ETSI TR 138 905 V15.0.0 (2018-10)

5G;
NR;
Derivation of test points for radio transmission and reception User Equipment (UE) conformance test cases
(3GPP TR 38.905 version 15.0.0 Release 15)

Reference
DTR/TSGR-0538905vf00

Keywords
5G

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Foreword

This Technical Report (TR) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- 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".

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].

Editor's note: intended to capture definitions

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

This clause contains information on test point analysis and test point selection for test cases in [2] clause 6 and 7 with information about transmitting test point selection for FR1 listed in table 4.1-1 and receiver test point selection in table 4.1-2.

Table 4.1-1: NR UE transmitter test point selection for FR1

Subclause	Number of test points	Justification in attachment	Comments
6.2.1 UE maximum output power	TBD	"38.521-1_TPanalysis_6.2.1_MaxOP.zip"	RAN5#2-5G-NR Adhoc
6.2C.1 Configured UE transmitted Output Power	270	"38.521-1_TPanalysis_6.2C.1_ConfigOPSUL.zip"	RAN5#80
6.2.3 UE A-MPR	Table 4.1.1.1-1	Table 4.1.1.1-1	See Table 4.1.1.1-1
6.3.1 Minimum output power	TBD	"38.521-1_TPanalysis_6.3.1_MinOP.zip"	RAN5#2-5G-NR Adhoc
6.3.3.2 General ON/OFF time mask	TBD	"38.521-1_TPanalysis_6.3.3.2_OnOff_M.zip"	RAN5#2-5G-NR Adhoc
6.3.4.2 Absolute power tolerance	6	"38.521-1_TPanalysis_6.3.4.2_AbsPtol.zip"	RAN5#78
6.3.4.4 Aggregate power tolerance	PUCCH: 6 PUSCH: 6	"38.521-1_TPanalysis_6.3.4.4_AggPtol.zip"	RAN5#78
6.4.1 Frequency error	5	"38.521-1_TPanalysis_6.4.1_FreqErr_v2.zip"	RAN5#2-5G-NR Adhoc RAN5#80
6.4.2.1 Error Vector Magnitude	PUSCH: 252 PUCCH: 36 PRACH: 36	"38.521-1_TPanalysis_6.4.2.1_EVM.zip"	RAN5#80
6.4.2.2 Carrier leakage	3	"38.521-1_TPanalysis_6.4.2.2_CarrLeak.zip"	RAN5#80
6.4.2.3 In-band emissions	36	"38.521-1_TPanalysis_6.4.2.3_IE.zip"	RAN5#80
6.4.2.4 EVM equalizer spectrum flatness	45	"38.521-1 TPanalysis_6.4.2.4_EVMequalizerSpectrumFlatness.zip"	RAN5#80
6.5.1 Occupied bandwidth	10	"38.521-1_TPanalysis_6.5.1_OccBW.zip	RAN5#78
6.5.2.2 Spectrum Emission Mask	112	"38.521-1_TPanalysis_6.5.2.2_SEM.zip"	RAN5#78
6.5.2.4 Adjacent channel leakage ratio	680	"38.521-1_TPanalysis_6.5.2.4_ACLR.zip"	RAN5#78
6.5.3.2 Spurious emissions for UE co-existence	TBD	"38.521-1_TPanalysis_6.5.3.2_SEcoex.zip"	RAN5#2-5G-NR Adhoc
6.5.4 Transmit intermodulation	8	"38.521-1_TPanalysis_6.5.4_TxIm.zip"	RAN5#80

Table 4.1-2: NR UE receiver test point selection for FR1

Subclause	Number of test points	Justification in attachment	Comments
7.3 Reference sensitivity power level	45	"38.521-1_TPanalysis_7.3_RefSense.zip"	RAN5#79
7.5 Adjacent Channel Selectivity	3	"38.521-1_TPanalysis_7.5_ACS.zip"	RAN5#2-5G-NR Adhoc
7.6.2 In Band Blocking	3	"38.521-1_TPanalysis_7.6.2_InB_Block.zip"	RAN5#2-5G-NR Adhoc
7.6.3 Out-of-band blocking	3	"38.521-1_TPanalysis_7.6.3_OobBlocking.zip"	RAN5#80

4.1.1 Test point selection for FR1 in A-MPR test cases

4.1.1.1 A-MPR test cases for single carrier

This section contains information on test point selection for test case 6.2.3 in [2], Additional Maximum Power Reduction (A-MPR).

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.

Table 4.1.1.1-1: NS value specific test points for A-MPR single carrier

NS value	Number of test points	Justification	Comments
NS_35	112	"38.521-1_TPanalysis_6.2.3_AMPR_NS_35.zip"	RAN5#80

4.2 Test point analysis for FR2

This clause contains information on test point analysis and test point selection for test cases in [3] clause 6 and 7 with information about transmitting test point selection for FR2 listed in table 4.2-1 and receiver test point selection in table 4.2-2.

Table 4.2-1: NR UE transmitter test point selection for FR2

Subclause	Number of test points	Justification in attachment	Comments
6.4.1 Frequency error	1	"38.521-2_TPanalysis_6.4.1_FreqErr.zip"	RAN5#80
6.5.1 Occupied Bandwidth	12	"38.521-2_TPanalysis_6.5.1_OccBW.zip"	RAN5#2-5G-NR Adhoc
6.5.2.1 Spectrum Emission Mask	90	"38.521-2_TPanalysis_6.5.2.1_SEM.zip"	RAN5#2-5G-NR Adhoc RAN5#79 RAN5#80
6.5.2.3 Adjacent Channel Leakage Ratio	TBD	"38.521-2_TPanalysis_6.5.2.3_ACLR.zip"	RAN5#2-5G-NR Adhoc
6.5.3 Spurious emissions	2	"38.521-2_TPanalysis_6.5.3_TxSpurious.zip"	RAN5#80

Table 4.2-2: 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
7.5 Adjacent channel selectivity	3	"38.521-2_TPanalysis_7.5 ACS.zip"	RAN5#2-5G-NR Adhoc
7.6.2 In Band Blocking	3	"38.521-2_TPanalysis_7.6.2 InB_Block.zip"	RAN5#2-5G-NR Adhoc

4.3 Test point analysis for NR CA and EN-DC

This clause contains information on test point analysis and test point selection for test cases in [4] clause 6 and 7 with information about transmitting test point selection for NR CA and EN-DC listed in table 4.3-1 and receiver test point selection in table 4.3-2.

Table 4.3-1: NR UE transmitter test point selection for NR CA and EN-DC

Subclause	Number of test points	Justification in attachment	Comments
6.2.1 UE maximum output power	TBD	TBD	TBD
6.2.2 Maximum Power Reduction (MPR)	TBD	TBD	TBD
6.2B.3.1 UE Additional Maximum Output Power reduction for Intra-band contiguous EN-DC	16	"38.521-3_TPanalysis_6.2B.3.1_AMPR_NS_04.zip"	RAN5#80
6.5B.3.1 Spurious Emissions for intra-band contiguous EN-DC	1	"38.521-3_TPanalysis_6.5B.3.1 TxSpurious_Intra_B_contig.zip"	RAN5#80

Table 4.3-2: NR UE receiver test point selection for NR CA and EN-DC

Subclause	Number of test points	Justification in attachment	Comments
7.3.2 Reference sensitivity power level	TBD	TBD	TBD

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 in the same area, e.g. “TBD”.
- Include Test Case Number(s), e.g. “TBD”.
- In cases where multiple analysis is needed per test cases, e.g. TBD.

Concatenated example file name: “TBD nnn.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.

Editor’s note: Rules for naming of zipped background documents will be added to this Annex.

Annex B: Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**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	-	-	-	Agreed Text Proposal in RAN5#2-5G-NR Adhoc: **R5-181889**, " TP to update TR 38.905 with information on test point analysis " 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" 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" **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"	0.1.0
2018-05	RAN5#79	R5-183078	-	-	-	Document title corrected. Agreed Text Proposal in RAN WG5#79: **R5-183963**, "Test Point analysis for FR1 RefSens test case"	0.2.0
2018-08	RAN5#80	R5-185134	-	-	-	**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"	1.0.0
2018-09	RAN#81	-	-	-	-	raised to v15.0.0 with editorial changes only	15.0.0

History

Document history		
V15.0.0	October 2018	Publication