DC_XA_nYA configuration the IMD requirements does not apply for UEs supporting UE capability <i>singleUL-Transmission</i> . | | | | | | |
| NOTE 2: Notations used | | | | | | |
| NE: Non-exception as defined in TS 38.101-3 [7], meaning standalone LTE in TS 36.101 [8] and NR in 38.101-1 [5] requirements apply. | | | | | | |
| HD: UL Harmonic Distortion, as defined in TS 38.101-3 [7], 7.3B.2.3.1 | | | | | | |
| HM: RX Harmonic Mixing, as defined in TS 38.101-3 [7], 7.3B.2.3.2 | | | | | | |
| IMD: Intermodulation Distortion, as defined in TS 38.101-3 [7], 7.3B.2.3.5 | | | | | | |
| CBI: Cross Band Isolation, as defined in TS 38.101-3 [7], 7.3B.2.3.4 | | | | | | |

Table 4.3.3.1-3: Reference Sensitivity test cases per EN-DC configuration (4CC)

| Band or band configuration | Single UL | UL config | Refsens exception, victim band | Requirement coverage (NOTEote 2) | Fallback DC configurations | Comments |
|--|-------------------------------------|-------------|--------------------------------|----------------------------------|----------------------------|-----------|
| DC_(n)XDA | | | | | | |
| 41 | Yes | DC_(n)41AA | N/A | NE | DC_(n)41CA DC_41C_n41A | RAN5#89-e |
| 41 | Yes | DC_41A_n41A | N/A | NE | N/A | RAN5#89-e |
| 48 | Only single UL requirements defined | DC_(n)48AA | N/A | NE | DC_(n)48CA DC_48C_n48A | RAN5#89-e |
| 48 | Only single UL requirements defined | DC_48A_n48A | N/A | NE | N/A | RAN5#89-e |
| DC_XA_nY(2A)-nZA | | | | | | |
| FFS | | | | | | |
| DC_XA_nYA-nZC | | | | | | |
| FFS | | | | | | |
| NOTE 1: If single UL is allowed in a DC_XA_nYA configuration the IMD requirements does not apply for UEs supporting UE capability <i>singleUL-Transmission</i> . | | | | | | |
| NOTE 2: Notations used | | | | | | |
| NE: Non-exception as defined in TS 38.101-3 [7], meaning standalone LTE in TS 36.101 [8] and NR in 38.101-1 [5] requirements apply. | | | | | | |
| HD: UL Harmonic Distortion, as defined in TS 38.101-3 [7], 7.3B.2.3.1 | | | | | | |
| HM: RX Harmonic Mixing, as defined in TS 38.101-3 [7], 7.3B.2.3.2 | | | | | | |
| IMD: Intermodulation Distortion, as defined in TS 38.101-3 [7], 7.3B.2.3.5 | | | | | | |
| CBI: Cross Band Isolation, as defined in TS 38.101-3 [7], 7.3B.2.3.4 | | | | | | |

4.3.3.2 Spurious emissions test cases for EN-DC

In this case, it is sufficient to verify the minimum requirements in frequency ranges affected by 2nd and 3rd order intermodulation products. The frequency ranges and UL RB allocations used in the test are calculated here.

The analyses are performed per EN-DC configuration and are stored as zip-files as defined in annex A.

Table 4.3.3.2-1: Frequency range analysis availability per EN-DC configuration

| EN-DC config | Justification | Comments |
|--------------|---|--------------------|
| DC_1A_n3A | 38.521-3_TpAnalysisSpur(DC_1A-n3A).zip | RAN5#89-e |
| DC_1A_n5A | 38.521-3_TpAnalysisSpur(DC_1A_n5A).zip | RAN5#94-e |
| DC_1A_n7A | 38.521-3_TpAnalysisSpur(DC_1A_n7A).zip | RAN5#94-e |
| DC_1A_n8A | 38.521-3_TpAnalysisSpur(DC_1A_n8A).zip | RAN5#95-e |
| DC_1A_n28A | 38.521-3_TpAnalysisSpur(DC_1A_n28A).zip | RAN5#92-e |
| DC_1A_n77A | 38.521-3_TpAnalysisSpur(DC_1A_n77A).zip | RAN5#92-e |
| DC_1A_n78A | 38.521-3_TpAnalysisSpur(DC_1A_n78A)_v1.zip | RAN5#92-e |
| DC_1A_n79A | 38.521-3_TpAnalysisSpur(DC_1A_n79A).zip | RAN5#92-e |
| DC_2A_n5A | 38.521-3_TpAnalysisSpur(DC_2A_n5A).zip | RAN5#89-e |
| DC_2A_n41A | 38.521-3_TpAnalysisSpur(DC_2A_n41A)_v1.zip | RAN5#96-e |
| DC_2A_n66A | 38.521-3_TpAnalysisSpur(DC_2A_n66A).zip | RAN5#88-e |
| DC_2A_n71A | 38.521-3_TpAnalysisSpur(DC_2A_n71A)_v2.zip | RAN5#92-e |
| DC_2A_n77A | 38.521-3_TpAnalysisSpur(DC_2A_n77A).zip | RAN5#94-e |
| DC_2A_n78A | 38.521-3_TpAnalysisSpur(DC_2A_n78A).zip | RAN5#88-e |
| DC_3A_n1A | 38.521-3_TpAnalysisSpur(DC_3A_n1A).zip | RAN5#88-e |
| DC_3A_n5A | 38.521-3_TpAnalysisSpur(DC_3A_n5A).zip | RAN5#94-e |
| DC_3A_n7A | 38.521-3_TpAnalysisSpur(DC_3A_n7A)_v1.zip | RAN5#91-e |
| DC_3A_n8A | 38.521-3_TpAnalysisSpur(DC_3A_n8A).zip | Added at RAN5#96-e |
| DC_3A_n28A | 38.521-3_TpAnalysisSpur(DC_3A_n28A).zip | RAN5#92-e |
| DC_3A_n41A | 38.521-3_TpAnalysisSpur(DC_3A_n41A)_v3.zip | RAN5#94-e |
| DC_3A_n77A | 38.521-3_TpAnalysisSpur(DC_3A_n77A).zip | RAN5#92-e |
| DC_3A_n78A | 38.521-3_TpAnalysisSpur(DC_3A_n78A)_v1.zip | RAN5#91-e |
| DC_3A_n79A | 38.521-3_TpAnalysisSpur(DC_3A-n79A)_v1.zip | RAN5#83 |
| DC_5A_n2A | 38.521-3_TpAnalysisSpur(DC_5A_n2A)_v2.zip | RAN5#96-e |
| DC_5A_n66A | 38.521-3_TpAnalysisSpur(DC_5A_n66A)_v2.zip | RAN5#92-e |
| DC_5A_n77A | 38.521-3_TpAnalysisSpur(DC_5A_n77A).zip | RAN5#94-e |
| DC_5A_n78A | 38.521-3_TpAnalysisSpur(DC_5A_n78A)_v2.zip | RAN5#92-e |
| DC_7A_n1A | 38.521-3_TpAnalysisSpur(DC_7A_n1A).zip | RAN5#88-e |
| DC_7A_n3A | 38.521-3_TpAnalysisSpur(DC_7A_n3A)_v1.zip | RAN5#96-e |
| DC_7A_5A | 38.521-3_TpAnalysisSpur(DC_7A_n5A).zip | RAN5#94-e |
| DC_7A_n8A | 38.521-3_TpAnalysisSpur(DC_7A_n8A).zip | RAN5#95-e |
| DC_7A_n28A | 38.521-3_TpAnalysisSpur(DC_7A_n28A).zip | RAN5#92-e |
| DC_7A_n66A | 38.521-3_TpAnalysisSpur(DC_7A_n66A).zip | RAN5#88-e |
| DC_7A_n78A | 38.521-3_TpAnalysisSpur(DC_7A_n78A)_v1.zip | RAN5#92-e |
| DC_8A_n1A | 38.521-3_TpAnalysisSpur(DC_8A_n1A).zip | RAN5#88-e |
| DC_8A_n3A | 38.521-3_TpAnalysisSpur(DC_8A_n3A)_v2.zip | RAN5#96-e |
| DC_8A_n20A | 38.521-3_TpAnalysisSpur(DC_8A_n20A)_v1.zip | RAN5#96-e |
| DC_8A_n28A | 38.521-3_TpAnalysisSpur(DC_8A_n28A).zip | RAN5#95-e |
| DC_8A_n41A | 38.521-3_TpAnalysisSpur(DC_8A_n41A)_v3.zip | RAN5#96-e |
| DC_8A_n77A | 38.521-3_TpAnalysisSpur(DC_8A_n77A)_v1.zip | RAN5#91-e |
| DC_8A_n78A | 38.521-3_TpAnalysisSpur(DC_8A_n78A)_v1.zip | RAN5#93-e |
| DC_11A_n77A | 38.521-3_TpAnalysisSpur(DC_11A_n77A)_v1.zip | RAN5#92-e |
| DC_11A_n78A | 38.521-3_TpAnalysisSpur(DC_11A_n78A)_v1.zip | RAN5#92-e |
| DC_11A_n79A | 38.521-3_TpAnalysisSpur(DC_11A_n79A)_v1.zip | RAN5#92-e |
| DC_12A_n66A | 38.521-3_TpAnalysisSpur(DC_12A_n66A)_v1.zip | RAN5#91-e |
| DC_12A_n78A | 38.521-3_TpAnalysisSpur(DC_12A_n78A)_v1.zip | RAN5#92-e |
| DC_13A_n2A | 38.521-3_TpAnalysisSpur(DC_13A_n2A)_v3.zip | RAN5#96-e |
| DC_13A_n66A | 38.521-3_TpAnalysisSpur(DC_13A_n66A).zip | RAN5#89-e |
| DC_13A_n77A | 38.521-3_TpAnalysisSpur(DC_13A_n77A).zip | RAN5#94-e |
| DC_14A_n2A | 38.521-3_TpAnalysisSpur(DC_14A_n2A)_v4.zip | RAN5#95-e |
| DC_14A_n66A | 38.521-3_TpAnalysisSpur(DC_14A_n66A)_v4.zip | RAN5#95-e |
| DC_19A_n1A | 38.521-3_TpAnalysisSpur(DC_19A_n1A).zip | RAN5#94-e |
| DC_19A_n77A | 38.521-3_TpAnalysisSpur(DC_19A_n77A).zip | RAN5#92-e |
| DC_19A_n78A | 38.521-3_TpAnalysisSpur(DC_19A_n78A).zip | RAN5#92-e |
| DC_19A_n79A | 38.521-3_TpAnalysisSpur(DC_19A_n79A).zip | RAN5#92-e |
| DC_20A_n1A | 38.521-3_TpAnalysisSpur(DC_20A-n1A)_v1.zip | RAN5#96-e |
| DC_20A_n3A | 38.521-3_TpAnalysisSpur(DC_20A_n3A)_v2.zip | RAN5#96-e |
| DC_20A_n7A | 38.521-3_TpAnalysisSpur(DC_20A_n7A).zip | RAN5#94-e |
| DC_20A_n8A | 38.521-3_TpAnalysisSpur(DC_20A_n8A).zip | RAN5#95-e |
| DC_20A_n78A | 38.521-3_TpAnalysisSpur(DC_20A_n78A).zip | RAN5#92-e |
| DC_20A_n28A | 38.521-3_TpAnalysisSpur(DC_20A_n28A).zip | RAN5#92-e |
| DC_21A_n1A | 38.521-3_TpAnalysisSpur(DC_21A_n1A).zip | RAN5#94-e |
| DC_21A_n77A | 38.521-3_TpAnalysisSpur(DC_21A_n77A).zip | RAN5#92-e |
| DC_21A_n78A | 38.521-3_TpAnalysisSpur(DC_21A_n78A).zip | RAN5#92-e |

| | | |
|-------------|---|-----------|
| DC_21A_n79A | 38.521-3_TpAnalysisSpur(DC_21A_n79A).zip | RAN5#92-e |
| DC_25A_n41A | 38.521-3_TpAnalysisSpur(DC_25A_n41A)_v2.zip | RAN5#94-e |
| DC_26A_n41A | 38.521-3_TpAnalysisSpur(DC_26A_n41A)_v2.zip | RAN5#94-e |
| DC_26A_n77A | 38.521-3_TpAnalysisSpur(DC_26A_n77A)_v1.zip | RAN5#92-e |
| DC_26A_n78A | 38.521-3_TpAnalysisSpur(DC_26A_n78A)_v1.zip | RAN5#92-e |
| DC_26A_n79A | 38.521-3_TpAnalysisSpur(DC_26A_n79A)_v1.zip | RAN5#91-e |
| DC_28A_n3A | 38.521-3_TpAnalysisSpur(DC_28A_n3A)_v1.zip | RAN5#92-e |
| DC_28A_n5A | 38.521-3_TpAnalysisSpur(DC_28A_n5A).zip | RAN5#94-e |
| DC_28A_n7A | 38.521-3_TpAnalysisSpur(DC_28A_n7A).zip | RAN5#94-e |
| DC_28A_n78A | 38.521-3_TpAnalysisSpur(DC_28A_n78A).zip | RAN5#92-e |
| DC_28A_n77A | 38.521-3_TpAnalysisSpur(DC_28A_n77A).zip | RAN5#92-e |
| DC_28A_n79A | 38.521-3_TpAnalysisSpur(DC_28A_n79A).zip | RAN5#92-e |
| DC_30A_n5A | 38.521-3_TpAnalysisSpur(DC_30A_n5A)_v1.zip | RAN5#91-e |
| DC_39A_n41A | 38.521-3_TpAnalysisSpur(DC_39A_n41A)_v2.zip | RAN5#94-e |
| DC_39A_n79A | 38.521-3_TpAnalysisSpur(DC_39A_n79A)_v1.zip | RAN5#92-e |
| DC_40A_n1A | 38.521-3_TpAnalysisSpur(DC_40A_n1A)_v1.zip | RAN5#92-e |
| DC_40A_n41A | 38.521-3_TpAnalysisSpur(DC_40A_n41A)_v2.zip | RAN5#94-e |
| DC_40A_n78A | 38.521-3_TpAnalysisSpur(DC_40A_n78A)_v1.zip | RAN5#92-e |
| DC_40A_n79A | 38.521-3_TpAnalysisSpur(DC_40A_n79A).zip | RAN5#94-e |
| DC_41A_n77A | 38.521-3_TpAnalysisSpur(DC_41A_n77A)_v1.zip | RAN5#92-e |
| DC_41A_n78A | 38.521-3_TpAnalysisSpur(DC_41A_n78A)_v1.zip | RAN5#92-e |
| DC_41A_n79A | 38.521-3_TpAnalysisSpur(DC_41A_n79A)_v1.zip | RAN5#92-e |
| DC_42A_n77A | 38.521-3_TpAnalysisSpur(DC_42A_n77A).zip | RAN5#92-e |
| DC_48A_n5A | 38.521-3_TpAnalysisSpur(DC_48A_n5A)_v1.zip | RAN5#96-e |
| DC_48A_n66A | 38.521-3_TpAnalysisSpur(DC_48A_n66A)_v1.zip | RAN5#96-e |
| DC_66A_n2A | 38.521-3_TpAnalysisSpur(DC_66A_n2A).zip | RAN5#88-e |
| DC_66A_n5A | 38.521-3_TpAnalysisSpur(DC_66A_n5A)_v1.zip | RAN5#92-e |
| DC_66A_n41A | 38.521-3_TpAnalysisSpur(DC_66A_n41A)_v1.zip | RAN5#96-e |
| DC_66A_n71A | 38.521-3_TpAnalysisSpur(DC_66A_n71A)_v2.zip | RAN5#92-e |
| DC_66A_n77A | 38.521-3_TpAnalysisSpur(DC_66A_n77A)_v2.zip | RAN5#94-e |
| DC_66A_n78A | 38.521-3_TpAnalysisSpur(DC_66A_n78A)_v2.zip | RAN5#92-e |

Annex A: Derivation documents

The documents and spreadsheets used to give the background for the selected test points for each test case are included in the present document as zip files.

The name of the zip shall:

- Include a prefix allowing easier grouping of files, e.g. “38.521-1_TPanalysis”, “38.521-2_TPanalysis” or “38.521-3_TPanalysis”.les in the same area, e.g. .
- Include Test Case Number(s) and an abbreviation Test Case Name, e.g. “6.2.1_MOP”, “7.6.2.InB_Block” or “6.2.1_MOP+6.2.2_MPR”.
- In cases where multiple analysis is needed per test cases, e.g. for different CA configurations, include the CA band combination applicable in the parentheses, e.g. add “(1A-3A)” for CA_1A-3A.

Concatenated example file name: “38.521-1_TPanalysis_6.2.1_MOP.zip”.

If there is an update of test points for a test case the old corresponding zip file shall be replaced with a new zip file with a version stepping in the file name. e.g. “nnn_v2.zip”. The aim is to provide a reference to completed test cases, so that test points for similar test cases can be selected on a common basis.

For cases when no spreadsheet is used then the principles for selecting reference sensitivity test points are described in Annex B, C or D.

Annex B: Principles for test point selection for NR CA reference sensitivity test cases

B.1 General

From TS 38.521-1 [2] (Table 7.3.2.4.1-1), the initial conditions used for NR RX reference sensitivity is given below.

| Initial Conditions | | | | |
|---|------------------------|---|----------------------|--------------------------------|
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | Low range, Mid range, High range (NOTE 4) | | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | Lowest, Mid, Highest (NOTE 4) Lowest UL / Lowest DL, Lowest UL / Highest DL (NOTE 3) | | |
| Test SCS as specified in Table 5.3.5-1 | | Lowest | | |
| Test Parameters | | | | |
| Test ID | Downlink Configuration | | Uplink Configuration | |
| | Modulation | RB allocation | Modulation | RB allocation |
| 1 | CP-OFDM QPSK | Full RB (NOTE 1) | DFT-s-OFDM QPSK | REFERENCE SENSITIVITY (NOTE 2) |
| NOTE 1: Full RB allocation shall be used per each SCS and channel BW as specified in Table 7.3.2.4.1-2. | | | | |
| NOTE 2: REFERENCE SENSITIVITY refers to Table 7.3.2.4.1-3 which defines uplink RB configuration and start RB location for each SCS, channel BW and NR band. | | | | |
| NOTE 3: According to asymmetric channel bandwidths specified in clause 5.3.6. | | | | |
| NOTE 4: For n70, in addition to default test configurations, additional configurations shall be used to verify reference sensitivity requirements with the UE TX-RX frequency separation of 295MHz (table 5.4.4-1): 5 MHz CH BW with DL @ low range, UL @ mid range 5 MHz CH BW with DL @ mid range, UL @ high range 10 MHz CH BW with DL @ low range, UL @ high range | | | | |

For reference, the initial test condition for E-UTRA-CA (inter-band DL CA and UL CA) is listed below: (Table 7.3B.4.1-1 in TS 38.521-1 [2])

| Initial Conditions | | | | | | | | | |
|---|---------------|---------------|-------------------------|--------|---|---|---|---|---|
| Test Environment as specified in TS 36.508 [7] subclause 4.1 | | | | | NC, TL/VL, TL/VH, TH/VL, TH/VH | | | | |
| Test Frequencies as specified in TS 36.508 [7] subclause 4.3.1 for different CA bandwidth classes, and PCC and SCCs are mapped onto physical frequencies according to Table 7.1-2 | | | | | B: Low range, High range C: Low range, High range (Note 4) | | | | |
| Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE. | | | | | Lowest N_{RB_agg} , Highest N_{RB_agg} (Notes 3, 4) | | | | |
| Test Parameters for CA Configurations | | | | | | | | | |
| CA Configuration / N_{RB_agg} | | DL Allocation | | | UL Allocation | | | | |
| PCC N_{RB} | SCCs N_{RB} | CC MOD | PCC & SCC RB allocation | CC MOD | N_{RB_alloc} | PCC & SCC RB allocations (L_{CRB} @ RB_{start}) | | | |
| 6 | 25 | QPSK | 6+25 | QPSK | 6 | P_6@0 | - | - | - |
| 15 | 50 | QPSK | 15+50 | QPSK | 15 | P_15@0 | - | - | - |
| 25 | 25 | QPSK | 25+25 | QPSK | 20 | P_20@0 | - | - | - |

B.2 Test case structure

This approach which is described in this clause is relying on certain properties of the RAN4 CA requirements and applies to both NR CA and EN-DC.

1. For E-UTRA, fallbacks are skipped unless there is a documented exception in TS36.521-2. This may cause that a fallback is skipped even if no technical analysis has been made leading to insufficient testing of demanding CA configurations. For NR fallback can only be skipped if there has been a technical analysis performed in TR 38.905.
2. The RAN4 decision to only specify the affected (aggressor and victim) bands for an exception enables a different approach than in E-UTRA that in most cases makes fallback analysis redundant. This is not entirely true for requirements under clause 7.3A.5 and 7.3A.6 of TS38.101-1 [5] but it is assumed that the same approach can be used also in those cases as it greatly simplifies test cases.
3. Test cases can be split into *default* and *additional* test cases where default test cases only test where there is no exception (single carrier requirements apply), and additional only test the exceptions in TS 38.101-1 [5] clause 7.3A.
4. *Default* test cases need to be defined from 2 up to 5 CCs. Since they cover no exception, no fallback analysis is required, and the applicability rule should say that only highest CC number is required (similar to other Rx tests).
5. As the *default* test cases are not covering any CA exceptions, there is no need to configure UL CA in these test cases. Single UL configuration is sufficient to fulfil the test purpose.
6. *Additional* test cases only need to be defined for 2CC (and for intermodulation also 3CC) since this is sufficient for testing the exception. Adding more CCs is not considered to affect the test result and does not add any value.
7. *Additional* test cases only need to consider pure inter-band configurations since requirements are the same for intra-band contiguous or non-contiguous, and the essential aspect to test is the interference between bands.
8. It is important for sufficient test coverage to ensure that all band combinations with the highest number of CCs supported in the UE can always be tested.
9. The highest supported CC number may be with a band including an exception that can be avoided by setting a different test frequency (e.g. harmonic interference). In such cases, there is a need to include test points in the *default* test case so that this CA configuration can be tested without an exception (see example 1 below).
10. The highest supported CC number may be with a band including an exception that cannot be avoided by setting a different test frequency (e.g. cross band isolation). In this case the test requirements of the *default* test that are normally general for any CA config need to include this specific exception requirement. In addition, one fallback configuration needs to be tested to ensure test coverage of the single carrier requirement for the victim band that applies in this case. In order to simplify test applicability this fallback configuration will be specified inside the higher order test case (see example 2 below).
11. The highest supported CC number may be with a band including a limitation that is not present in the lower order fallback (e.g. UL is not possible in one of the bands). In this case, one fallback configuration needs to be tested to ensure test coverage of the single carrier requirement with UL active in the band. In order to simplify test applicability this fallback configuration will be specified inside the higher order test case.
12. To ensure that it has been checked that the CA configuration has been fully analysed with regard to test configuration and fallback testing, the CA configuration is listed in TR 38.905.

B.3 Test Environment

Reference sensitivity is one of the critical test cases for NR. Considering NR CA testing scenario is very similar to E-UTRA_CA test case, similar Test Environment shall be used for NR CA testing, i.e. NC, TL/VL, TL/VH, TH/VL, TH/VH.

B.4 Test Frequencies selection

In E-UTRA DL CA and UL CA reference sensitivity testing, Low range and High range are selected for intra-band CA testing. Mid range is selected for inter band E-UTRA CA testing.

Considering NR CA testing scenario is very similar to E-UTRA_CA test case, similar Test Frequencies should be used for NR CA default case.

It is proposed that Low and High Range are tested as default for intra-band and mid range for inter-band. For CA combinations containing intra-band configuration in an inter-band CA configuration it is proposed that low and high range are tested for intra-band CA and mid channel for inter-band without intra-band component. It is also proposed that the fallback configurations from intra-band configuration to single carrier component do not need to be tested even if the test frequency would differ (e.g. XA-YC -> XA-YA fallback does not need to be tested even if YC is tested with low/high frequency and YA would be tested with mid frequency).

For CA configurations affected by exceptions the test frequency cannot be freely chosen. One test frequency per exception requirement is sufficient to test the requirement, in addition to testing the case where the exception is avoided. This is indicated in table 2.3-2. Exceptions in TS 38.101-1 [5] clause 7.3A.5 (2UL intermodulation) are not specified since the test frequency and channel bandwidth is already specified in TS 38.101-1 [5].

Table B.4-1: Void

Proposal 2a: Low range and high range for intra band CA and mid range for inter-band CA shall be selected for NR in *default* test cases 7.3A.1 to 7.3A.4 in general, but final selection is band dependent. For CA combinations containing intra-band configuration in an inter-band CA configuration low and high range shall be selected for intra-band CA and mid channel for inter-band without intra-band component. The fallback configurations from intra-band configuration to single carrier component do not need to be tested even if the test frequency would differ.

Proposal 2b: In the *additional* test case, one test frequency per exception is selected.

B.5 Test Channel Bandwidth selection

The objective is how to verify the NR CA reference sensitivity. In intra-band E-UTRA CA reference sensitivity testing, two extreme bandwidth combinations corresponding to Lowest NRB_agg Highest NRB_agg are selected. Highest NRB_agg is selected for inter band E-UTRA CA testing.

As a simplification the highest aggregated channel bandwidth is proposed to test NR CA reference sensitivity.

Proposal 3: Highest aggregated channel bandwidth combinations shall be selected for NR CA reference sensitivity measurement. (Highest NRB_agg).

B.6 Modulation selections

QPSK is used for both uplink and downlink modulations for E-UTRA reference sensitivity measurement which is the same as for E-UTRA standalone reference sensitivity testing. There is no particular reason to deviate from current E-UTRA configurations of modulation scheme selection. NR modulations shall also follow what is selected in standalone NR testing.

B.7 Examples

Example 1 (highest CC number has an exception that can be avoided):

- UE supports CA_XA-YA-ZA-RA (4DL CA)
 - CA_X-Y has an exception if testing Low+Low freq
 - CA_X-Y has no exception if testing Mid+Mid freq
 - Other bands pairs have no exception

Applicable Test cases for the example:

7.3A.1 2CC non-exception/"default"

Skip test (no fallback analysis required)

7.3B 3CC non-exception/“default”

Skip test (no fallback analysis required)

7.3A.3 4CC non-exception/“default”

Test CA_XA-YA-ZA-RA in Mid+Mid freq in bands X and Y respectively avoiding the exception

7.3A.1_1 2CC exception/“additional”

Test CA_X-Y in Low+Low freq

Example 2 (highest CC number has an exception that cannot be avoided):

- UE supports CA_XA-YA-ZA-RA (4DL CA)
 - CA_X-Y has an exception always (e.g. cross band isolation) with band Y being the victim
 - Other bands pairs have no exception

Applicable Test cases for the example:

7.3A.1 2CC non-exception/“default”

Skip test (no fallback analysis required)

7.3A.2 3CC non-exception/“default”

Skip test (no fallback analysis required)

7.3A.3 4CC non-exception/“default”

Test CA_XA-YA-ZA-RA and add exception in test requirements

Add test points for 3CC fallback avoiding the exception CA_YA-ZA-RA

7.3A.1_1 2CC exception/“additional”

Test CA_X-Y

B.8 Current test completion status per CA configuration

The completion status per EN-DC configuration is documented in clause 4.3.3.1.

B.9 Reference Sensitivity checklist for CA

The purpose of this annex is to facilitate the reference sensitivity test point analysis in TR 38.905 for NR CA configurations.

B.9.1 Checklist for two bands

- 1) Check if the 2 DL band configuration has reference sensitivity exceptions in the tables listed below:
 - UL Harmonic Distortion (HD), as defined in TS 38.101-1 [5], Table 7.3A.4-1.
 - RX Harmonic Mixing (HM), as defined in TS 38.101-1 [5], Table 7.3A.4-4 to Table 7.3A.4-4a.
 - Intermodulation Distortion (IMD), as defined in TS 38.101-1 [5], Table 7.3A.5-1 to Table 7.3A.5-1a.
 - Cross Band Isolation (CBI), as defined in TS 38.101-1 [5], Table 7.3A.6-1 to Table 7.3A.6-1b.

- 2) If reference sensitivity exceptions are found for two bands above:
 - Then add the result from the check to Table 4.1.3.1-2 for 2CC if they do not already exist.
 - Add test frequencies for HD, HM and CBI to Table 4.1.3.1-6 if a new 2CC band pair was added to Table 4.1.3.1-2.

Add two band test points to test case in TS 38.521-1 [2] Table 7.3A.1_1.4.1-1.

B.9.2 Checklist for three bands

- 1) Check all three band fallback configurations in accordance to B.9.1.
- 2) Check for any 3DL/2UL IMD reference sensitivity exceptions in TS 38.101-1 [5], Table 7.3A.5-2 to Table 7.3A.5-2a.
- 3) If exceptions are found for three bands above:
 - Then add the result from the check to Table 4.1.3.1-3: for three bands if they do not already exist.
 - Add three band test points to test case in TS 38.521-1 [2] Table FFS.

B.9.3 Checklist for four bands and five bands

- 1) Check all two band and three band fall backs in accordance to B.9.1 and B.9.2 above.

No reference sensitivity exceptions exists for four bands and five bands in TS 38.101-1 [5].

Annex C: Principles for test point selection for FR2 NR CA reference sensitivity test cases

FFS

Annex D: Principles for test point selection for EN-DC reference sensitivity test cases

D.1 General

The purpose of this Annex is to describe the test point selection of NR and E-UTRA carriers for RX sensitivity testing within FR1. Considering the high number of EN-DC band combinations, the procedure has been developed to carefully reduce the number of test points. Since the objective of TS 38.521-3 [4] specification is providing conformance testing requirement for NR in the case of EN-DC scenarios, the number of E-UTRA test points can be reduced.

TS 38.521-3 [4] include exception test cases and non-exception test cases for inter-band EN-DC with FR1. The exceptional test cases must be tested as per configurations defined in TS 38.521-3 [4]. The procedure covers selection of both non-exceptional case and exception cases.

When no NR or E-UTRA exception or additional requirements exist, the E-UTRA anchor is configured such that it does not interfere with NR operation (based on TS 38.101-3 [7] clause 6.1 and 7.1). The EN-DC testing is performed in E-UTRA anchor-agnostic mode. NR is tested but in SA as per TS 38.521-1 [2].

General initial conditions to be used for NR RX sensitivity testing are:

Table D.1-1: Initial test condition for standalone NR RX sensitivity

| Initial Conditions | | | | |
|---|------------------------|------------------|--|--------------------------------|
| Test Environment as specified in TS 38.508-1 [5] subclause 4.1 | | | Normal, TL/VL, TL/VH, TH/VL, TH/VH | |
| Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Low range, Mid range, High range | |
| Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1 | | | Lowest, Mid, Highest | |
| Test SCS as specified in Table 5.3.5-1 | | | Lowest supported SCS per test channel BW | |
| Test Parameters | | | | |
| Test ID | Downlink Configuration | | Uplink Configuration | |
| | Modulation | RB allocation | Modulation | RB allocation |
| 1 | CP-OFDM QPSK | Full RB (Note 1) | DFT-s-OFDM QPSK | REFERENCE SENSITIVITY (Note 2) |

D.2 Requirements

D.2.1 Defined EN-DC configurations

Downlink EN-DC configurations in 38.101-3 V16.5.0 clause 5.5B are:

Currently defined downlink EN-DC configurations in 38.101-3 [7] V16.6.0 clause 5.5B are:

- Intra-band contiguous EN-DC configurations within a single band includes max 2 NR CCs and max 3 E-UTRA CC, but in total max 4 CCs.
- Intra-band non-contiguous EN-DC configurations within a single band does not include NR CA (max 1NR CC), only E-UTRA CA (max 3 E-UTRA CC)
- Inter-band EN-DC configurations include up to 6 bands and 8 CCs but for NR the maximum is:
 - 2 NR CCs in 1 band (nXC or nX(2A))
 - 4 NR CCs in 2 bands (nXA-nYA, nXA-nYC, nXA-nY(2A), nX(2A)-nY(2A))
- Combinations of intra-band contiguous EN-DC + inter-band E-UTRA/NR CA.
- Combinations of intra-band non-contiguous EN-DC + inter-band E-UTRA/NR CA.

Currently defined uplink EN-DC configurations in TS 38.101-3 [7] V16.6.0 clause 5.5B are:

- The UL configuration contains at least 1 E-UTRA CC and 1 NR CC, meaning 2 UL CC.
- 3 UL CC configurations are also defined only with intra-band contiguous CA on either E-UTRA or NR (DC_XA-nYC or DC_XC-nYA).

D.2.2 Definition of exception requirements

Before going into the test case details, the term “exception” needs to be clarified since it is different for EN-DC compared to SA. We can have the following situations:

1. EN-DC config without exception
 - a. Anchor agnostic, only need to be tested for UE not supporting SA
2. EN-DC config with exception when the exception applies
 - b. Need to be tested for all EN-DC UEs
3. EN-DC config with exception when the exception does not apply (single carrier requirement applies)
 - c. Need to be tested for some exception types. Which exception types that need to this test coverage is defined in clause D.2.10.3.
 - d. In some cases, it is not possible to avoid the exception.
 - e. Anchor agnostic approach shall not be followed. It is important that E-UTRA aggressor is active to test performance when the interferer falls outside of the victim carrier

D.2.3 Reference sensitivity

Intra-band

Unlike for standalone NR, there are exceptions for intra-band operation, currently limited to band 3 for non-contiguous operation and band 71 for contiguous operation.

The exceptions in band 3 is due to 2UL intermodulation interference making it similar to the corresponding inter-band intermodulation case. This scenario did not happen in standalone NR mode due to that there is no UL CA defined for CA_n3(2A).

It can therefore be treated in the same way as inter-band intermodulation and added in the “additional” test case.

The intra-band contiguous exceptions are not expected to be very common. Currently only band 71 is affected, which can be added in the “additional” test case.

Inter-band

For both SA and NSA there are 4 different types of interference related to inter-band operation that results in refsens exception if the frequency relation of the exception is fulfilled.

Table D.2.3-1: Exception types for inter-band (2 bands)

| Exception types | Aggressor | Victim | Frequency relation |
|--|---------------------------------|--------------|--|
| UL harmonic interference (HD) | Low band UL | High band DL | $a \cdot f_{UL_LB} = f_{DL_HB}$ |
| Receiver Harmonic Mixing (HM) | Low band DL LO and High band UL | Low band DL | $b \cdot f_{DL_LB} + c \cdot f_{UL_HB} = f_{DL_LB}$ |
| Intermodulation due to Dual uplink (IMD) | Low band UL and High band UL | DL | $a \cdot f_{UL_LB} + c \cdot f_{UL_HB} = f_{DL_LB}$ or $a \cdot f_{UL_LB} + c \cdot f_{UL_HB} = f_{DL_HB}$ |
| Cross band isolation (CBI) | UL on other than victim band | DL | |

The exception requirements for dual uplink intermodulation apply only for a specified test frequency setting per UL configuration in TS 38.101-3 [7].

More details on how the exception requirements were derived can be found in TR 37.863 (Rel-15), TR 37.716 (Rel-16) and TR 37.817 (Rel-17). These TRs can be used to identify all the applicable requirements for a certain EN-DC configuration which are otherwise spread out over multiple sections in TS 38.101-3 [7]. Additionally, the TRs specify exactly which aggressors that contribute to the exception for IMD which is not defined in the TS. Some terminology from the mentioned TRs are re-used here to calculate test frequency for avoiding the exceptions, namely:

BW_{INT} : Effective bandwidth of the interference falling into the victim band.

F_{INT} : Interference centre frequency. If $|F_{INT}| \geq (BW_{INT} + BW_{victim})/2$ the interference is not overlapping the victim carrier and exception requirements do not apply.

It has been agreed that for SA tests all the interference types except intermodulation can be tested with 1UL. Doing the same for NSA would simplify the test cases and would also mean that the main interferer (the aggressor) can be tested with higher power.

Most other Rx requirements than reference sensitivity in intra-band contiguous EN-DC configuration require a configuration with 2UL however, meaning the “default” test cases need to be tested with 2UL active in this scenario

There are combinations of intra-band contiguous/non-contiguous EN-DC + inter-band E-UTRA/NR CA which are listed in the inter-band EN-DC configuration tables of T S38.101-3 [7]. These configurations do not add any exception requirements and are therefore proposed not to be tested unless they contain maximum number of NR CCs supported by the UE.

D.2.4 Rx requirements other than reference sensitivity

The requirements are in some cases referring back to standalone requirements in TS 36.101/ TS 38.101-1. In other cases, specific exceptions for EN-DC are defined in TS 38.101-3 [7]. This is summarized in Table 2.1.3-1.

Table D.2.4-1: Rx requirements

| Clause | Title | Requirement | | |
|--------|-------------------|-----------------------|---------------------------|---------------------------------|
| | | Intra-band contiguous | Intra-band non-contiguous | Inter-band |
| 7.4B | Max input level | Exception with 2UL | Standalone | Standalone |
| 7.5B | ACS | Exception with 2UL | Standalone | Standalone |
| 7.6B.2 | IBB | Exception with 2UL | Standalone | Standalone |
| 7.6B.3 | OBBB | Exception with 2UL | Standalone | Standalone (only 2 band needed) |
| 7.6B.4 | NBB | Exception with 2UL | Standalone | Standalone |
| 7.7B | Spurious response | Exception with 2UL | Standalone | Standalone (only 2 band needed) |
| 7.8B | Intermodulation | Exception with 2UL | Standalone | Standalone |
| 7.9B | Rx spurious | Standalone | Standalone | Standalone |

D.2.5 Test case structure and test coverage

As seen above, the EN-DC requirements are similar to the SA requirements from a structure point of view. Therefore, the same test case structure as for SA where test cases are separated into “default” and “additional” test cases can be considered for EN-DC which can greatly reduce complexity in TS 38.521-3[4] as well as reducing the need to complicated fallback test analysis. However, the additional complexity of EN-DC requirements means that a clear separation between exception (“additional”) test cases and “default” test cases is not as straightforward.

The following principles are suggested for EN-DC Rx test cases:

1. Let the 2CC test cases cover all reference sensitivity exceptions. Include test coverage of reference sensitivity when exception is avoided.
2. The 2CC test cases always need to be tested even for UE supporting more CCs since some of the exceptions are not covered in >2CC test cases.

3. Let the 3CC-5CC test cases cover mainly non-exception testing (anchor agnostic), including EN-DC not affected by exceptions and EN-DC affected by exceptions. 2UL 3 band intermodulation exceptions are tested in the 3CC test. Exceptions that 2CC fallback cannot cover are tested in 3CC test.
4. Highest number of NR CCs per band combination supported in the UE need to be tested. Anchor agnostic testing unless the EN-DC configuration has an exception requirement. Only 1 E-UTRA CC need to be tested for intra-band non-contiguous EN-DC and inter-band EN-DC. Maximum number of E-UTRA CCs need to be tested for intra-band contiguous EN-DC (1 band). This is further explained in clause 3.2.6.
5. Since requirements for 3UL and 2UL for the Rel-16 EN-DC configurations are the same there is no technical reason to test receiver requirements with 3UL configured. This may change in Rel-17 but will not have an impact on structure if we can add 3UL as new test points in existing tests.
6. The test configuration shall be with 1UL or 2UL active depending on the exception type as indicated in Table D.2.5-1.

Table D.2.5-1: UL configuration to test

| Exception type | Intra-band contiguous EN-DC | Intra-band non-contiguous EN-DC | Inter-band EN-DC |
|---|-----------------------------|------------------------------------|-----------------------|
| Intra-band contiguous (band 71) | 2UL ¹ | - | - |
| Intra-band non-contiguous (band 3) | - | 2UL ¹ | - |
| UL harmonics, Rx mixing, cross band isolation | - | - | 1UL |
| 2UL Intermodulation | - | - | 2UL ¹ |
| EN-DC config w/o exception | 2UL ² | 1UL (anchor agnostic) ³ | 1UL (anchor agnostic) |
| NOTE 1: Exception requirements apply only with 2UL and apply only for one test frequency/BW setting. NOTE 2: Other than refsens requirements in this configuration mandate 2UL NOTE 3: Requirements in this configuration mandate 2UL (TS 38.101-3, 7.1) unless UE supports only single UL. However, there is no Rel-16 configuration w/o exception where 2UL is supported meaning only 1UL is configured in the test case | | | |

7. Void
8. Other than reference sensitivity test cases should use the MSD=0 test points defined in reference sensitivity test case, or minimum achievable MSD. This is currently ensured by using anchor agnostic configuration for inter-band EN-DC, but other solutions are not precluded.
9. Test cases need to be defined from 2 up to 5 CCs for Rel-16. The number of CCs may increase in Rel-17. The reason for not needing more than 5CC is that it is sufficient to test max number of NR CCs as well as all defined exceptions.

D.2.6 EN-DC configurations to test

D.2.6.1 Lower order fallbacks

In E-UTRA specifications, the lower order CA fallback cases are important in the test point analysis. If requirements are the same in the lower order fallback, then the fallback can be skipped to save test time. The same principle can be applied for EN-DC, but there is a need to keep in mind that this is only for CA fallback and not EN-DC fallback. Additionally, lower order CA fallbacks can be split into E-UTRA CA fallbacks and NR CA fallbacks.

EN-DC fallback

EN-DC fallback does not need to be handled since this would mean falling back to pure E-UTRA operation, which is covered by TS 36.521-1 test cases.

E-UTRA CA fallback

Since it has been agreed to use anchor agnostic approach for EN-DC test cases (TS 38.521-3 [4], clause 4.6), it is enough to test with 1 E-UTRA CC unless more CCs are needed to test an exception requirement in TS 38.101-3 [7].

There are exception requirements in TS 38.101-3 [7] for intra-band-contiguous EN-DC (not reference sensitivity, but other Rx requirements as shown in clause D.2.3) meaning the maximum number of E-UTRA CCs need to be tested in this scenario.

E-UTRA CA fallback in intra-band contiguous EN-DC can result in change of EN-DC config from contiguous to non-contiguous (e.g. DC_(n)41DA -> DC_41C_n41A). This change means requirements are different, but since the non-contiguous requirement is same as the standalone requirement it does not need to be tested.

E-UTRA CA fallback in inter-band contiguous EN-DC can result in change of EN-DC config to intra-band contiguous (e.g. DC_1A-(n)41AA->DC_(n)41AA). This change means requirements are different, implying that both EN-DC config types may need to be tested. See clause D.2.6.2.

NR CA fallback

As shown in clause D.2.1, the maximum number of NR CCs for Rel-16 is 4, which only occurs in inter-band EN-DC (2 NR bands). The fallback to 2-3 NR CCs (2 bands) don't need to be tested since requirements are still the same. The fallback to single NR band with 1CC may need to be tested in the cases where the 2CC configuration had a reference sensitivity exception that is avoided in the higher order case.

Table D.2.6.1-1: EN-DC configurations requiring testing and max number of CCs

| Clause number | Title | Requirement coverage | EN-DC configuration type | | |
|---|---|---|---------------------------|---------------------------|--|
| | | | Intra-band cont EN-DC | Intra-band non-cont EN-DC | Inter-band EN-DC |
| 7.3B.2.1 | Reference sensitivity for Intra-band Contiguous EN-DC (2 CCs) | 1. Band n71 exceptions 2. standalone NR requirements | Yes | - | - |
| 7.3B.2.2 | Reference sensitivity for Intra-band non-contiguous EN-DC (2 CCs) | 1. Band n3 exceptions 2. standalone NR requirements | - | Yes | - |
| 7.3B.2.3 | Reference sensitivity for Inter-band EN-DC within FR1 (2 CCs) | 1. UL harmonics, harmonic mixing, cross band isolation, 2UL intermodulation (2 band) 2. standalone NR requirements | - | - | Yes |
| 7.3B.2.3_1.1 | Reference sensitivity for EN-DC within FR1 (3 CCs) | 1. standalone NR requirements, 2. 2UL intermodulation (3 band) | Yes (2E-UTRA+1NR, Note 1) | - | Yes (1E-UTRA+2NR, 2E-UTRA+1NR, Note 2) |
| 7.3B.2.3_1.2 | Reference sensitivity for EN-DC within FR1 (4 CCs) | standalone NR requirements | Yes (3E-UTRA+1NR, Note 1) | - | Yes (1E-UTRA+3NR, Note 4) |
| 7.3B.2.3_1.2 | Reference sensitivity for EN-DC within FR1 (5 CCs) | standalone NR requirements | - | - | Yes (1E-UTRA+4NR, Note 4) |
| NOTE 1: This is needed for other than refsens Rx test case that refers back to refsens test config table | | | | | |
| NOTE 2: For EN-DC configs affected by 2UL intermodulation, 2E-UTRA+1NR may need to be tested when E-UTRA CC1 is aggressor and E-UTRA CC2 is victim or when E-UTRA CC1 and CC2 are aggressors and NR CC is victim) | | | | | |
| NOTE 3: Void | | | | | |
| NOTE 4: Test of max number of NR CCs. Anchor agnostic testing. | | | | | |

D.2.6.2 EN-DC configurations requiring testing and max number of CCs

There is an issue in only requiring highest CC number to be tested, since this rule can only be applied within one EN-DC configuration type. For example, if the UE supports 3E-UTRA+1NR intra-band contiguous EN-DC and 1E-UTRA+2NR inter-band EN-DC, both configurations need to be tested for sufficient test coverage of core requirements. Another problem is that highest CC number to test within Inter-band EN-DC is not easy to determine it shall include 1 or 2 E-UTRA CCs, not more.

D.2.6.3 Test coverage

As explained in clause D.2.1 only certain configurations are specified in TS 38.101-3 [7].

Additionally, some configurations may not need to be tested for reasons like:

- 1) To test an exception, it is sufficient to test with fewer CCs (“No test needed” in tables below)
- 2) No exception requirement exists (“N/A” in tables below)
- 3) No such configuration is defined in TS 38.101-3[7] clause 5.5B (“N/A” in tables below)

For configurations that need to be tested, anchor agnostic approach can be used for E-UTRA when testing a non-exception requirement. In other cases, the E-UTRA carrier need to be fully configured.

The different cases that may happen for 3CC and 4CC configurations, and the proposed test coverage are listed in the tables below where the following general rules have been applied:

- Harmonic exceptions are only tested in the 2CC test and need not be considered in >2CC test cases. 2CC test cases are always run.
- Any inter-band EN-DC configuration with more than 2 E-UTRA bands will not be tested.
- Any inter-band EN-DC configuration with more than 1 E-UTRA CC per band will not be tested.

Table D.2.6.3-1: 3CC test coverage

| EN-DC type | E-UTRA CA | NR CA | Notation | Test coverage | | |
|------------|-----------|-------|----------|------------------------------------|---|---------------------|
| | | | | Non-exception test points (NOTE 4) | Exception test points (NOTE 5) | |
| | | | | No exception | UL harmonics, harmonic mixing, cross band isolation | 2UL intermodulation |
| | | | | | | |

| | | | | | | |
|---|----------------------|----------------------|------------------------------|---|--|--|
| Intra-band contiguous EN-DC (1 band) | No | Yes | DC_(n)XAB | N/A | N/A | N/A |
| | Yes | No | DC_(n)XCA | Test needed due to other than refsens exception in intra-band EN-DC | N/A | N/A |
| Intra-band non-contiguous EN-DC (1 band) | Yes (cont) | No | DC_XC_nXA | No test needed. Only 2CC need to be tested | N/A | N/A |
| | Yes (non-cont) | No | DC_XA-XA_nXA DC_XA_(n)XAA | No test needed. Only 2CC need to be tested | N/A | N/A |
| | No | Yes (cont) | Note 1 | N/A | N/A | N/A |
| | No | Yes (non-cont) | Note 1 | N/A | N/A | N/A |
| Inter-band EN-DC | No | Yes (intra-cont) | DC_XA_nYC | Test needed (if max NR CC) – anchor agnostic | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |
| | No | Yes (intra-non-cont) | DC_XA_nY(2A) | Test needed (if max NR CC) – anchor agnostic | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |
| | No | Yes (inter) | DC_XA_nYA-nZA | Test needed (if max NR CC) – anchor agnostic | Test needed (if exception involving 2 NR bands). 2CC need to be tested | Test needed (if IMD 3 band). 2CC need to be tested |
| | Yes (intra-cont) | No | DC_XC_nYA | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |
| | Yes (intra-non-cont) | No | DC_XA-XA_nYA | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |
| | Yes (inter) | No | DC_XA-YA_nZA | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested | Test needed if IMD(3 band). 2CC need to be tested. |
| | Yes (inter) | No | DC_XA-YA_nZA | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested | Test needed if IMD(3 band). 2CC need to be tested. |
| Inter-band + Intra-band contiguous EN-DC (2 band) | No | Yes | DC_(n)XAA-nYA | Test needed (if max NR CC) – anchor agnostic | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |
| | Yes | No | DC_XA-(n)YAA | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |
| Inter-band + Intra-band non-contiguous EN-DC (2 band) | No | Yes | DC_XA_nXA-nYA | Test needed (if max NR CC) – anchor agnostic | Test needed (if exception involving 2 NR bands). 2CC need to be tested | No test needed. Only 2CC need to be tested |
| | Yes | No | DC_XA-YA_nYA | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |

NOTE 1: No such config in TS 38.101-3 [7] V16.5.0

NOTE 2: CC BW class C is indicated in the table. The same rules apply to BW class B

NOTE 3: Different test coverage is indicated by colour coding in this table.

NOTE 4: Applicable to both EN-DC configurations not affected by any exception and EN-DC configurations affected by exceptions, corresponding to Table 7.3B.2.3_1.1.4.1-0 in TS 38.521-3.

NOTE 5: Only applicable to EN-DC configurations affected by exceptions, including UL harmonics, harmonic mixing, cross band isolation and 2UL intermodulation, corresponding to Table 7.3B.2.3_1.1.4.1-1 in TS 38.521-3.

Table D.2.6.3-2: 4CC test coverage

| EN-DC type | E-UTRA CA | NR CA | Notation | Test coverage | |
|------------|-----------|-------|----------|------------------------------------|--------------------------------|
| | | | | Non-exception test points (NOTE 4) | Exception test points (NOTE 5) |
| | | | | | |

| | | | | No exception | UL harmonics, harmonic mixing, cross band isolation | 2UL intermodulation |
|---|-----------------|----------------|---|---|---|---|
| Intra-band contiguous EN-DC (1 band) | No | Yes | NOTE 1 | N/A | N/A | N/A |
| | Yes | No | DC_(n)XDA | Test needed due to other than refsens exception in intra-band EN-DC | N/A | N/A |
| Intra-band non-contiguous EN-DC (1 band) | Yes (cont) | No | DC_XD_nXA | No test needed. Only 2CC need to be tested | N/A | N/A |
| | Yes (non-cont) | No | NOTE 1 | N/A | N/A | N/A |
| | No | Yes (cont) | NOTE 1 | N/A | N/A | N/A |
| | No | Yes (non-cont) | NOTE 1 | N/A | N/A | N/A |
| Inter-band EN-DC | No | Yes (cont) | NOTE 1 | N/A | N/A | N/A |
| | No | Yes | DC_XA_nY(2A)-nZA | Test needed (if max NR CC) – anchor agnostic | No test needed. Only 2CC need to be tested | No test needed. 2CC need to be tested. 3CC need to be tested if IMD(3 band) |
| | No | Yes | DC_XA_nYA-nZC | Test needed (if max NR CC) – anchor agnostic | No test needed. Only 2CC need to be tested | No test needed. 2CC need to be tested. 3CC need to be tested if IMD(3 band) |
| | Yes (all types) | No | DC_XD_nYA, DC_XA-YC_nZA, DC_XA-XA-YA_nZA, DC_XA-YA-ZA_nRA | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested | No test needed. 2CC need to be tested. 3CC need to be tested if IMD(3 band) |
| | Yes (all types) | Yes (cont) | DC_XC_nYC, DC_XA-XA_nYC, DC_XA-YA_nYC | No test needed. 3CC need to be tested if max NR CC | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |
| | | Yes (non-cont) | DC_XC_nY(2A), DC_XA-YA_nY(2A) | No test needed. 3CC need to be tested if max NR CC | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |
| | | Yes (inter) | DC_XC_nYA-nZA, DC_XA-XA_nYA-nZA, DC_XA-YA_nZA-nRA | No test needed. 3CC need to be tested if max NR CC | No test needed. Only 2CC need to be tested | No test needed. 2CC need to be tested. 3CC need to be tested if IMD(3 band) |
| Inter-band + Intra-band contiguous EN-DC (2-3 band) | No | Yes | NOTE 1 | N/A | N/A | N/A |
| | Yes | No | DC_XA-YA_(n)ZAA, DC_XC_(n)YAA | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |
| | Yes | Yes | DC_(n)XCA-nYA | No test needed. 3CC need to be tested if max NR CC | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested |
| Inter-band + Intra-band non-contiguous EN-DC (2-3 band) | No | Yes | NOTE 1 | N/A | N/A | N/A |
| | Yes | No | DC_XA-YA-ZA_nZA | No test needed. Only 2CC need to be tested | No test needed. Only 2CC need to be tested | No test needed. 2CC need to be tested. 3CC need to be tested if IMD(3 band) |
| | Yes | Yes | DC_XA-YA_nYA-nZA | No test needed. 3CC need to be tested if max NR CC | No test needed. Only 2CC need to be tested | No test needed. 2CC need to be tested. 3CC need to be tested if IMD(3 band) |

NOTE 1: No such config in TS 38.101-3 [7] V16.5.0
NOTE 2: 2CC BW class C is indicated in the table. The same rules apply to BW class B
NOTE 3: Different test coverage is indicated by colour coding in this table.
NOTE 4: Applicable to both EN-DC configurations not affected by any exception and EN-DC configurations affected by exceptions, corresponding to Table 7.3B.2.3_1.2.4.1-1.
NOTE 5: Only applicable to EN-DC configurations affected by exceptions, including UL harmonics, harmonic mixing, cross band isolation and 2UL intermodulation.

D.2.7 Test Environment

The test environment for FR1 EN-DC RX sensitivity measurement is Normal, TL/VL, TL/VH, TH/VL, TH/VH (same as for NR CA).

D.2.8 Test Frequencies selections for EN-DC

In E-UTRA DL CA and UL CA reference sensitivity testing, Low range and High range are selected for intra-band CA testing. Mid-range is selected for inter band E-UTRA CA testing.

In standalone NR CA reference sensitivity testing, Low and High Range are tested as default for intra-band and Mid-range for inter-band. For CA combinations containing intra-band configuration in an inter-band CA configuration, low and high range are tested for intra-band CA and mid channel for inter-band without intra-band component.

The same principle shall apply for EN-DC testing.

For EN-DC configurations affected by exceptions, the test frequency cannot be freely chosen. One test frequency per exception requirement is sufficient to test the requirement. This is indicated in Table D.2.8-1 following the frequency relation formulas defined in clause D.2.3. Exceptions in TS 38.101-3 clause 7.3A.5 (2UL intermodulation) are not specified since the test frequency and channel bandwidth is already specified in TS 38.101-1.

Table D.2.8-1: Test frequency selection per band pair for exceptions avoidable by test frequency setting (UL harmonics, Rx mixing, cross band isolation)

| Band set (Note 2) | Frequency | Channel BW [MHz] | Exception type | Comments |
|------------------------|-----------------------------|--------------------------------------|------------------------------|--|
| 1A / n3A | Mid/Mid | Highest/Highest | - | Non-Exception. |
| | Low/High | 20 / 40 | Cross band isolation | Exception in TS 38.101-3 table 7.3B.2.3.4-1 |
| 1A/77A | UL 1950/ DL 3900 | 20/100 | UL Harmonic Interference | Exception Note 2 and 13 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | UL 1950/ DL 3870 | 20/20 | UL Harmonic Interference | Exception Note 3 and 13 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | UL 1950/UL 4090.005 | 5/5 | Dual UL intermodulation | Exception in TS 38.101-3 Table 7.3B.2.3.5.1-1 |
| | UL 1950/ UL3709.005 | 5/5 | Dual UL intermodulation | Exception in TS 38.101-3 Table 7.3B.2.3.5.1-1 |
| 2A / n41A | High/Low | 20/100 | Cross band isolation | Exception in TS 38.101-3 table 7.3B.2.3.4-1 |
| 2A/71A | DL1980 MHz/ UL665.5 MHz | 20/5 | UL Harmonic Interference | Exception Note 11 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | DL1980 MHz/ UL673 MHz | 20/10 | UL Harmonic Interference | Exception Note 12 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | UL1881 MHz/UL Low | 20/20 | Receiver Harmonic Mixing | Exception Note 4 in TS 38.101-3 Table 7.3B.2.3.2-1 |
| 2A/n77A | UL 1860 MHz / DL 3720 MHz | 20/100 | UL Harmonic Interference | Exception Note 2, 13 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | UL 1860 MHz / DL 3700 MHz | 20/20 | UL Harmonic Interference | Exception Note 3 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | DL Mid (1960) / UL 3920 | 20/100 | Receiver harmonic mixing HM2 | Receiver Harmonic Mixing Exception in TS38.101-3 Table 7.3B.2.3.2-1 |
| | UL 1860 MHz / DL 3400 MHz | | | HD avoid |
| | DL 1950 / UL 4000 | 20/100 | | HM avoid |
| 2A/78A | DL 3740 MHz / UL 1870 MHz | Highest (20 MHz) / Highest (100 MHz) | UL Harmonic Interference HD2 | Exception Note 2, 13 of TS38.101-3 table 7.3B.2.3.1-1 |
| | DL 3740 MHz / UL 1885 MHz | 20 MHz) / Highest (20 MHz) | UL Harmonic Interference HD2 | Exception Note 3 of TS38.101-3 table 7.3B.2.3.1-1 |
| 3A / n1A | Mid/Mid | Highest/Highest | - | Non-Exception. |
| | High/Low | 20 / 20 | Cross band isolation | Exception in TS 38.101-3 table 7.3B.2.3.4-1 |
| 3A / n41A | | | | CMCC CR R5-205929 |
| 3A / n77A 3A / n78A | Mid/High | Highest/Highest | - | Non-Exception. |
| | Mid/3495 | Highest/Highest | UL Harmonic Interference | Exception Note 2 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | Mid/3525 | 20/20 | UL Harmonic Interference | Exception Note 3 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | Mid /3685.005 | 20/20 | Receiver Harmonic Mixing | Receiver Harmonic Mixing Exception in TS 38.101-3 Table 7.3B.2.3.2-1 |
| | Low/High | 20/20 | | Receiver Harmonic Mixing avoided |
| | UL 1740/ UL3574.995 | 5/10 | Dual UL intermodulation | Exception in TS 38.101-3 Table 7.3B.2.3.5.1-1 |
| | UL 1765/ UL 3435 | 5/10 | Dual UL intermodulation | Exception in TS 38.101-3 Table 7.3B.2.3.5.1-1 |
| 5A/n77A | UL 829 MHz / DL 3316 MHz | 10/100 | UL Harmonic Interference | Exception Note 6, 7, 17 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | UL 829 MHz / DL 4145 MHz | 10/100 | UL Harmonic Interference | Exception Note 4, 5, 17 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | UL 840 MHz/DL 3600 MHz | 10/100 | | HD avoid |
| 5A/n78A | UL 840 MHz / DL 3360 MHz | 10/100 | UL Harmonic Interference | Exception Note 6, 7, 17 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | UL 840 MHz / DL 3560.01 MHz | 10/100 | | HD avoid |

| | | | | |
|----------------------------------|----------------------------------|--------------------------------------|------------------------------|---|
| | UL 844 MHz/UL 3421.005 MHz | 5/10 | Dual UL intermodulation | Exception in TS 38.101-3 Table 7.3B.2.3.5.1-1 |
| 7A / n78A | High/Low | 20/100 | Cross band isolation | Exception in TS 38.101-3 table 7.3B.2.3.4-1 |
| 8A /n77A 8A/n78A | Mid (UL 897.5 MHz) / 3590.01 | Highest (10 MHz) / Highest (100 MHz) | UL Harmonic Interference HD4 | Exception Note 7 of TS38.101-3 table 7.3B.2.3.1-1 |
| | Mid (UL 897.5 MHz) / 3520.005 | Highest (10 MHz) / Highest (100 MHz) | | Non-Exception. Not overlapping interference since $BW_{INT}=40$ MHz, $F_{INT} = (40+100)/2 = 70$ |
| 8A / n79A | UL 897.5/ UL 3634.995 | 5/40 | Dual UL intermodulation | Exception in TS 38.101-3 Table 7.3B.2.3.5.1-1 |
| | UL 900/DL 4500 | 10/100 | UL Harmonic Interference | Exception Note 4 nad 5 of TS38.101-3 table 7.3B.2.3.1-1 |
| | UL 900/DL 4299.99 | 10/100 | | HD avoid |
| 11A / n79A | UL 897.5/ UL 4532.505 | 5/40 | Dual UL intermodulation | Exception in TS 38.101-3 Table 7.3B.2.3.5.1-1 |
| | Mid (DL 1485.9 MHz) / 4457.7 | Highest (10 MHz) / Highest (100 MHz) | Receiver Harmonic Mixing HM3 | Receiver Harmonic Mixing Exception in TS38.101-3 Table 7.3B.2.3.2-1 |
| 11A / n79A | Mid (DL 1485.9 MHz) / 4512.7 MHz | Highest (10 MHz) / Highest (100 MHz) | | Non-Exception. Not overlapping interference since $BW_{INT}=100$ MHz, $F_{INT} = (100+10)/2 = 55$ |
| | UL 782 MHz / DL 3910 MHz | 10/100 | UL Harmonic Interference | Exception Note 4, 5 of TS 38.101-3 table 7.3B.2.3.1-1 |
| 13A/n77A | DL Mid (751) / UL 3755 | 10/100 | Receiver harmonic mixing | Receiver Harmonic Mixing Exception in TS38.101-3 Table 7.3B.2.3.2-1 |
| | UL 782 MHz /DL 3600 MHz | 10/100 | | HD avoid |
| | DL 751 / UL 3950 | 10/100 | | HM avoid |
| | DL 884 MHz / Low (4420.02 MHz) | 10 MHz / 40 MHz | Receiver Harmonic Mixing HM3 | Receiver Harmonic Mixing Exception in TS38.101-3 Table 7.3B.2.3.2-1 |
| 19A / n79A | DL 884 MHz / Low (4445.02 MHz) | 10 MHz / 40 MHz | | Non-Exception. Not overlapping interference since $BW_{INT}=40$ MHz, $F_{INT} = (40+10)/2 = 25$ |
| | Mid/Mid | Highest/Highest | - | Non-Exception. |
| 20A / n78A | Mid/3388 | Highest/Highest | UL Harmonic Interference | Exception Note 7 of TS 38.101-3 table 7.3B.2.3.1-1 |
| | DL 1506/UL4518 | 20/100 | Receiver Harmonic Mixing HM3 | Receiver Harmonic Mixing Exception in TS38.101-3 Table 7.3B.2.3.2-1 |
| 21A / n79A | DL 1506/ UL 4800 | 20/100 | | Receiver Harmonic Mixing avoid |
| | UL 1457.5/UL 4420.5 | 5/40 | Dual UL intermodulation | Exception in TS 38.101-3 Table 7.3B.2.3.5.1-1 |
| | High (UL 841.5 MHz) / 2524.5 MHz | Highest (15 MHz) / 50 MHz | UL Harmonic Interference HD3 | Exception Note 9 of TS38.101-3 table 7.3B.2.3.1-1 |
| 26A / n41A | High (UL 841.5 MHz) / 2572 MHz | Highest (15 MHz) / 50 MHz | | Non-Exception. Not overlapping interference since $BW_{INT}=45$ MHz, $F_{INT} = (45+50)/2 = 47.5$ |
| | High (UL 841.5 MHz) / 3366 MHz | Highest (15 MHz) / Highest (100 MHz) | UL Harmonic Interference HD4 | Exception Note 7 of TS38.101-3 table 7.3B.2.3.1-1 |
| 26A / n77A 26A / n78A | High (UL 841.5 MHz) / 3446 MHz | Highest (15 MHz) / Highest (100 MHz) | | Non-Exception. Not overlapping interference since $BW_{INT}=60$ MHz, $F_{INT} = (60+100)/2 = 80$ |
| | High (DL 886.5 MHz) / 4432.5 MHz | Highest (15 MHz) / 60 MHz | Receiver Harmonic Mixing HM5 | Receiver Harmonic Mixing Exception in TS38.101-3 Table 7.3B.2.3.2-1 |
| 26A / n79A | High (DL 886.5 MHz) / 4470.5 MHz | Highest (15 MHz) / 60 MHz | | Non-Exception. Not overlapping interference since $BW_{INT}=60$ MHz, $F_{INT} = (60+15)/2 = 37.5$ |
| | Low/Mid | Highest/Highest | - | Non-Exception. |
| 40A / n78A | | | | |

| | | | | |
|--|---------------------------------|--------------------------------------|------------------------------|---|
| | Mid/3525 | 20/20 | Receiver Harmonic Mixing | Receiver Harmonic Mixing Exception Note 8 in TS38.101-3 Table 7.3B.2.3.2-1 |
| 41A / n77A 41A / n78A | Low (DL 2593 MHz) / 3750 MHz) | Highest (20 MHz) / Highest (100 MHz) | Receiver Harmonic Mixing HM4 | Receiver Harmonic Mixing Exception in TS38.101-3 Table 7.3B.2.3.2-1 |
| | Mid (DL 2593 MHz) / 3974.5 MHz) | Highest (20 MHz) / Highest (100 MHz) | Cross band isolation | Not overlapping HM interference since $BW_{INT}=240$ MHz, $F_{INT} = (240+100)/2 = 170$ |
| | Mid / Mid | Highest / Highest | - | Non-Exception only possible with 1UL in band 41 |
| 48A/n 66A | DL 3557,6 MHz/ UL 1778.8 MHz | Highest (20 MHz) / Highest (400 MHz) | UL Harmonic Interference HD2 | Exception Note 2, 13 of TS38.101-3 table 7.3B.2.3.1-1 |
| | DL 3581.0 MHz/ UL 1777.5 MHz | Highest (20 MHz) / Highest (400 MHz) | UL Harmonic Interference HD2 | Exception Note 3 of TS38.101-3 table 7.3B.2.3.1-1 |
| 66A /n77A | UL 1720 MHz / DL 3440 MHz | 20/100 | UL Harmonic Interference | Exception Note 2, 13 of TS38.101-3 table 7.3B.2.3.1-1 |
| | UL 1720 MHz / DL 3420 MHz | 20/20 | UL Harmonic Interference | Exception Note 3 of TS38.101-3 table 7.3B.2.3.1-1 |
| | UL 1720 MHz / DL 3600 MHz | 20/100 | | HD avoid |
| 66A /n78A | DL 3510 MHz/ UL 1755 MHz | Highest (20 MHz) / Highest (100 MHz) | UL Harmonic Interference HD2 | Exception Note 2, 13 of TS38.101-3 table 7.3B.2.3.1-1 |
| | DL 3480 MHz/ UL 1755 MHz | Highest (20 MHz) / Highest (100 MHz) | UL Harmonic Interference HD2 | Exception Note 3 of TS38.101-3 table 7.3B.2.3.1-1 |
| NOTE 1: This selection is used in test case 7.3B.2.3 unless otherwise stated | | | | |
| NOTE 2: Aggressor band in bold | | | | |

For EN-DC configurations affected by IMD exceptions where the exception is avoided, the test frequency and bandwidth are FFS.

D.2.9 Test EN-DC channel bandwidth

D.2.9.1 Test point selection EN-DC configuration without exception

Follow similar arguments for frequency selection, for regular inter-band EN-DC and intra-band non-contiguous testing, the NR channel bandwidths shall follow what is specified in SA scenario. Since the objective is to test NR performance, it is sufficient to select 5 MHz channel bandwidth for E-UTRA carrier, which is common for all E-UTRA bands.

For intra-band contiguous EN-DC testing, the highest bandwidth is selected for E-UTRA carrier and NR carrier, respectively.

D.2.9.2 Test point selection EN-DC configuration with exception

For inter-band EN-DC configuration with exception requirement due to UL harmonics, Rx mixing and cross band isolation, the highest channel bandwidth shall be tested for E-UTRA and NR carrier.

For inter-band EN-DC configuration with exception requirement due to 2UL intermodulation, the test channel bandwidth selection for both NR and E-UTRA are EN-DC combo dependent. There are fixed channel bandwidth pairs required for these exceptional test scenarios.

For intra-band EN-DC configuration with exception requirement, the test channel bandwidth selection for both NR and E-UTRA are EN-DC combo dependent. There are fixed channel bandwidth pairs required for these exceptional test scenarios.

Only 5 MHz channel bandwidth shall be employed by E-UTRA band, Lowest, Mid, Highest channel bandwidth shall be selected for NR carrier for EN-DC non- exceptional testing.

D.2.10 RB allocation and RB location selections

D.2.10.1 Test point selection EN-DC configuration without exception

Following the E-UTRA anchor-agnostic proposed in R5-185916 [6], E-UTRA operation does not interfere with NR connection, 0 RB were proposed for both UL and DL channels for non-exceptional test scenarios.

There is no reason to deviate from current NR configurations for RB allocation selection employed in standalone testing.

D.2.10.2 Test point selection EN-DC configuration with exception when exception applies

For EN-DC inter-band and intra-band EN-DC exceptional test scenarios, the RB allocation for both NR and E-UTRA are selected as specified in TS 38.101-3 [7] for the EN-DC band combination.

Based on the E-UTRA anchor-agnostic approach, 0 RB shall be used for both UL and DL channels for non-exceptional test scenarios. RB allocation for NR carrier in inter-band EN-DC non-exceptional testing shall follow what is selected for standalone testing.

D.2.10.3 Test point selection EN-DC configuration with exception when exception does not apply

According to the test principle outlined in clause D.2.5, there is a need to verify the UE performance when the exception is avoided and MSD=0 dB applies. Detailed background can be found in [9].

The calculation of test frequency for avoiding exceptions is presented in clause 2.5. The UL configuration also need to be determined and may be with one or two simultaneous UL CCs depending on the scenario.

For HD and HM exceptions when the victim band is TDD there is no need from an interference point of view to have UL active on the victim band, meaning this can be verified with 1UL. The same can apply for EN-DC configurations where single switched Tx is allowed. In the case of FDD victim band when 2UL is mandatory, both UL CCs should be active since this represents the worst case.

For CBI exceptions the requirements are defined in two different ways depending on the EN-DC configuration:

1. Exception applies for any frequency separation as long as aggressor UL is active. In this case, the only way to avoid the exception is to not have UL active on the aggressor band. The test point then becomes very similar to the standalone test and then does not need to be tested for a SA and NSA capable UE. Therefore, CBI exception avoiding could not be tested for this kind of combinations.
2. Exception applies only if separation is small. Just like for HD and HM exceptions, the exception can be avoided by configuring a larger separation with aggressor signal still active.

For 2-band IMD exceptions, the exception is avoided by changing the frequency of one of the CCs such that the intermodulation does not overlap with the victim CC anymore. In the case of multiple IMD affecting the same victim band, only the worst case IMD may be tested. However, in TS 38.101-3[7], there is no general criteria in which REFSSENS can be fulfilled with MSD=0 for the EN-DC combinations which have MSD exceptions due to IMD interference (2 UL active). The 2-band IMD exception avoiding testing is still FFS in TS 38.521-3[4].

For 3-band IMD exceptions there are a separate set of IMD depending on the UL configuration (selecting 2UL among 3 bands gives two cases). Within a UL configuration, the same test point selection as for 2-band IMD can be used.

D.2.11 Modulation scheme selections

The modulation scheme for both non-exceptional and exceptional EN-DC intra-band and inter-band test scenarios are selected as:

- For E-UTRA: QPSK (same as used for E-UTRA reference sensitivity testing in TS 36-521-1 [9])
- For NR: Use same modulation scheme as used for NR standalone testing.

D.2.12 Current test completion status per EN-DC configuration

The completion status per EN-DC configuration is documented in clause 4.3.3.1.

Annex B: Change history

| Change history | | | | | | | |
|----------------|--------------------|-----------|------|---------|-----|---|----------------|
| Date | Meeting | TDoc | CR | R ev | Cat | Subject/Comment | New version |
| 2017-09 | RAN5#76 | R5-174704 | - | - | - | Draft skeleton TR 38.905 | 0.0.1 |
| 2018-04 | RAN5#2-5G-NR Adhoc | R5-181954 | - | - | - | <p>Agreed Text Proposal in RAN5#2-5G-NR Adhoc: R5-181889, " TP to update TR 38.905 with information on test point analysis "</p> <p>Agreed Test Point Analysis in RAN5#78: R5-180885, "Discussion on test point selection for NR Occupied Bandwidth in FR1" R5-180886, "Discussion on test point selection for NR SEM in FR1" R5-180887, "Discussion on test point selection for NR ACLR in FR1" R5-181524, "Discussion on test point selection for Absolute Power Tolerance in FR1" R5-181525, "Discussion on test point selection for Aggregate Power Tolerance in FR1"</p> <p>Agreed Test Point Analysis in RAN5#2-5G-NR Adhoc: R5-182019, "Discussion of NR FR1 Test Point for TX Spurious Emission test cases " R5-182024, "Discussion on test point selection for NR Frequency Error in FR1" R5-181830, "Discussion on test point selection for Maximum Output Power in FR1" R5-181831, "Discussion on test point selection for Minimum Output Power in FR1" R5-181832, "Discussion on test point selection for General ON/OFF Time Mask in FR1" R5-181879, "Discussion on test point selection for NR In-Band in FR1" R5-181880, "Discussion on test point selection for NR ACS in FR1" R5-182025, "Discussion on test point selection for NR Frequency Error in FR1"</p> <p>R5-181905, "Discussion on test point selection for NR Occupied Bandwidth in FR2" R5-182030, "Discussion on test point selection for NR ACLR in FR2" R5-182042, "Discussion on test point selection for NR In-Band blocking in FR2" R5-182044, "Discussion on test point selection for NR ACS in FR2"</p> | 0.1.0 |
| 2018-05 | RAN5#79 | R5-183078 | - | - | - | <p>Document title corrected.</p> <p>Agreed Text Proposal in RAN WG5#79: R5-183963, "Test Point analysis for FR1 RefSens test case"</p> | 0.2.0 |
| 2018-08 | RAN5#80 | R5-185134 | - | - | - | <p>R5-184923, "Test Point analysis for FR2 RefSense test case" R5-184961, "TP for updating TR 38.905 with FR2 Frequency Error test point analysis" R5-185307, "TP for updating TR38.905 with FR1 AMPR test point analyses with NS_35" R5-185309, "Test Point analysis for FR1 Configured Output Power for SUL" R5-185311, "TP for updating TR 38.905 with FR1 Carrier Leakage test point analysis" R5-185314, "TP for updating TR 38.905 with FR1 EVM equalizer spectrum flatness test point analysis" R5-185316, "TP for updating TR 38.905 with FR1 Frequency Error test point analysis" R5-185412, "TP for updating TR 38.905 with EVM test point analysis" R5-185491, "Test Point analysis for FR2 TxSpurious test case" R5-185215, "TP for updating TR 38.905 with FR2 SEM test point analysis" R5-185334, "Discussion of LTE Test point selection for EN-DC with FR1 Tx Spurious emission Test" R5-185301, "Discussion on test point selection for NR Out-of-band in FR1" R5-185423, "Discussion on Uplink configuration for NR Transmit Intermodulation in FR1" R5-185216, "TP for updating TR38.905 with UE AMPR for NS_04 Intra-band contiguous EN-DC" R5-185319, "TP for updating TR 38.905 with FR1 In-band Emissions test point analysis"</p> | 1.0.0 |
| 2018-09 | RAN#81 | - | - | - | - | raised to v15.0.0 with editorial changes only | 15.0.0 |
| 2018-12 | RAN#82 | R5-186454 | 0016 | - | F | TP analysis for test case 6.5.2.4.2 | 15.1.0 |
| 2018-12 | RAN#82 | R5-186455 | 0017 | - | F | TP analysis for EN-DC test case 6.2B.2.3 | 15.1.0 |

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|---------|--------|-----------|------|---|---|--|--------|
| 2018-12 | RAN#82 | R5-186609 | 0018 | - | F | TP_analysis for TX spurious emission UE co-existence for intra-band contiguous EN-DC with FR1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-186610 | 0019 | - | F | TP analysis for Reference sensitivity for Intra-band Contiguous EN-DC with FR1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-186611 | 0020 | - | F | TP analysis for Reference sensitivity for Inter-band EN-DC with FR1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-186674 | 0021 | - | F | Test point analysis for AMPR Intra-band contiguous EN-DC in FR1 for NS_35 | 15.1.0 |
| 2018-12 | RAN#82 | R5-186710 | 0022 | - | F | TP analysis for test case 6.2B.2.4, UE Maximum Output Power reduction for Inter-Band EN-DC including FR2 | 15.1.0 |
| 2018-12 | RAN#82 | R5-186791 | 0028 | - | F | TP analysis OBW intraband contiguous EN-DC | 15.1.0 |
| 2018-12 | RAN#82 | R5-186792 | 0029 | - | F | TP analysis SEM intraband contiguous EN-DC | 15.1.0 |
| 2018-12 | RAN#82 | R5-187035 | 0031 | - | F | Update test points analysis for multiple FR1 test cases | 15.1.0 |
| 2018-12 | RAN#82 | R5-187396 | 0037 | - | F | Update of TR 38.905 with SA FR1 A-MPR test point analyses, NS_04 | 15.1.0 |
| 2018-12 | RAN#82 | R5-188240 | 0039 | 1 | F | Update of TR 38.905 with EN-DC A-MPR test point analyses, NS_04 | 15.1.0 |
| 2018-12 | RAN#82 | R5-188227 | 0041 | 1 | F | Test Point analysis for FR2 Maximum Output Power | 15.1.0 |
| 2018-12 | RAN#82 | R5-187489 | 0042 | - | F | TP analysis for FR1 test case 6.3.4.3, relative power tolerance | 15.1.0 |
| 2018-12 | RAN#82 | R5-187582 | 0043 | - | F | Discussion on test point selection for EVM in FR2 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187583 | 0044 | - | F | Discussion on test point selection for Carrier Leakage in FR2 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187584 | 0045 | - | F | Update of test point selection for EVM equalizer spectrum flatness in FR1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187587 | 0046 | - | F | Discussion on test point selection for In-band Emissions in FR2 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187589 | 0047 | - | F | Discussion on test point selection for EVM equalizer spectrum flatness in FR2 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187593 | 0048 | - | F | Discussion on test point selection for EVM equalizer spectrum flatness for Pi/2 BPSK in FR1 | 15.1.0 |
| 2018-12 | RAN#82 | R5-187806 | 0023 | 1 | F | Test Point analysis for FR1 7.4 Maximum input level | 15.1.0 |
| 2018-12 | RAN#82 | R5-187808 | 0035 | 1 | F | TP analysis for receiver spurious emission tests for FR1 SA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187809 | 0036 | 1 | F | TP analysis for wideband intermodulation tests for FR1 SA | 15.1.0 |
| 2018-12 | RAN#82 | R5-187817 | 0033 | 1 | F | TP analysis for receiver spurious emission tests for FR1 inter-band EN-DC | 15.1.0 |
| 2018-12 | RAN#82 | R5-187818 | 0034 | 1 | F | TP analysis for wideband intermodulation tests for FR1 inter-band EN-DC | 15.1.0 |
| 2018-12 | RAN#82 | R5-187836 | 0025 | 1 | F | Test Point analysis for FR2 7.4 Maximum input level | 15.1.0 |
| 2018-12 | RAN#82 | R5-187907 | 0024 | 1 | F | Test Point analysis for FR1 MPR test case | 15.1.0 |
| 2019-03 | RAN#83 | R5-191257 | 0077 | - | F | Test Point analysis for TC 6.3.3.4 PRACH time mask in FR1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191260 | 0078 | - | F | Test Point analysis for NR Narrow band in FR1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191261 | 0079 | - | F | Test Point analysis for NR spurious response in FR1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191337 | 0081 | - | F | Adding test case 6.2B.2.1 to 38.905 | 15.2.0 |
| 2019-03 | RAN#83 | R5-191678 | 0086 | - | F | Addition of TP analysis of FR2 6.3.1 Minimum output power | 15.2.0 |
| 2019-03 | RAN#83 | R5-191811 | 0087 | - | F | Test Point analysis update for FR2 TxSpurious test case | 15.2.0 |
| 2019-03 | RAN#83 | R5-191855 | 0091 | - | F | TP_analysis_38.905_6.5.3.1_TX_SpurEmission | 15.2.0 |
| 2019-03 | RAN#83 | R5-192002 | 0104 | - | F | Adding test case 7.4B.1 to 38.905 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192003 | 0105 | - | F | Adding test case 7.4B.2 to 38.905 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192007 | 0106 | - | F | Adding test case 6.2B.1.1 to 38.905 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192008 | 0107 | - | F | Adding test case 6.2B.1.2 to 38.905 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192009 | 0108 | - | F | Adding test case 6.2B.1.3 to 38.905 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192239 | 0116 | - | F | TP analysis of FR1 time alignment error for UL MIMO | 15.2.0 |
| 2019-03 | RAN#83 | R5-192401 | 0085 | 1 | F | Addition of TP analysis of FR1 6.2.4 Configured transmitted power | 15.2.0 |
| 2019-03 | RAN#83 | R5-192404 | 0099 | 1 | F | TP analysis for FR1 6.5A.2.4.1.1 NR ACLR for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-192405 | 0100 | 1 | F | TP analysis for FR1 6.5A.2.4.2.1 UTRA ACLR for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-192406 | 0103 | 1 | F | TP analysis for FR1 6.5A.4.1 Transmit intermodulation for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-192410 | 0110 | 1 | F | Update of TP analysis of FR1 6.3.1 Minimum Output Power | 15.2.0 |
| 2019-03 | RAN#83 | R5-192444 | 0113 | 1 | F | Addition of TP analysis for EN-DC 6.2B.4.1.3 Configured transmitted power inter-band within FR1 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192449 | 0080 | 1 | F | Adding FR2 test case 6.3.4.3 to 38.905 | 15.2.0 |
| 2019-03 | RAN#83 | R5-192546 | 0082 | 1 | F | Test Point analysis for FR1 6.3.3.6 SRS time mask | 15.2.0 |
| 2019-03 | RAN#83 | R5-192568 | 0095 | 1 | F | TP analysis for FR1 6.4A.2.1.1 Error Vector Magnitude for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-192569 | 0094 | 1 | F | TP analysis for FR1 6.4A.1.1 Frequency error for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-192571 | 0096 | 1 | F | TP analysis for FR1 6.4A.2.2.1 Carrier leakage for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-192572 | 0097 | 1 | F | TP analysis for FR1 6.4A.2.3.1 In-band emissions for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-192573 | 0098 | 1 | F | TP analysis for FR1 6.5A.2.2.1 Spectrum emission mask for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-192574 | 0101 | 1 | F | TP analysis for FR1 6.5A.3.1.1 General spurious emissions for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-192575 | 0102 | 1 | F | TP analysis for FR1 6.5A.3.2.1 Spurious emissions for UE co-existence for CA (2UL CA) | 15.2.0 |
| 2019-03 | RAN#83 | R5-192582 | 0109 | 1 | F | Add Tp analysis statements for MIMO tests | 15.2.0 |
| 2019-03 | RAN#83 | R5-192599 | 0084 | 1 | F | Update of TP analysis of FR1 6.2.1 MOP | 15.2.0 |
| 2019-03 | RAN#83 | R5-192624 | 0115 | 1 | F | TP_analysis_38.905_6.5B.3_TX_SpurEmission | 15.2.0 |

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|---------|--------|-----------|------|---|---|--|--------|
| 2019-03 | RAN#83 | R5-192647 | 0092 | 1 | F | Addition of Test Point analysis of FR2 6.3.4.4 Aggregate power tolerance | 15.2.0 |
| 2019-03 | RAN#83 | R5-192684 | 0073 | 1 | F | TP analysis for FR1 Rx 7.9A.1 Spurious Emission for 2DL CA | 15.2.0 |
| 2019-03 | RAN#83 | R5-192691 | 0111 | 1 | F | Addition of TP analysis for EN-DC 6.2B.4.1.1 Configured transmitted power Intra-band contiguous | 15.2.0 |
| 2019-03 | RAN#83 | R5-192692 | 0112 | 1 | F | Addition of TP analysis for EN-DC 6.2B.4.1.2 Configured transmitted power Intra-band non-contiguous | 15.2.0 |
| 2019-03 | RAN#83 | R5-192846 | 0114 | 2 | F | Introduction of new section for TP analysis of Tx spurious | 15.2.0 |
| 2019-06 | RAN#84 | R5-193543 | 0137 | - | F | Additional TT analysis for 38.521-3 MPR intra-band contiguous | 15.3.0 |
| 2019-06 | RAN#84 | R5-193808 | 0147 | - | F | Addition of TP analysis for power control for UL-MIMO | 15.3.0 |
| 2019-06 | RAN#84 | R5-193916 | 0148 | - | F | Update of TP analysis of 6.2D.3 A-MPR for UL-MIMO | 15.3.0 |
| 2019-06 | RAN#84 | R5-193919 | 0149 | - | F | Add SA FR1 RF 6.5D.2.4.2 to 38.905 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194010 | 0151 | - | F | Test Point analysis update for FR2 TxSpurious UE coexistence test case | 15.3.0 |
| 2019-06 | RAN#84 | R5-194168 | 0152 | - | F | Updating Annex A; Derivation documents | 15.3.0 |
| 2019-06 | RAN#84 | R5-194169 | 0153 | - | F | Update of test points analysis for NS_35 A-MPR FR1 test case | 15.3.0 |
| 2019-06 | RAN#84 | R5-194170 | 0154 | - | F | Test point analysis for A-MPR Intra-band contiguous EN-DC; NS_04 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194257 | 0155 | - | F | TP analysis for Asymmetric CH BWs in Reference Sensitivity Requirements in FR1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194402 | 0158 | - | F | Test Point analysis for EN-DC In-band emissions for intra-band contiguous | 15.3.0 |
| 2019-06 | RAN#84 | R5-194459 | 0160 | - | F | Update to TP analysis for FR2 Maximum Output Power | 15.3.0 |
| 2019-06 | RAN#84 | R5-194904 | 0142 | 1 | F | Addition of TP analysis for 38.521-1 7.6D.3 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194907 | 0163 | 1 | F | Addition of TP analysis for 38.521-1 6.3A.3 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194909 | 0164 | 1 | F | Addition of TP analysis for 38.521-1 6.3A.1 FR1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194913 | 0165 | - | F | Addition of TP analysis for ACS for 2DL CA in FR1 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194914 | 0166 | - | F | Addition of TP analysis for FR1 MOP for CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-194927 | 0162 | 1 | F | Addition of test frequency selection of spurious co-existence inter-band for DC 3-n79 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194931 | 0141 | 1 | F | Addition of TP analysis for 38.521-1 7.6D.2 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194932 | 0143 | 1 | F | Addition of TP analysis for 38.521-1 7.6D.4 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194933 | 0144 | 1 | F | Addition of TP analysis for 38.521-1 7.8D.2 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194959 | 0167 | - | F | Addition of TP analysis for UL-MIMO cases of 6.3D.1 and 6.3D.3 | 15.3.0 |
| 2019-06 | RAN#84 | R5-194961 | 0157 | 1 | F | TP analysis for FR2 Tx 6.3A.1.1 Minimum output power for CA 2UL CA | 15.3.0 |
| 2019-06 | RAN#84 | R5-194963 | 0161 | 1 | F | Update SCS test points for FR2 ACS and Inband blocking test cases | 15.3.0 |
| 2019-06 | RAN#84 | R5-195146 | 0138 | 1 | F | Addition of TP analysis for SA FR2 6.2.2 | 15.3.0 |
| 2019-06 | RAN#84 | R5-195148 | 0139 | 1 | F | Addition of TP analysis for SA FR2 6.3.2 | 15.3.0 |
| 2019-06 | RAN#84 | R5-195190 | 0145 | 1 | F | TPanalysis of 7.7D Spurious response for UL-MIMO | 15.3.0 |
| 2019-06 | RAN#84 | R5-193730 | 0146 | - | F | Addition of test frequency selection of 6.5A.3.2 for Rel-16 CA_n41A-n79A | 16.0.0 |
| 2019-06 | RAN#84 | R5-195055 | 0150 | 1 | F | Addition of test frequency selection of 6.5B.3.3.2 spurious co-existence inter-band for Rel-16 DC configurations | 16.0.0 |
| 2019-09 | RAN#85 | R5-196435 | 0184 | - | F | Update of TP analysis of FR2 minimum output power to add UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-196445 | 0185 | - | F | Correction of 4.5 to add DC_3A-n41 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197315 | 0175 | 1 | F | Addition of TP analysis for FR1 MPR for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-197317 | 0176 | 1 | F | Addition of TP analysis for FR1 ConfigTP for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-197320 | 0179 | 1 | F | Addition of TP analysis of FR1 6.4D.2.1 EVM for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-197322 | 0180 | 1 | F | Addition of TP analysis of FR1 6.4D.2.2 Carrier leakage for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-197323 | 0181 | 1 | F | Addition of TP analysis of FR1 6.4D.2.3 Inband emission for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-197325 | 0182 | 1 | F | Addition of TP analysis of FR1 6.4D.2.4 EVM equalizer spectrum flatness for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-197326 | 0186 | 1 | F | Test Point analysis for Occupied bandwidth for 2UL CA in FR1 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197524 | 0187 | 1 | F | TP_analysis_38.905_7.3A_CA_ref_sensitivity | 16.1.0 |
| 2019-09 | RAN#85 | R5-197589 | 0168 | 1 | F | New addition of TP analysis for MOP & MOP Spherical Coverage for UL CA in SA FR2 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197590 | 0169 | 1 | F | New addition of TP analysis for Carrier leakage for UL CA in SA FR2 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197591 | 0170 | 1 | F | Adding test case 6.5B.2.1.3 to 38.905 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197592 | 0173 | 1 | F | Addition of TP analysis of FR2 6.6 Beam Correspondence | 16.1.0 |
| 2019-09 | RAN#85 | R5-197593 | 0174 | 1 | F | Test Point analysis update for FR2 Tx Spurious test case | 16.1.0 |
| 2019-09 | RAN#85 | R5-197594 | 0177 | 1 | F | Addition of TP analysis of FR1 Maximum input level for CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-197595 | 0178 | 1 | F | Addition of TP analysis of FR1 6.4D.1 Frequency error for UL MIMO | 16.1.0 |
| 2019-09 | RAN#85 | R5-197596 | 0183 | 1 | F | Addition of TP analysis of FR2 6.2A.2 MPR for 2 UL CA | 16.1.0 |
| 2019-09 | RAN#85 | R5-197597 | 0191 | 1 | F | Addition of TP analysis for FR2 AMPR with NS_201 | 16.1.0 |
| 2019-09 | RAN#85 | R5-197628 | 0192 | 2 | F | Updates of TP analysis for EN-DC MPR test case 6.2.B.2.1 | 16.1.0 |
| 2019-12 | RAN#86 | R5-198384 | 0203 | | F | Addition of TP analysis of FR2 6.6 Beam Correspondence v1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-198392 | 0205 | | F | Addition of TP analysis of FR2 6.3D.3.4 SRS time mask for UL-MIMO | 16.2.0 |
| 2019-12 | RAN#86 | R5-198490 | 0206 | | F | TPanalysis of TC 7.5B.1 ACS for intra-band contiguous EN-DC 2CCs | 16.2.0 |

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| 2019-12 | RAN#86 | R5-198523 | 0208 | | F | Test points analysis for NS_03 A-MPR FR1 test case | 16.2.0 |
| 2019-12 | RAN#86 | R5-198527 | 0210 | | F | Test points analysis for NS_43 and NS_43U A_MPR FR1 test case | 16.2.0 |
| 2019-12 | RAN#86 | R5-199326 | 0209 | 1 | F | Test points analysis for NS_05 and NS_05U A_MPR FR1 test case | 16.2.0 |
| 2019-12 | RAN#86 | R5-199327 | 0211 | 1 | F | Test points analysis for NS_100 A_MPR FR1 test case | 16.2.0 |
| 2019-12 | RAN#86 | R5-199328 | 0200 | 1 | F | Addition of test point analysis for SA FR1 TC 7.6A.3 Out-of-band blocking for CA | 16.2.0 |
| 2019-12 | RAN#86 | R5-199372 | 0197 | 1 | F | Update of test point analysis for SA FR2 TC 6.2.2 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199410 | 0199 | 1 | F | Update of test point analysis for SA FR1 TC 6.2.2 to add almost contiguous allocation test points | 16.2.0 |
| 2019-12 | RAN#86 | R5-199487 | 0202 | 1 | F | Addition of test point analysis for SA FR1 TC 7.8A Wide band Intermodulation for CA | 16.2.0 |
| 2019-12 | RAN#86 | R5-199488 | 0201 | 1 | F | Addition of test point analysis for SA FR1 TC 7.6A.4 Narrow band blocking for CA | 16.2.0 |
| 2019-12 | RAN#86 | R5-199489 | 0207 | 1 | F | Addition of TP analysis for ACS for 3DL CA in FR1 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199501 | 0198 | 1 | F | Update of test point analysis for SA FR1 TC 6.5.2.4.2 | 16.2.0 |
| 2019-12 | RAN#86 | R5-199507 | 0196 | 1 | F | TP analysis for test case 6.2B.2.2, UE Maximum Output Power reduction for Intra-Band Non-Contiguous EN-DC | 16.2.0 |
| 2019-12 | RAN#86 | R5-199509 | 0194 | 1 | F | TP analysis for MOP for EN-DC | 16.2.0 |
| 2019-12 | RAN#86 | R5-199549 | 0204 | 1 | F | Addition to TP analysis of FR2 TC 6.3A.4.2.1 Absolute Power Control for CA | 16.2.0 |
| 2020-03 | RAN#87 | R5-200402 | 0215 | - | F | Updating TP of MOP for inter-band EN-DC | 16.3.0 |
| 2020-03 | RAN#87 | R5-200412 | 0221 | - | F | Editorial change of replacing zip file of FR2 6.3.1 by v2 | 16.3.0 |
| 2020-03 | RAN#87 | R5-200419 | 0222 | - | F | Update of test point analysis for 7.6A.3 Out-of-band blocking for CA | 16.3.0 |
| 2020-03 | RAN#87 | R5-200459 | 0223 | - | F | Update of test point analysis for 7.6A.4 Narrow band blocking for CA | 16.3.0 |
| 2020-03 | RAN#87 | R5-200460 | 0224 | - | F | Update of test point analysis for 7.8A Wide band Intermodulation for CA | 16.3.0 |
| 2020-03 | RAN#87 | R5-200574 | 0226 | - | F | Addition of Test point selection for FR1 in SUL test cases | 16.3.0 |
| 2020-03 | RAN#87 | R5-200603 | 0227 | - | F | Test Point analysis for FR2 ref sens for CA | 16.3.0 |
| 2020-03 | RAN#87 | R5-200758 | 0229 | - | F | Correction of NS_05 test points analysis | 16.3.0 |
| 2020-03 | RAN#87 | R5-200762 | 0231 | - | F | Test points analysis for NS_38 A-MPR FR1 test case | 16.3.0 |
| 2020-03 | RAN#87 | R5-200764 | 0232 | - | F | Test points analysis for NS_39 A-MPR FR1 test case | 16.3.0 |
| 2020-03 | RAN#87 | R5-200766 | 0233 | - | F | Test points analysis for NS_43 A-MPR FR1 test case | 16.3.0 |
| 2020-03 | RAN#87 | R5-200768 | 0234 | - | F | Test points analysis for NS_43U A-MPR FR1 test case | 16.3.0 |
| 2020-03 | RAN#87 | R5-200799 | 0236 | - | F | Updated test point analysis for FR2 A-MPR test case | 16.3.0 |
| 2020-03 | RAN#87 | R5-200815 | 0237 | - | F | Update of Test Point Analysis for UE Coexistence for DC_3A-n41A and DC_8A-n41A | 16.3.0 |
| 2020-03 | RAN#87 | R5-200990 | 0238 | 1 | F | Addition of TP analysis for FR1 In-band blocking for CA | 16.3.0 |
| 2020-03 | RAN#87 | R5-201182 | 0216 | 1 | F | Updating TP of configured output power for inter-band EN-DC | 16.3.0 |
| 2020-03 | RAN#87 | R5-201184 | 0218 | 1 | F | Updating TP of configured output power for intra-band contiguous EN-DC | 16.3.0 |
| 2020-03 | RAN#87 | R5-201186 | 0220 | 1 | F | Updating TP of configured output power for intra-band non-contiguous EN-DC | 16.3.0 |
| 2020-03 | RAN#87 | R5-201237 | 0230 | 1 | F | Test points analysis for NS_37 A-MPR FR1 test case | 16.3.0 |
| 2020-03 | RAN#87 | R5-201239 | 0235 | 1 | F | Test points analysis for NS_18 A-MPR FR1 test case | 16.3.0 |
| 2020-06 | RAN#88 | R5-201746 | 0242 | - | F | Addition of Number of test points for FR1 in SUL test cases | 16.4.0 |
| 2020-06 | RAN#88 | R5-201747 | 0243 | - | F | Addition of TP analysis for FR1 A-MPR for CA | 16.4.0 |
| 2020-06 | RAN#88 | R5-201765 | 0246 | - | F | Test points analysis for NS_27 A_MPR FR1 test case | 16.4.0 |
| 2020-06 | RAN#88 | R5-201767 | 0247 | - | F | Test points analysis for NS_40 A_MPR FR1 test case | 16.4.0 |
| 2020-06 | RAN#88 | R5-201773 | 0250 | - | F | Test points analysis for NS_47 A_MPR FR1 test case | 16.4.0 |
| 2020-06 | RAN#88 | R5-201871 | 0253 | - | F | Update of test points analysis in UE co-existence for inter-band EN-DC | 16.4.0 |
| 2020-06 | RAN#88 | R5-201872 | 0254 | - | F | Update of Test Point Analysis for UE Co-existence for DC_5A-n66A | 16.4.0 |
| 2020-06 | RAN#88 | R5-201873 | 0255 | - | F | Update of Test Point Analysis for UE Co-existence for DC_5A-n78A | 16.4.0 |
| 2020-06 | RAN#88 | R5-201874 | 0256 | - | F | Update of Test Point Analysis for UE Co-existence for DC_66A-n5A | 16.4.0 |
| 2020-06 | RAN#88 | R5-201875 | 0257 | - | F | Update of Test Point Analysis for UE Co-existence for DC_66A-n78A | 16.4.0 |
| 2020-06 | RAN#88 | R5-201929 | 0258 | - | F | Cleanup in 38.905 | 16.4.0 |
| 2020-06 | RAN#88 | R5-201931 | 0260 | - | F | Combined TP analysis for MPR, ACLR and SEM intra-band contiguous EN-DC test cases | 16.4.0 |
| 2020-06 | RAN#88 | R5-202029 | 0261 | - | F | Introduction of test point analysis for 2CCs EN-DC TCs in FR1 in 7.6B Blocking characteristics for DC and 7.7B Spurious response for DC | 16.4.0 |
| 2020-06 | RAN#88 | R5-202111 | 0262 | - | F | NS_24 TP analysis to TR 38.905 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202524 | 0267 | - | F | TP_analysis_6.5.3.3_TX_Additional_SpurEmission_NS_43 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202755 | 0248 | 1 | F | Test points analysis for NS_41 A_MPR FR1 test case | 16.4.0 |
| 2020-06 | RAN#88 | R5-202756 | 0249 | 1 | F | Test points analysis for NS_42 A_MPR FR1 test case | 16.4.0 |
| 2020-06 | RAN#88 | R5-202757 | 0264 | 1 | F | TP_analysis_6.5.3.3_TX_Additional_SpurEmission_NS_05 | 16.4.0 |
| 2020-06 | RAN#88 | R5-202918 | 0239 | 1 | F | Test Point analysis for FR2 Frequency Error for CA | 16.4.0 |
| 2020-06 | RAN#88 | R5-202926 | 0266 | 1 | F | Addition of TPanalysis 6.5A.3.2.1_SECoex for CA_n1A-n78A | 16.4.0 |
| 2020-06 | RAN#88 | R5-202932 | 0244 | 1 | F | Addition of TP analysis for FR1 Maximum input level for 3DL CA | 16.4.0 |
| 2020-06 | RAN#88 | R5-202933 | 0245 | 1 | F | Addition of TP analysis for FR1 In-band blocking for 3DL CA | 16.4.0 |
| 2020-06 | RAN#88 | R5-202952 | 0251 | 1 | F | Updating TP of MOP for intra-band contiguous EN-DC | 16.4.0 |

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| 2020-06 | RAN#88 | R5-202953 | 0252 | 1 | F | Updating TP of MOP for intra-band non-contiguous EN-DC | 16.4.0 |
| 2020-06 | RAN#88 | R5-202954 | 0259 | 1 | F | Combined TP analysis for MPR, NR ACLR and SEM FR1 test cases | 16.4.0 |
| 2020-06 | RAN#88 | R5-202955 | 0263 | 1 | F | Updated TP analysis for 7.3A Reference sensitivity for CA | 16.4.0 |
| 2020-09 | RAN#89 | R5-203642 | 0269 | - | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_40A_n1A | 16.5.0 |
| 2020-09 | RAN#89 | R5-203643 | 0270 | - | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_40A_n78A | 16.5.0 |
| 2020-09 | RAN#89 | R5-203751 | 0275 | - | F | Editorial correction to references to EN-DC configurations | 16.5.0 |
| 2020-09 | RAN#89 | R5-204720 | 0299 | 1 | F | Add_TP_analysis_table for TX_spurious_emission | 16.5.0 |
| 2020-09 | RAN#89 | R5-204726 | 0278 | 1 | F | Addition of test point analysis in Tx spurious emissions | 16.5.0 |
| 2020-09 | RAN#89 | R5-204727 | 0273 | 1 | F | Updating TP analysis for 6.2A.2-MPR for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-204728 | 0279 | 1 | F | Update of test point analysis of MOP for intra-band contiguous EN-DC | 16.5.0 |
| 2020-09 | RAN#89 | R5-204789 | 0271 | 1 | F | Update of TP analysis for NS_43 and NS_01 in FR1 A-MPR for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-204790 | 0272 | 1 | F | Update of TP analysis for NS_43U and NS_01 in FR1 A-MPR for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-204791 | 0280 | 1 | F | Updating test point analysis for DC_1A-n78A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204792 | 0281 | 1 | F | Updating test point analysis for DC_2A-n66A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204793 | 0282 | 1 | F | Updating test point analysis for DC_2A-n78A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204794 | 0283 | 1 | F | Updating test point analysis for DC_3A-n7A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204795 | 0284 | 1 | F | Updating test point analysis for DC_3A-n78A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204796 | 0285 | 1 | F | Updating test point analysis for DC_7A-n78A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204797 | 0292 | 1 | F | Correction to test point analysis for spurious emissions UE co-existence for a few inter-band EN-DC configurations | 16.5.0 |
| 2020-09 | RAN#89 | R5-204817 | 0286 | 1 | F | Updating test point analysis for DC_3A-n1A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204818 | 0287 | 1 | F | Updating test point analysis for DC_7A-n1A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204819 | 0288 | 1 | F | Updating test point analysis for DC_7A-n66A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204820 | 0289 | 1 | F | Updating test point analysis for DC_8A-n1A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204821 | 0290 | 1 | F | Updating test point analysis for DC_12A-n78A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204822 | 0291 | 1 | F | Updating test point analysis for DC_28A-n3A for spurious emissions UE co-existence | 16.5.0 |
| 2020-09 | RAN#89 | R5-204829 | 0293 | 1 | F | Addition of test point analysis for AMPR NS_48 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204838 | 0274 | 1 | F | Updating TP analysis for 6.2A.4-Configured output power for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-204948 | 0295 | 1 | F | Addition of Test Point analysis for FR2 Transmit OFF Power for CA | 16.5.0 |
| 2020-09 | RAN#89 | R5-204949 | 0298 | 1 | F | TP analysis 6.5B.3 TX SpurEmission EN-DC V2 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204950 | 0300 | 1 | F | Updated TP analysis for 7.3B Reference sensitivity for EN-DC in FR1 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204959 | 0301 | 1 | F | Update of TP analysis 6.5A.3.2.1_SECoex for CA_n1A-n78A | 16.5.0 |
| 2020-09 | RAN#89 | R5-204963 | 0276 | 1 | F | Update test point analysis for A-MPR NS_18 with CBW being 30MHz | 16.5.0 |
| 2020-09 | RAN#89 | R5-204964 | 0294 | 1 | F | Addition of test point analysis for additional spurious emission with NS_17 | 16.5.0 |
| 2020-09 | RAN#89 | R5-204982 | 0268 | 2 | F | Updated TP analysis for 7.3A | 16.5.0 |
| 2020-12 | RAN#90 | R5-205264 | 0303 | - | F | Addition of Test Point analysis for 6.3A.4.1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205265 | 0304 | - | F | Addition of Test Point analysis for 6.3A.4.2 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205267 | 0305 | - | F | Addition of Test Point analysis for 6.3A.4.3 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205558 | 0309 | - | F | Adding test point analysis for A-MPR test of band n30 with NS_21 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205619 | 0312 | - | F | Addition of TP Analysis for TC 6.5A.2.1 Spectrum Emission Mask for CA in FR2 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205630 | 0313 | - | F | Addition of TP Analysis for TC 6.5A.2.2 Adjacent channel leakage ratio for CA in FR2 | 16.6.0 |
| 2020-12 | RAN#90 | R5-205780 | 0318 | - | F | Addition of test point analysis for DC_2A_n5A in Tx spurious emissions cases | 16.6.0 |
| 2020-12 | RAN#90 | R5-205781 | 0319 | - | F | Addition of test point analysis for DC_8A_n78A in Tx spurious emissions cases | 16.6.0 |
| 2020-12 | RAN#90 | R5-205782 | 0320 | - | F | Addition of test point analysis for DC_12A_n66A in Tx spurious emissions cases | 16.6.0 |
| 2020-12 | RAN#90 | R5-205783 | 0321 | - | F | Addition of test point analysis for DC_30A_n5A in Tx spurious emissions cases | 16.6.0 |
| 2020-12 | RAN#90 | R5-205785 | 0322 | - | F | Addition of test point analysis for DC_13A_n66A in Tx spurious emissions cases | 16.6.0 |
| 2020-12 | RAN#90 | R5-205885 | 0329 | - | F | Addition of test point analysis for A-MPR NS_46 | 16.6.0 |

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| 2020-12 | RAN#90 | R5-206037 | 0333 | - | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_20A_n3A | 16.6.0 |
| 2020-12 | RAN#90 | R5-206729 | 0332 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_1A_n3A | 16.6.0 |
| 2020-12 | RAN#90 | R5-206752 | 0302 | 1 | F | Addition of test point analysis for A-MPR NS_45 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206769 | 0325 | 1 | F | Update of test point analysis for Tx spurious emissions in NR FR1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206853 | 0328 | 1 | F | Update to test point analysis for A-MPR NS_18 with 30MHz | 16.6.0 |
| 2020-12 | RAN#90 | R5-206854 | 0314 | 1 | F | Updating TP analysis for OBW for CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-206855 | 0316 | 1 | F | Updating TP analysis for Maximum input level for 3DL CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-206856 | 0317 | 1 | F | Updating TP analysis for Inband blocking for 3DL CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-206857 | 0323 | 1 | F | Update of test point analysis for MPR, SEM and ACLR in NR FR1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206858 | 0324 | 1 | F | Update of test point analysis for MOP in FR1 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206873 | 0310 | 1 | F | Restructuring of TR 38.905. | 16.6.0 |
| 2020-12 | RAN#90 | R5-206874 | 0311 | 1 | F | Combined TP analysis for FR2 test cases MPR, ACLR and SEM | 16.6.0 |
| 2020-12 | RAN#90 | R5-206875 | 0331 | 1 | F | Update of TPA for in-band emission and carrier leakage TCs | 16.6.0 |
| 2020-12 | RAN#90 | R5-206876 | 0336 | 1 | F | Update of test point analysis for occupied bandwidth in FR2 | 16.6.0 |
| 2020-12 | RAN#90 | R5-206893 | 0315 | 1 | F | Updating TP analysis for REFSENS for CA | 16.6.0 |
| 2020-12 | RAN#90 | R5-206917 | 0330 | 1 | F | Updated TP analysis for 7.3B Reference sensitivity for EN-DC in FR1 | 16.6.0 |
| 2021-03 | RAN#91 | R5-210383 | 0343 | - | F | Correct a typo of 6.3A.4.2 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210512 | 0344 | - | F | Introduction of test point analysis for SA FR2 7.4A Maximum input level for CA | 16.7.0 |
| 2021-03 | RAN#91 | R5-210740 | 0347 | - | F | Updating TP analysis of FR1 A-MPR for NS_48 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210742 | 0348 | - | F | Adding TP analysis of FR1 A-MPR for NS_49 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210743 | 0349 | - | F | Resubmitting TP analysis of FR1 A-MPR for NS_44 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210791 | 0353 | - | F | Adding TP selection for 6.4C.2 Transmit modulation quality for SUL | 16.7.0 |
| 2021-03 | RAN#91 | R5-210900 | 0354 | - | F | Updating TP analysis for Spurious Emissions for CA in FR1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-210905 | 0356 | - | F | Updating TP analysis for FR1 REFSENS for SUL testing | 16.7.0 |
| 2021-03 | RAN#91 | R5-210963 | 0362 | - | F | Spur emission TP analysis R16 DC_5A_n2A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211018 | 0368 | - | F | TP analysis for test case 6.5D.2_1.4.2, UTRA ACLR for UL MIMO (Rel-16 onward) | 16.7.0 |
| 2021-03 | RAN#91 | R5-211134 | 0380 | - | F | TP analysis for ULFP Tx in MPR test case | 16.7.0 |
| 2021-03 | RAN#91 | R5-211230 | 0389 | - | F | NS_12, NS_13, NS_14, NS_15 TP analysis to 38.905 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211733 | 0340 | 1 | F | Updated TP analysis for 7.3B Reference sensitivity for EN-DC in FR1 | 16.7.0 |
| 2021-03 | RAN#91 | R5-211734 | 0341 | 1 | F | TP analysis for 38.521-3 test case 6.5B.2.2.1 SEM Intra-band non-contiguous | 16.7.0 |
| 2021-03 | RAN#91 | R5-211735 | 0342 | 1 | F | TP analysis for 38.521-3 test case 6.5B.2.2.3 ACLR Intra-band non-contiguous | 16.7.0 |
| 2021-03 | RAN#91 | R5-211736 | 0345 | 1 | F | Update of test point analysis for FR2 UL CA frequency error test cases | 16.7.0 |
| 2021-03 | RAN#91 | R5-211737 | 0369 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_8A_n77A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211738 | 0370 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_11A_n77A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211739 | 0371 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_11A_n78A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211740 | 0372 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_11A_n79A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211741 | 0373 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_25A_n41A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211742 | 0374 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_26A_n41A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211743 | 0375 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_26A_n77A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211744 | 0376 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_26A_n78A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211745 | 0377 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_26A_n79A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211746 | 0378 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_41A_n77A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211747 | 0379 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_41A_n78A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211748 | 0388 | 1 | F | Test Point analysis update for FR2 Tx additional spurious emission test case | 16.7.0 |
| 2021-03 | RAN#91 | R5-211774 | 0337 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_7A_n3A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211775 | 0338 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_8A_n3A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211776 | 0339 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_20A_n1A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211777 | 0361 | 1 | F | Spur emission TP analysis R16 DC_2A_n41A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211778 | 0363 | 1 | F | Spur emission TP analysis R16 DC_13A_n2A | 16.7.0 |

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| 2021-03 | RAN#91 | R5-211779 | 0364 | 1 | F | Spur emission TP analysis R16 DC_48A_n5A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211780 | 0365 | 1 | F | Spur emission TP analysis R16 DC_48A_n66A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211781 | 0366 | 1 | F | Spur emission TP analysis R16 DC_66A_n41A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211809 | 0350 | 1 | F | Adding TP analysis for Rel-16 DMRS in A-MPR test case | 16.7.0 |
| 2021-03 | RAN#91 | R5-211810 | 0351 | 1 | F | Update of TP analysis for EVM equalizer spectrum flatness for half Pi BPSK | 16.7.0 |
| 2021-03 | RAN#91 | R5-211811 | 0352 | 1 | F | Update of TP analysis for FR1 SUL test cases | 16.7.0 |
| 2021-03 | RAN#91 | R5-211893 | 0346 | 1 | F | Update of test point analysis for FR2 MPR, SEM and ACLR test cases | 16.7.0 |
| 2021-03 | RAN#91 | R5-211894 | 0359 | 1 | F | Addition of reference sensitivity test point analyses for FR1 NR CA and EN-DC | 16.7.0 |
| 2021-03 | RAN#91 | R5-211895 | 0360 | 1 | F | Moving of principles for reference sensitivity test point selection from attachments to annexes | 16.7.0 |
| 2021-03 | RAN#91 | R5-211897 | 0382 | 1 | F | TP analysis for DC_8A_n77A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211898 | 0383 | 1 | F | TP analysis for DC_11A_n79A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211899 | 0384 | 1 | F | TP analysis for DC_26A_n41A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211900 | 0385 | 1 | F | TP analysis for DC_26A_n77A and DC_26A_n78A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211901 | 0386 | 1 | F | TP analysis for DC_26A_n79A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211902 | 0387 | 1 | F | TP analysis for DC_41A_n77A and DC_41A_n78A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211906 | 0390 | 1 | F | Reference sensitivity TP analysis for DC_1A-28A_n3A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211907 | 0391 | 1 | F | Reference sensitivity analysis for DC_3A-7A_n1A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211908 | 0392 | 1 | F | Reference sensitivity TP analysis for DC_7A-20A_n1A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211909 | 0393 | 1 | F | Reference sensitivity TP analysis for DC_7A-28A_n3A | 16.7.0 |
| 2021-03 | RAN#91 | R5-211914 | 0358 | 1 | F | Adding TP analysis for NR test case-Time mask for UL carrier switching | 16.7.0 |
| 2021-03 | RAN#91 | - | - | - | - | Administrative release upgrade to match the release of TS 38.508-1, TS 38.508-2 and TS 38.521-1 which were upgraded at RAN#91 to Rel-17 due to Rel-17 relevant CRs | 17.0.0 |
| 2021-06 | RAN#92 | R5-212519 | 0397 | - | F | Update of test point analysis for FR2 Occupied Bandwidth for UL MIMO test case | 17.1.0 |
| 2021-06 | RAN#92 | R5-212524 | 0400 | - | F | Spurious emission TP analysis for Rel-15 EN-DC configuration DC_66A_n71A | 17.1.0 |
| 2021-06 | RAN#92 | R5-212929 | 0405 | - | F | Addition of TP analysis of V2X MPR, SEM and ACLR non-concurrent | 17.1.0 |
| 2021-06 | RAN#92 | R5-212930 | 0406 | - | F | Addition of TP analysis of 6.3E.1 V2X minimum output power non-concurrent | 17.1.0 |
| 2021-06 | RAN#92 | R5-212982 | 0407 | - | F | Addition of TP analysis for CA_n28A-n41A in Tx Spurious Emission cases | 17.1.0 |
| 2021-06 | RAN#92 | R5-212990 | 0409 | - | F | Updating TP analysis for UTRA ACLR MIMO testing for band n1 | 17.1.0 |
| 2021-06 | RAN#92 | R5-213024 | 0411 | - | F | Correction to test points selection for intra-band EN-DC spurious emissions testing | 17.1.0 |
| 2021-06 | RAN#92 | R5-213053 | 0421 | - | F | TP analysis for 6.2.4 updated for eMIMO | 17.1.0 |
| 2021-06 | RAN#92 | R5-213114 | 0428 | - | F | Correction of test coverage clause numbering | 17.1.0 |
| 2021-06 | RAN#92 | R5-213946 | 0396 | 1 | F | Introduction of test point analysis for FR2 CA Error Vector Magnitude test case | 17.1.0 |
| 2021-06 | RAN#92 | R5-213947 | 0401 | 1 | F | Spurious emission TP analysis for Rel-15 EN-DC configuration DC_2A_n71A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213948 | 0403 | 1 | F | Addition of test points analysis for NS_06 FR1 test cases | 17.1.0 |
| 2021-06 | RAN#92 | R5-213949 | 0413 | 1 | F | Correction to test points selection for inter-band EN-DC co-existence spurious emissions testing | 17.1.0 |
| 2021-06 | RAN#92 | R5-213950 | 0414 | 1 | F | Update of TP analysis for general spurious emissions for DC_3A_n7A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213951 | 0415 | 1 | F | Update of TP analysis for general spurious emissions for DC_3A_n78A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213952 | 0416 | 1 | F | Update of TP analysis for general spurious emissions for DC_8A_n77A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213953 | 0417 | 1 | F | Update of TP analysis for general spurious emissions for DC_12A_n66A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213954 | 0418 | 1 | F | Update of TP analysis for general spurious emissions for DC_26A_n41A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213955 | 0419 | 1 | F | Update of TP analysis for general spurious emissions for DC_26A_n79A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213956 | 0420 | 1 | F | Update of TP analysis for general spurious emissions for DC_30A_n5A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213957 | 0422 | 1 | F | Update of test point analysis for FR2 MPR SEM and ACLR UL-MIMO test cases | 17.1.0 |
| 2021-06 | RAN#92 | R5-213958 | 0423 | 1 | F | TP analysis for DC_11A_n77A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213959 | 0424 | 1 | F | TP analysis for DC_11A_n78A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213960 | 0425 | 1 | F | TP analysis for DC_25A_n41A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213961 | 0426 | 1 | F | TP analysis for DC_42A_n77A | 17.1.0 |
| 2021-06 | RAN#92 | R5-213962 | 0427 | 1 | F | General TP analysis update for NR CA retests | 17.1.0 |
| 2021-06 | RAN#92 | R5-214070 | 0402 | 1 | F | Correction of power control in 38.905 | 17.1.0 |
| 2021-06 | RAN#92 | R5-214071 | 0429 | 1 | F | Test Point analysis for FR2 Tx spurious emission CA test case | 17.1.0 |

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| 2021-06 | RAN#92 | R5-214073 | 0398 | 1 | F | Spurious emission TP analysis for Rel-16 EN-DC configuration DC_14A_n2A | 17.1.0 |
| 2021-06 | RAN#92 | R5-214074 | 0399 | 1 | F | Spurious emission TP analysis for Rel-16 EN-DC configuration DC_14A_n66A | 17.1.0 |
| 2021-06 | RAN#92 | R5-214093 | 0412 | 1 | F | Correction to test points selection for inter-band EN-DC general spurious emissions testing | 17.1.0 |
| 2021-09 | RAN#93 | R5-214245 | 0431 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_1A_n77A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214246 | 0432 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_1A_n79A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214247 | 0433 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_3A_n28A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214248 | 0434 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_3A_n77A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214249 | 0435 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_7A_n28A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214250 | 0436 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_19A_n77A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214251 | 0437 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_19A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214252 | 0438 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_19A_n79A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214253 | 0439 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_20A_n28A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214255 | 0441 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_21A_n77A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214256 | 0442 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_21A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214257 | 0443 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_21A_n79A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214258 | 0444 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_28A_n77A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214260 | 0446 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_28A_n79A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214261 | 0447 | - | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_42A_n77A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214262 | 0448 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_1A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214263 | 0449 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_3A_n79A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214264 | 0450 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_5A_n66A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214265 | 0451 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_5A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214266 | 0452 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_7A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214267 | 0453 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_11A_n77A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214268 | 0454 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_11A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214269 | 0455 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_11A_n79A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214271 | 0457 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_26A_n77A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214272 | 0458 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_26A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214273 | 0459 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_39A_n79A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214274 | 0460 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_41A_n77A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214275 | 0461 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_41A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214276 | 0462 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_41A_n79A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214277 | 0463 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_66A_n5A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214278 | 0464 | - | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_66A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214315 | 0465 | - | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_40A_n1A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214316 | 0466 | - | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_40A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-214385 | 0467 | - | F | Introduction of NR FR2 Test Points For Aggregate power tolerance for CA | 17.2.0 |

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| 2021-09 | RAN#93 | R5-214721 | 0468 | - | F | Adding TP analysis for test case 6.5D.1_1 | 17.2.0 |
| 2021-09 | RAN#93 | R5-214907 | 0469 | - | F | Introduction of test point analysis for FR2 Time alignment error for UL MIMO test case | 17.2.0 |
| 2021-09 | RAN#93 | R5-215076 | 0473 | - | F | Addition of TP analysis of V2X MPR, SEM and ACLR non-concurrent with SL-MIMO | 17.2.0 |
| 2021-09 | RAN#93 | R5-215077 | 0474 | - | F | Addition of TP analysis of V2X minimum output power for non-concurrent with SL-MIMO | 17.2.0 |
| 2021-09 | RAN#93 | R5-215164 | 0475 | - | F | Addition of test points analysis for NS_06 power class 1 test cases | 17.2.0 |
| 2021-09 | RAN#93 | R5-215219 | 0479 | - | F | Update of TP analysis for general spurious emissions for DC_12A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215220 | 0480 | - | F | Update of TP analysis for general spurious emissions for DC_28A_n3A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215229 | 0483 | - | F | Correction to TP analysis for in-band emission for intra-band contiguous EN-DC | 17.2.0 |
| 2021-09 | RAN#93 | R5-215236 | 0484 | - | F | Addition of reference sensitivity TP analysis for DC_1A_n28A-n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215237 | 0485 | - | F | Addition of reference sensitivity TP analysis for DC_1A-3A_n28A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215238 | 0486 | - | F | Addition of reference sensitivity TP analysis for DC_1A-7A_n28A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215239 | 0487 | - | F | Addition of reference sensitivity TP analysis for DC_3A-7A_n28A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215293 | 0492 | - | F | Updating Test point analysis for DC_3A-20A_n28A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215302 | 0495 | - | F | Updating TP analysis for Relative power tolerance for CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-215304 | 0496 | - | F | Updating TP analysis for Aggregate power tolerance for CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-215306 | 0497 | - | F | Updating TP analysis for Occupied bandwidth for CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-215327 | 0498 | - | F | TP analysis for FR2 General ON OFF time mask | 17.2.0 |
| 2021-09 | RAN#93 | R5-215336 | 0499 | - | F | Correction to TP analysis for FR1 A-SPR with NS_17 | 17.2.0 |
| 2021-09 | RAN#93 | R5-215543 | 0502 | - | F | Update_TP_analysis for Rel_16_DC_14A_n2A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215545 | 0503 | - | F | Update_TP_analysis for Rel_16_DC_13A_n2A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215547 | 0504 | - | F | Update_TP_analysis for Rel_15_DC_2A_n71A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215550 | 0505 | - | F | Update_TP_analysis for Rel_15_DC_66A_n71A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215919 | 0440 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_20A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215920 | 0456 | 1 | F | Update of spurious emission TP analysis for Rel-15 EN-DC configuration DC_25A_n41A | 17.2.0 |
| 2021-09 | RAN#93 | R5-215921 | 0471 | 1 | F | Addition of TP analysis for spurious emissions for DC_28A_n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216014 | 0430 | 1 | F | Introduction of spurious emission TP analysis for Rel-15 EN-DC configuration DC_1A_n28A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216017 | 0477 | 1 | F | Update of TP analysis for general spurious emissions for DC_3A_n41A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216018 | 0481 | 1 | F | Update of TP analysis for general spurious emissions for DC_39A_n41A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216019 | 0482 | 1 | F | Update of TP analysis for general spurious emissions for DC_40A_n41A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216020 | 0507 | 1 | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_8A_n41A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216056 | 0472 | 1 | F | Addition of TP for REFSENS for inter-band EN-DC 2CC and 3CC combos | 17.2.0 |
| 2021-09 | RAN#93 | R5-216057 | 0488 | 1 | F | Correction to TP analysis for reference sensitivity per EN-DC configuration | 17.2.0 |
| 2021-09 | RAN#93 | R5-216058 | 0489 | 1 | F | Correction to Annex D Principles for test point selection for EN-DC reference sensitivity test cases | 17.2.0 |
| 2021-09 | RAN#93 | R5-216059 | 0490 | 1 | F | Updating Test point analysis for DC_3A_n28A-n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216060 | 0491 | 1 | F | Updating Test point analysis for DC_7A_n28A-n78A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216061 | 0493 | 1 | F | Updating Test point analysis for DC_7A-20A_n28A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216062 | 0501 | 1 | F | Defining TP analysis for MPR, SEM and ACLR for FR2 UL MIMO | 17.2.0 |
| 2021-09 | RAN#93 | R5-216064 | 0500 | 1 | F | Update_TP_analysis for Rel_16_DC_14A_n66A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216068 | 0494 | 1 | F | Updating TP analysis for Absolute power tolerance for CA | 17.2.0 |
| 2021-09 | RAN#93 | R5-216109 | 0506 | 1 | F | TP analysis for ref sensitivity DC_48A_n66A | 17.2.0 |
| 2021-09 | RAN#93 | R5-216142 | 0476 | 1 | F | Correction to IE and UE capability for low PAPR DMRS in test point analysis | 17.2.0 |
| 2021-12 | RAN#94 | R5-216513 | 0508 | - | F | TP analysis update for FR1 6.2.3 AMPR NS_27 | 17.3.0 |
| 2021-12 | RAN#94 | R5-216516 | 0509 | - | F | TP analysis update for IBNC EN-DC 6.2B.2.2_MPR 6.5B.2.2.1_SEM 6.5B.2.2.3_ACLR | 17.3.0 |
| 2021-12 | RAN#94 | R5-216547 | 0511 | - | F | TP analysis for FR2 DL 256QAM to Maximum input level | 17.3.0 |
| 2021-12 | RAN#94 | R5-216548 | 0512 | - | F | TP analysis for FR2 DL 256QAM to Maximum input level for CA | 17.3.0 |
| 2021-12 | RAN#94 | R5-217164 | 0515 | - | F | TP analysis for ref sensitivity for DC_66A_n2A | 17.3.0 |
| 2021-12 | RAN#94 | R5-217165 | 0516 | - | F | TP analysis for ref sensitivity for DC_66A_n78A | 17.3.0 |
| 2021-12 | RAN#94 | R5-217166 | 0517 | - | F | TP analysis for ref sensitivity for DC_66A_n71A | 17.3.0 |
| 2021-12 | RAN#94 | R5-217190 | 0520 | - | F | Test Point analysis for FR2 Tx spur emission coex CA test case | 17.3.0 |
| 2021-12 | RAN#94 | R5-217301 | 0521 | - | F | Addition of reference sensitivity TP analysis for DC_1A-20A_n28A | 17.3.0 |
| 2021-12 | RAN#94 | R5-217302 | 0522 | - | F | Addition of reference sensitivity TP analysis for DC_3A_n78C | 17.3.0 |
| 2021-12 | RAN#94 | R5-217303 | 0523 | - | F | Addition of reference sensitivity TP analysis for DC_20A_n28A-n78A | 17.3.0 |
| 2021-12 | RAN#94 | R5-217306 | 0524 | - | F | Editorial correction to Annex 2.10.3 test point selection EN-DC reference sensitivity | 17.3.0 |

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| 2021-12 | RAN#94 | R5-217307 | 0525 | - | F | Update of TP analysis for general spurious emissions for DC_8A_n78A | 17.3.0 |
| 2021-12 | RAN#94 | R5-217561 | 0526 | - | F | Update of test point analysis for carrier leakage in FR2 | 17.3.0 |
| 2021-12 | RAN#94 | R5-217604 | 0527 | - | F | Addition of TP analysis of V2X MOP 6.2E.1.x | 17.3.0 |
| 2021-12 | RAN#94 | R5-218200 | 0532 | - | F | TP analysis for ref sensitivity for DC_41A_n77A and DC_41A_n78A | 17.3.0 |
| 2021-12 | RAN#94 | R5-218276 | 0513 | 1 | F | Update_TP_analysis for Rel_16_DC_14A_n2A | 17.3.0 |
| 2021-12 | RAN#94 | R5-218277 | 0514 | 1 | F | Update_TP_analysis for Rel_16_DC_14A_n66A | 17.3.0 |
| 2021-12 | RAN#94 | R5-218306 | 0528 | 1 | F | Addition of TP analysis of V2X MPR 6.2E.2.x | 17.3.0 |
| 2021-12 | RAN#94 | R5-218364 | 0510 | 1 | F | Addition of TP analysis of A-MPR and ASE for NS_56 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218409 | 0531 | 1 | F | Update of test point analysis for relative power tolerance in FR2 | 17.3.0 |
| 2021-12 | RAN#94 | R5-218445 | 0518 | 1 | F | TP analysis for ref sensitivity for DC_2A_n71A | 17.3.0 |
| 2021-12 | RAN#94 | R5-218446 | 0519 | 1 | F | TP analysis for ref sensitivity for DC_5A_n66A | 17.3.0 |
| 2021-12 | RAN#94 | R5-218447 | 0530 | 1 | F | TP analysis update for A-MPR and A-Spurious test cases | 17.3.0 |
| 2021-12 | RAN#94 | R5-218487 | 0529 | 1 | F | Update of TR 38.905 with EN DC A MPR test point analyses, NS_04 | 17.3.0 |
| 2022-03 | RAN#95 | R5-220321 | 0537 | - | F | Adding Reference sensitivity Test point analysis for Rel-16 inter-band EN-DC FR1 two band combinations | 17.4.0 |
| 2022-03 | RAN#95 | R5-220363 | 0541 | - | F | Update TP analysis for Rel-17 DC_2A_n77A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220364 | 0542 | - | F | Update TP analysis for Rel-17 DC_5A_n77A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220365 | 0543 | - | F | Update TP analysis for Rel-17 DC_13A_n77A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220366 | 0544 | - | F | Update TP analysis for Rel-17 DC_66A_n77A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220377 | 0545 | - | F | Introduction of reference sensitivity test point analysis for DC_1A-n7A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220378 | 0546 | - | F | Introduction of reference sensitivity test point analysis for DC_28A_n7A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220379 | 0547 | - | F | Introduction of reference sensitivity test point analysis for DC_1A_n5A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220381 | 0548 | - | F | Introduction of reference sensitivity test point analysis for DC_3A_n5A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220383 | 0549 | - | F | Introduction of reference sensitivity test point analysis for DC_7A-n5A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220385 | 0550 | - | F | Introduction of reference sensitivity test point analysis for DC_7A_n28A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220388 | 0552 | - | F | Introduction of reference sensitivity test point analysis for DC_7A_n5A-n78A | 17.4.0 |
| 2022-03 | RAN#95 | R5-220389 | 0553 | - | F | Introduction of reference sensitivity test point analysis for DC_28A_n7A-n78A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221748 | 0555 | 1 | F | Addition of Test Point analysis for FR1 Spurious emission for UE co-existence for DC_19_n1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221749 | 0556 | 1 | F | Addition of Test Point analysis for FR1 Spurious emission for UE co-existence for DC_21_n1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-220794 | 0558 | - | F | TP analysis for 6.2D.1 for ULFPtx | 17.4.0 |
| 2022-03 | RAN#95 | R5-220982 | 0561 | - | F | Update of test point analysis for Adjacent Channel Selectivity for EN-DC within FR1 | 17.4.0 |
| 2022-03 | RAN#95 | R5-221115 | 0562 | - | F | Updating TP analysis for FR1 AMPR for CA_n41A-n79A testing | 17.4.0 |
| 2022-03 | RAN#95 | R5-221123 | 0563 | - | F | Updating TP analysis for FR1 MPR for intra-band CA test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221125 | 0564 | - | F | Updating TP analysis for FR1 Absolute power tolerance CA test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221127 | 0565 | - | F | Updating TP analysis for FR1 ACLR for intra-band CA test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221129 | 0566 | - | F | Updating TP analysis for FR1 SEM for intra-band CA test case | 17.4.0 |
| 2022-03 | RAN#95 | R5-221313 | 0573 | - | F | TP analysis for ref sensitivity for DC_2A_n78A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221320 | 0575 | - | F | TP analysis for ref sensitivity for 4 Rel-17 ENDC combos | 17.4.0 |
| 2022-03 | RAN#95 | R5-221327 | 0577 | - | F | TP analysis for ref sensitivity for DC_2A_n66A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221602 | 0580 | - | F | Correction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_8A_n3A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221603 | 0581 | - | F | Correction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_20A_n3A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221631 | 0583 | - | F | Update of spurious emission TP analysis for DC_3A_n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221632 | 0584 | - | F | Update of spurious emission TP analysis for DC_8A_n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221633 | 0585 | - | F | Update of spurious emission TP analysis for DC_25A_n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221634 | 0582 | - | F | Update of spurious emission TP analysis for DC_26A_n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221635 | 0586 | - | F | Update of spurious emission TP analysis for DC_39A_n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221636 | 0587 | - | F | Update of spurious emission TP analysis for DC_40A_n41A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221750 | 0574 | 1 | F | Update_TP_analysis for EVM | 17.4.0 |
| 2022-03 | RAN#95 | R5-221751 | 0576 | 1 | F | Test Point analysis for FR2 Tx spur emission UL MIMO tests | 17.4.0 |
| 2022-03 | RAN#95 | R5-221752 | 0578 | 1 | F | Addition of reference sensitivity checklist for CA reference sensitivity test point analysis | 17.4.0 |
| 2022-03 | RAN#95 | R5-221753 | 0579 | 1 | F | Modification of test point analysis clause for FR1 NR CA | 17.4.0 |
| 2022-03 | RAN#95 | R5-221774 | 0533 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_8A_n20A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221775 | 0534 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_20A_n7A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221776 | 0535 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_28A_n5A | 17.4.0 |

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| 2022-03 | RAN#95 | R5-221777 | 0536 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_40A_n79A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221778 | 0551 | 1 | F | Introduction of reference sensitivity test point analysis for DC_7A_n78A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221779 | 0567 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_1A_n5A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221780 | 0568 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_1A_n7A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221781 | 0569 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_3A_n5A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221782 | 0570 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_7A_n5A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221783 | 0571 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_28A_n7A | 17.4.0 |
| 2022-03 | RAN#95 | R5-221829 | 0557 | 1 | F | TP analysis for 6.2E.2.2 MPR for concurrent operation | 17.4.0 |
| 2022-03 | RAN#95 | R5-221841 | 0559 | 1 | F | TP analysis for 6.2D.2 for ULFPtx | 17.4.0 |
| 2022-06 | RAN#96 | R5-222187 | 0588 | - | F | Correction of Number of test points for V2X SEM and V2X ACLR in 38.521-1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222188 | 0589 | - | F | Correction of Justification in attachment for UL MIMO MPR and ACLR in 38.521-1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222189 | 0590 | - | F | Correction of test points analysis of 2UL CA ACLR test case in 38.521-1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222420 | 0602 | - | F | Update of R17 Reference Sensitivity test point analysis for FR1 NR CA | 17.5.0 |
| 2022-06 | RAN#96 | R5-222429 | 0603 | - | F | Test point analysis update for FR1 test case 6.3A.4.1.1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222574 | 0606 | - | F | Addition of test analysis for several CA combinations | 17.5.0 |
| 2022-06 | RAN#96 | R5-222682 | 0613 | - | F | Update of test points analysis for CA_n1A-n3A refsens test case | 17.5.0 |
| 2022-06 | RAN#96 | R5-222733 | 0614 | - | F | Update for 38.521-1_TPanalysis_7.3_RefSense | 17.5.0 |
| 2022-06 | RAN#96 | R5-222734 | 0615 | - | F | Update TpAnalysisSpur_DC_14A_n2A | 17.5.0 |
| 2022-06 | RAN#96 | R5-222735 | 0616 | - | F | Update TpAnalysisSpur_DC_14A_n66A | 17.5.0 |
| 2022-06 | RAN#96 | R5-222831 | 0617 | - | F | Addition of test point analysis for 6.2B.1.3_1 Maximum Output Power | 17.5.0 |
| 2022-06 | RAN#96 | R5-222886 | 0619 | - | F | Update to TP analysis of A-MPR to add ULFPtx | 17.5.0 |
| 2022-06 | RAN#96 | R5-222903 | 0620 | - | F | Addition of TP analysis for FR1 RedCap requirements | 17.5.0 |
| 2022-06 | RAN#96 | R5-222915 | 0621 | - | F | Removing test case 6.5D.1_1 Occupied bandwidth for UL MIMO (Rel-16 onward) from 38.905 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222927 | 0622 | - | F | Addition of test point analysis for new test case 6.2G.1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222928 | 0623 | - | F | Addition of test point analysis for new test cases 6.2G.2 and 6.5G.2.3.1 | 17.5.0 |
| 2022-06 | RAN#96 | R5-222929 | 0624 | - | F | Addition of test point analysis for new test case 6.2G.3 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223017 | 0625 | - | F | Update of test point analysis for MPR, SEM and NR ACLR for UL MIMO | 17.5.0 |
| 2022-06 | RAN#96 | R5-223050 | 0626 | - | F | Update of test points analysis per CA configuration Table | 17.5.0 |
| 2022-06 | RAN#96 | R5-223682 | 0591 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_1A_n8A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223683 | 0592 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_7A_n8A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223684 | 0593 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_8A_n28A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223685 | 0594 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_20A_n8A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223686 | 0595 | 1 | F | Introduction of reference sensitivity test point analysis for DC_1A-20A_n8A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223687 | 0596 | 1 | F | Introduction of reference sensitivity test point analysis for DC_1A-28A_n5A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223688 | 0597 | 1 | F | Introduction of reference sensitivity test point analysis for DC_3A-7A_n5A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223689 | 0598 | 1 | F | Introduction of reference sensitivity test point analysis for DC_3A-8A_n28A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223690 | 0599 | 1 | F | Introduction of reference sensitivity test point analysis for DC_7A-8A_n3A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223691 | 0600 | 1 | F | Introduction of reference sensitivity test point analysis for DC_7A-20A_n8A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223692 | 0601 | 1 | F | Introduction of reference sensitivity test point analysis for DC_7A-28A_n5A | 17.5.0 |
| 2022-06 | RAN#96 | R5-223696 | 0628 | 1 | F | Update_TP_analysis for AMPR NS_27 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223732 | 0627 | 1 | F | Updating A-MPR and A-SE TP analysis for NS_48 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223745 | 0607 | 1 | F | Tx spurious emission TP analysis for Rel-17 CA_n24-n41 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223746 | 0608 | 1 | F | Tx spurious emission TP analysis for Rel-17 CA_n24-n48 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223747 | 0609 | 1 | F | Tx spurious emission TP analysis for Rel-17 CA_n24-n77 | 17.5.0 |
| 2022-06 | RAN#96 | R5-223771 | 0618 | 1 | F | Addition of test point analysis for 6.2B.4.1.3_1 Configured Output Power | 17.5.0 |
| 2022-06 | RAN#96 | R5-223867 | 0604 | 1 | F | Updating TP analysis for MPR, SEM and ACLR for FR2 | 17.5.0 |

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| 2022-09 | RAN#97 | R5-224158 | 0631 | - | F | Introduction of reference sensitivity test point analysis for DC_3A-7A-20A_n8A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224207 | 0633 | - | F | Adding test point analysis for A_MPR NS_27 with 30 MHz channel bandwidth | 17.6.0 |
| 2022-09 | RAN#97 | R5-224254 | 0634 | - | F | Correction of test points analysis of some Rx test cases in 38.521-1 for the addition of test points for asymmetric channel bandwidths and UL-MIMO | 17.6.0 |
| 2022-09 | RAN#97 | R5-224792 | 0640 | - | F | Addition of test point analysis for TxD test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-224872 | 0646 | - | F | A-MPR TP analysis for Rel-17 CA_n24-n48 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224873 | 0647 | - | F | A-MPR TP analysis for Rel-17 CA_n24-n77 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224886 | 0649 | - | F | TP analysis for additional spurious emission for NS_14 | 17.6.0 |
| 2022-09 | RAN#97 | R5-224901 | 0657 | - | F | General rule for TP selection for NR_U test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-224938 | 0658 | - | F | Editorial corrections to the timeline for introduction of test points | 17.6.0 |
| 2022-09 | RAN#97 | R5-224940 | 0659 | - | F | Introduction of reference sensitivity test point analysis for DC_2A-66A_n41A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224944 | 0660 | - | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_2A_n41A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224945 | 0661 | - | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_7A_n3A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224947 | 0662 | - | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_8A_n41A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224948 | 0663 | - | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_13A_n2A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224949 | 0664 | - | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_20A_n1A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224951 | 0665 | - | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_48A_n5A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224953 | 0666 | - | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_48A_n66A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224955 | 0667 | - | F | Update of spurious emission TP analysis for Rel-16 EN-DC configuration DC_66A_n41A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224959 | 0668 | - | F | Editorial corrections to spurious emission test cases for DC_8A_n3A, DC_8A_n20A and DC_20A_n3A | 17.6.0 |
| 2022-09 | RAN#97 | R5-224965 | 0669 | - | F | Incorrect TP analysis revision for test case 6.2D.2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225065 | 0670 | - | F | Updating test point selection criteria for FR1 SUL test cases | 17.6.0 |
| 2022-09 | RAN#97 | R5-225074 | 0671 | - | F | Adding TP analysis for new FR1 test case 6.3C.3.2 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225076 | 0672 | - | F | Updating TP analysis for FR1 test case 6.3A.3.1_1 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225108 | 0673 | - | F | Editorial correction for DC_1A_n5A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225711 | 0630 | 1 | F | Introduction of spurious emission TP analysis for Rel-16 EN-DC configuration DC_3A_n8A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225712 | 0635 | 1 | F | Update TP analysis for Rel-16 CA_n2A_n77A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225713 | 0636 | 1 | F | Update TP analysis for Rel-16 CA_n5A_n77A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225714 | 0637 | 1 | F | Update TP analysis for Rel-16 CA_n66A_n77A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225715 | 0638 | 1 | F | TP analysis for ref sensitivity for Rel-16 NR CA combos | 17.6.0 |
| 2022-09 | RAN#97 | R5-225716 | 0650 | 1 | F | Update Spurious emission TP R16 DC_5A_n2A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225737 | 0643 | 1 | F | Tx Spurious emissions test point analysis for many UL CA combos | 17.6.0 |
| 2022-09 | RAN#97 | R5-225738 | 0644 | 1 | F | Test point analysis for reference sensitivity for many 4CA combos | 17.6.0 |
| 2022-09 | RAN#97 | R5-225739 | 0645 | 1 | F | A-MPR TP analysis for Rel-17 CA_n24-n41 | 17.6.0 |
| 2022-09 | RAN#97 | R5-225745 | 0629 | 1 | F | Test point analysis for test 6.2.4_1 Configured transmitted power with Power Boost | 17.6.0 |
| 2022-09 | RAN#97 | R5-225746 | 0641 | 1 | F | Update TP analysis for AMPR NS_05 and NS_05U | 17.6.0 |
| 2022-09 | RAN#97 | R5-225749 | 0632 | 1 | F | Introduction of spurious emission TP analysis for CA_n48A-n70A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225779 | 0642 | 1 | F | Update to MPR for CA TP analysis to add PC2 requirements | 17.6.0 |
| 2022-09 | RAN#97 | R5-225825 | 0648 | 1 | F | Ref sensitivity TP selection for DC_2A_n41A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225826 | 0651 | 1 | F | Ref sensitivity TP selection for DC_1A_n77A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225827 | 0652 | 1 | F | Ref sensitivity TP selection for DC_3A_n77A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225828 | 0653 | 1 | F | Ref sensitivity TP selection for DC_8A_n78A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225829 | 0654 | 1 | F | Ref sensitivity TP selection for DC_5A_n78A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225830 | 0655 | 1 | F | Ref sensitivity TP selection for DC_8A_n79A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225831 | 0656 | 1 | F | Ref sensitivity TP selection for DC_21A_n79A | 17.6.0 |
| 2022-09 | RAN#97 | R5-225832 | 0674 | 1 | F | Updated TP analysis MPR for CA in FR2 | 17.6.0 |

History

| Document history | | |
|-------------------------|--------------|-------------|
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