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Evolved Universal Terrestrial Radio
Access Network (E-UTRAN);
Derivation of test tolerances for User Equipment (UE)
radio reception conformance tests
(3GPP TR 36.904 version 13.1.0 Release 13)

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Contents

Foreword

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Introduction

1 Scope

The present document specifies a general method used to derive Test Tolerances for UE radio reception conformance tests in 3GPP TS 36.521-1 [2], and establishes a system for relating the Test Tolerances to the measurement uncertainties of the Test System.

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

The present document is applicable from Release 10 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 36.521-1: "User Equipment (UE) conformance specification, Radio transmission and reception Part 1: conformance testing".

[3]   ETSI ETR 273-1-2: "Improvement of radiated methods of measurement (using test sites) and evaluation of the corresponding measurement uncertainties; Part 1: Uncertainties in the measurement of mobile radio equipment characteristics; Sub-part 2: Examples and annexes".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 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 TR 21.905 [1].

Other definitions used in the present document are listed in 3GPP TS 36.521-1 [2].

3.2 Symbols

Symbols used in the present document are listed in 3GPP TR 21.905 [1], 3GPP TS 36.521-1 [2].

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 36.521-1 [2].

4 General Principles

4.1 Principle of Superposition

For multi-cell tests there are several cells each generating various Physical channels. In general cells are combined along with AWGN, so the signal and noise seen by the UE may be determined by more than one cell.

Since several cells may contribute towards the overall power applied to the UE, a number of test system uncertainties affect the signal and noise seen by the UE. The aim of the superposition method is to vary each controllable parameter of the test system separately, and to establish its effect on the critical parameters as seen by the UE receiver. The superposition principle then allows the effect of each test system uncertainty to be added, to calculate the overall effect.

The contributing test system uncertainties shall form a minimum set for the superposition principle to be applicable.

4.2 Sensitivity analysis

A change in any one channel level or channel ratio generated at source does not necessarily have a 1:1 effect at the UE. The effect of each controllable parameter of the test system on the critical parameters as seen by the UE receiver shall therefore be established. As a consequence of the sensitivity scaling factors not necessarily being unity, the test system uncertainties cannot be directly applied as test tolerances to the critical parameters as seen by the UE.

> EXAMPLE: In many of the tests described, the $\hat{E}s / I_{ot}$ is one of the critical parameters at the UE. Scaling factors are used to model the sensitivity of the $\hat{E}s / I_{ot}$ to each test system uncertainty. When the scaling factors have been determined, the superposition principle then allows the effect of each test system uncertainty to be added, to give the overall variability in the critical parameters as seen at the UE.

There are often constraints on several parameters at the UE. The aim of the sensitivity analysis, together with the acceptable test system uncertainties, is to ensure that the variability in each of these parameters is controlled within the limits necessary for the specification to apply. The test has then been conducted under valid conditions.

4.3 Statistical combination of uncertainties

The acceptable uncertainties of the test system are specified as the measurement uncertainty tolerance interval for a specific measurement that contains 95% of the performance of a population of test equipment, in accordance with 3GPP TS 36.521-1 [2] clause F.1. In the UE radio reception conformance tests covered by the present document, the Test System shall enable the stimulus signals in the test case to be adjusted to within the specified range, with an uncertainty not exceeding the specified values.

The method given in the present document combines the acceptable uncertainties of the test system, to give the overall variability in the critical parameters as seen at the UE. Since the process does not add any new uncertainties, the method of combination should be chosen to maintain the same tolerance interval for the combined uncertainty as is already specified for the contributing test system uncertainties.

The basic principle for combining uncertainties is in accordance with ETR 273-1-2 [3]. In summary, the process requires 3 steps:

a) Express the value of each contributing uncertainty as a one standard deviation figure, from knowledge of its numeric value and its distribution.

b) Combine all the one standard deviation figures as root-sum-squares, to give the one standard deviation value for the combined uncertainty.

c) Expand the combined uncertainty by a coverage factor, according to the tolerance interval required.

Provided that the contributing uncertainties have already been obtained using this method, using a coverage factor of 2, further stages of combination can be achieved by performing step b) alone, since steps a) and c) simply divide by 2 and multiply by 2 respectively.

The root-sum-squares method is therefore used to maintain the same tolerance interval for the combined uncertainty as is already specified for the contributing test system uncertainties. In some cases where correlation between contributing uncertainties has an adverse effect, the method is modified in accordance with clause 4.4.5 of the present document.

In each analysis, the uncertainties are assumed to be uncorrelated, and are added result root-sum-square unless otherwise stated.

The combination of uncertainties is performed using dB values for simplicity. It has been shown that using dB uncertainty values gives a slightly worse combined uncertainty result than using linear values for the uncertainties. The analysis method therefore errs on the safe side.

# 4.4 Correlation between uncertainties

The statistical (root-sum-square) addition of uncertainties is based on the assumption that the uncertainties are independent of each other. For realisable test systems, the uncertainties may not be fully independent. The validity of the method used to add uncertainties depends on both the type of correlation and on the way in which the uncertainties affect the test requirements.

Clauses 4.4.1 to 4.4.3 give examples to illustrate different types of correlation.

Clauses 4.4.4 to 4.4.7 show how the scenarios applicable to multi-cell RRM tests are treated.

4.4.1 Uncorrelated uncertainties

The graph shows an example of two test system uncertainties, A and B, which affect a test requirement. Each sample from a population of test systems has a specific value of error in parameter A, and a specific value of error in parameter B. Each dot on the graph represents a sample from a population of test systems, and is plotted according to its error values for parameters A and B.
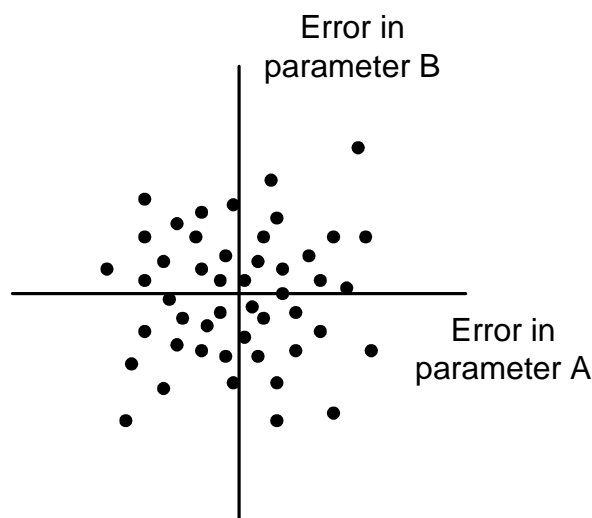
Figure 4.4.1.1: Example of two test system uncertainties affecting a test requirement

It can be seen that a positive value of error in parameter A, for example, is equally likely to occur with either a positive or a negative value of error in parameter B. This is expected when two parameters are uncorrelated, such as two uncertainties which arise from different and unrelated parts of the test system.

4.4.2 Positively correlated uncertainties

The graph shows an example of two test system uncertainties, A and B, which affect a test requirement. Each sample from a population of test systems has a specific value of error in parameter A, and a specific value of error in parameter

B. Each dot on the graph represents a sample from a population of test systems, and is plotted according to its error values for parameters A and B.

Figure 4.4.2-1: Example of two test system uncertainties affecting a test requirement
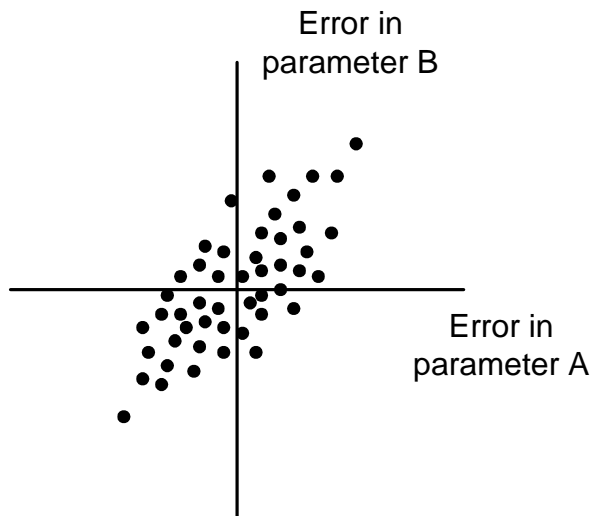
It can be seen that a positive value of error in parameter A, for example, is more likely to occur with a positive value of error in parameter B and less likely to occur with a negative value of error in parameter B. This can occur when the two uncertainties arise from similar parts of the test system, or when one component of the uncertainty affects both parameters in a similar way.

In an extreme case, if the error in parameter A and the error in parameter B came from the same sources of uncertainty, and no others, the dots would lie on a straight line of slope +1.

4.4.3   Negatively correlated uncertainties

The graph shows an example of two test system uncertainties, A and B, which affect a test condition. Each sample from a population of test systems has a specific value of error in parameter A, and a specific value of error in parameter B. Each dot on the graph represents a sample from a population of test systems, and is plotted according to its error values for parameters A and B.
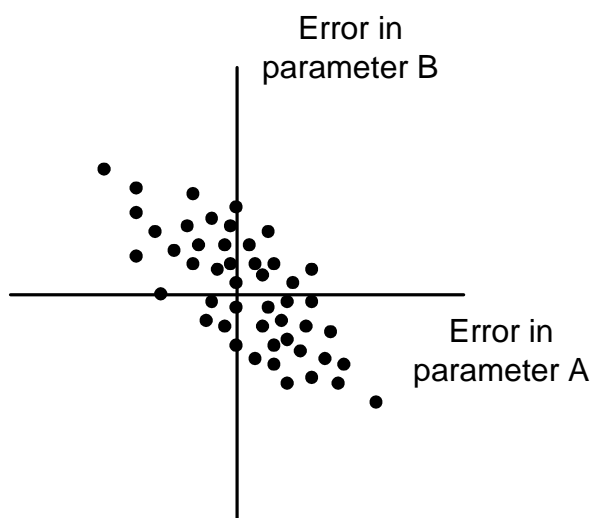

Figure 4.4.3-1: Example of two test system uncertainties affecting a test condition

It can be seen that a positive value of error in parameter A, for example, is more likely to occur with a negative value of error in parameter B and less likely to occur with a positive value of error in parameter B. This effect can theoretically occur, and is included for completeness, but is unlikely in a practical test system.

4.4.4   Treatment of uncorrelated uncertainties

If two uncertainties are uncorrelated, they are added statistically in the analysis. Provided that each uncertainty is already expressed as an expanded uncertainty with coverage factor 2, the contributing uncertainties are added root-sum-squares to give a combined uncertainty which also has coverage factor 2, and the 95% tolerance interval is maintained.

This is the default assumption.

4.4.5   Treatment of positively correlated uncertainties with adverse effect

If two test system uncertainties are positively correlated, and if they affect the value of a critical parameter in the same direction, the combined effect may be greater than predicted by adding the contributing uncertainties root-sum-squares.

In this scenario the two uncertainties are added worst-case in the analysis. Provided that each uncertainty is already expressed as an expanded uncertainty with coverage factor 2, the combined uncertainty will cover a 95% tolerance interval even when the two contributing uncertainties are fully correlated. If the two contributing uncertainties are less than fully correlated, the combined uncertainty will cover a tolerance interval greater than 95%.

4.4.6   Treatment of positively correlated uncertainties with beneficial effect

If two test system uncertainties are positively correlated, and if they affect the value of a critical parameter in opposite directions, the combined effect will be less than predicted by adding the contributing uncertainties root-sum-squares.

In this scenario the two uncertainties are added statistically in the analysis. Provided that each uncertainty is already expressed as an expanded uncertainty with coverage factor 2, the combined uncertainty will cover a 95% tolerance interval when the two contributing uncertainties are uncorrelated. If the two contributing uncertainties are positively correlated, the combined uncertainty will cover a tolerance interval greater than 95%.

4.4.7   Treatment of negatively correlated uncertainties

Negatively correlated uncertainties are excluded by the assumptions. This has been agreed as an acceptable restriction on practical test systems, as the mechanisms which produce correlation generally arise from similarities between two parts of the test system, and therefore produce positive correlation.

5   Grouping of test cases defined in TS 36.521-1

The Test cases are grouped from the viewpoint of efficiently defining the uncertainties and test tolerances. Tests in the same group generally have the same type of uncertainties.

Table 5-1: Test case groups for test tolerance analysis

Group	E-UTRA FDD	E-UTRA TDD	Comments
eICIC demodulation tests	8.2.1.2.3_C.1 8.2.1.3.3_C.1 8.2.1.3.3_C.2 8.4.1.2.3_C.1 8.4.1.2.3_C.2 8.5.1.2.3_C.1	8.2.2.2.3_C.1 8.2.2.3.3_C.1 8.2.2.3.3_C.2 8.4.2.2.3_C.1 8.4.2.2.3_C.2 8.5.2.2.3_C.1	Two cell eICIC demodulation tests. Various number of sub-tests. Tests have AWGN or fading conditions.
Enhanced performance requirement Type A demodulation tests	8.2.1.2.4 8.2.1.4.3 8.3.1.1.3	8.2.2.2.4 8.2.2.4.3 8.3.2.1.4	Two or three cell enhanced performance requirement Type A demodulation tests. Various number of sub-tests. Tests have fading conditions.
Enhanced performance requirement Type A CSI reporting tests	9.3.5.1.1 9.3.5.2.1	9.3.5.1.2 9.3.5.2.2	Two cell enhanced performance requirement Type A CSI reporting tests. Various number of sub-tests. Serving cell has fading condition while interfering cell have static condition.
feICIC demodulation tests	8.2.1.2.3_E.1 8.2.1.3.3_E.1 8.2.1.4.1_E.1 8.4.1.2.3_E.1 8.4.1.2.3_E.2 8.5.1.2.3_E.1	8.2.2.2.3_E.1 8.2.2.3.3_E.1 8.2.2.4.1_E.1 8.4.2.2.3_E.1 8.4.2.2.3_E.2 8.5.2.2.3_E.1	Three cell feICIC demodulation tests. Various number of sub-tests. Tests have AWGN or fading conditions.
feICIC CSI reporting tests	9.2.1.5_E.1 9.3.1.3.1_E.1 9.5.4.1_E.1	9.2.1.6_E.1 9.3.1.3.2_E.1 9.5.4.2_E_1	Three cell feICIC demodulation tests. Various number of sub-tests. Tests have AWGN or fading conditions.
Enhanced performance requirement Type C demodulation tests	8.2.1.3.1C	8.2.2.3.1C	Two cell enhanced performance requirement Type C demodulation tests. One sub-test per test case. Tests have fading conditions.
Enhanced performance requirement Type B demodulation tests	8.2.1.2.5 8.2.1.2.6 8.2.1.4.4 8.3.1.1.4 8.3.1.1.5 8.3.1.1.6 8.3.1.1.7	8.2.2.2.6 8.2.2.2.7 8.2.2.4.5 8.3.2.1.5 8.3.2.1.6 8.3.2.1.7 8.3.2.1.8	Three cell enhanced performance requirement Type B demodulation tests. Various number of sub-tests. Tests have fading conditions.
Enhanced performance requirement Type B CSI reporting tests	9.3.8.1.1 9.3.8.2.1 9.3.8.3.1	9.3.8.1.2 9.3.8.2.2 9.3.8.3.2	Three cell enhanced performance requirement Type B CSI reporting tests. One sub-test per test case. Tests have fading conditions.

6 Determination of Test System Uncertainties

6.1 General

The uncertainty of a test system when making measurements reduces the ability of the test system to distinguish between conformant and non-conformant test subjects. The aim is therefore to minimise uncertainty, subject to a number of practical constraints:

a) A vendor's test system should be reproducible in the required quantities.

b) A choice of test systems should be available from different vendors.

c) The uncertainties should allow reasonable freedom of test system implementation

d) The test system can be run automatically

e) The test system may include several radio access technologies

f) It should be possible to maintain calibration of deployed test systems over reasonable spans of time and environmental conditions

In practice therefore within 3GPP the acceptable uncertainty of the test system is the smallest value that can be agreed between the test system vendors represented, consistent with the above constraints. The uncertainty will not therefore be as low as could be achieved, for example, by a national standards laboratory.

6.2 Uncertainty figures

The actual figures for the acceptable uncertainty of a test system are defined in Annex F of 36.521-1 [2]. To avoid maintenance issues with figures in separate specifications, the uncertainties are not formally defined within the present document.

7 Determination of Test Tolerances

7.1 General

The general principles given in the present document are applied to each test case, according to the applicable uncertainties and requirements to obtain a correct verdict.

The test cases which have been analysed to determine Test Tolerances are included the present document as .zip files. The name of the zip file indicates the test cases covered.

Annex A gives the rationale for their inclusion.

Annex A: Derivation documents

The documents (and spreadsheets where applicable) used to derive the test tolerances for each test case are included in the present document as zip files.

The aim is to provide a reference to completed test cases, so that test tolerances for similar test cases can be derived on a common basis. The information on test case grouping in section 5 can be used to identify similarities.

Annex B:
Change History

Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2014-04	RAN5#63	R5-142065	-	-	TR 36.904 Skeleton proposed for RAN5#63	-	0.0.1
2014-05	RAN5#63	R5-142066	-	-	TR 36.904 update proposed including all technically endorsed TT analyses on RAN5#63	0.0.1	0.0.2
2014-05	RAN#64	RP-140610	-	-	TR 36.904 presented as 2.0.0 for approval at RAN#64	0.0.2	2.0.0
2014-06	RAN#64	-	-	-	Upgraded to v11.0.0 with no change	2.0.0	11.0.0
2014-09	RAN#65	R5-144067	0001	-	Add Test Tolerance analyses for TS 36.521-1 Test case 8.2.2.2.4	11.0.0	11.1.0
2014-09	RAN#65	R5-144069	0002	-	Add Test Tolerance analyses for TS 36.521-1 Test case 8.2.2.4.3	11.0.0	11.1.0
2014-09	RAN#65	R5-144071	0003	-	Add Test Tolerance analyses for TS 36.521-1 Test case 8.3.1.1.3	11.0.0	11.1.0
2014-09	RAN#65	R5-144073	0004	-	Add Test Tolerance analyses for TS 36.521-1 Test case 8.3.2.1.4	11.0.0	11.1.0
2014-09	RAN#65	R5-144078	0005	-	Add Test Tolerance analysis for TS 36.521-1 Test cases 8.2.1.3.3_E.1 and 8.2.2.3.3_E.1	11.0.0	11.1.0
2014-09	RAN#65	R5-144100	0006	-	Test Tolerance Analysis for TS 36.521-1 TC 8.2.1.4.1_E.1+8.2.2.4.1_E.1	11.0.0	11.1.0
2014-09	RAN#65	R5-144106	0007	-	Test Tolerance Analysis for TS 36.521-1 TC 8.4.1.2.3_E.2+8.4.2.2.3_E.2	11.0.0	11.1.0
2014-09	RAN#65	R5-144110	0008	-	Corrections to TR 36.904 for feICIC Group	11.0.0	11.1.0
2014-09	RAN#65	R5-144113	0009	-	Test Tolerance Analysis for TS 36.521-1 TC 9.2.1.5_E.1+9.2.1.6_E.1	11.0.0	11.1.0
2014-09	RAN#65	R5-144116	0010	-	Test Tolerance Analysis for TS 36.521-1 TC 9.3.1.3.1_E.1+9.3.1.3.2_E.1	11.0.0	11.1.0
2014-09	RAN#65	R5-144119	0011	-	Test Tolerance Analysis for TS 36.521-1 TC 9.5.4.1_E.1+9.5.4.2_E.1	11.0.0	11.1.0
2014-09	RAN#65	R5-144285	0012	-	Add Test Tolerance analysis for TS 36.521-1 Test cases 8.2.1.2.3_C.1 and 8.2.2.2.3_C.1	11.0.0	11.1.0
2014-09	RAN#65	R5-144288	0013	-	Add Test Tolerance analysis for TS 36.521-1 Test cases 8.2.1.2.3_E.1 and 8.2.2.2.3_E.1	11.0.0	11.1.0
2014-09	RAN#65	R5-144296	0014	-	Editorial update of eICIC CSI Test Tolerance analyses	11.0.0	11.1.0
2014-09	RAN#65	R5-144816	0015	-	Add Test Tolerance analysis for TS 36.521-1 Test cases 9.3.6.1_F and 9.3.6.2_F	11.0.0	11.1.0
2014-09	RAN#65	R5-144823	0016	-	Add Test Tolerance analyses for TS 36.521-1 Test cases 9.3.5.2.1 and 9.3.5.2.2	11.0.0	11.1.0
2014-12	RAN#66	R5-145826	0017	-	Test Tolerance Analysis for TS 36.521-1 TC 8.5.1.2.3_E.1+8.5.2.2.3_E.1	11.1.0	11.2.0
2014-12	RAN#66	R5-145834	0018	-	Update Test Tolerance analyses for TS 36.521-1 Test cases 9.5.3.x and 9.5.4.x	11.1.0	11.2.0
2015-03	RAN#67	R5-150217	0019	-	Test Tolerance Analysis for TS 36.521-1 TC 8.3.1.2.1_D_1+8.3.2.2.1_D_1	11.2.0	11.3.0
2015-12	RAN#70	R5-155883	0020	1	Add Test Tolerance analysis for FDD multi-cell SU-MIMO test case (8.2.1.3.1C)	11.3.0	12.0.0
2015-12	RAN#70	R5-155884	0021	1	Add Test Tolerance analysis for TDD multi-cell SU-MIMO test case (8.2.2.3.1C)	11.3.0	12.0.0
2015-12	RAN#70	R5-155885	0022	1	Addition of LTE Type C group into 36.904	11.3.0	12.0.0
2016-03	RAN#71	R5-160032	0024	-	Add Test Tolerance analysis for FDD PDSCH Transmit Diversity 2x2 with TM9 Interference Model - Enhanced Perrformance Requirement Type B (8.2.1.2.6)	12.0.0	12.1.0
2016-03	RAN#71	R5-160033	0025	-	Add Test Tolerance analysis for TDD PDSCH Transmit Diversity 2x2 with TM2 Interference Model - Enhanced Perrformance Requirement Type B (8.2.2.2.6)	12.0.0	12.1.0
2016-03	RAN#71	R5-160034	0026	-	Add Test Tolerance analysis for TDD PDSCH Transmit Diversity 2x2 with TM9 Interference Model - Enhanced Perrformance Requirement Type B (8.2.2.2.7)	12.0.0	12.1.0
2016-03	RAN#71	R5-160035	0027	-	Add Test Tolerance analysis for FDD and TDD CQI reporting under fading conditions (PUCCH) TM4 - Enhanced Receiver Type B (9.3.8.1.1 and 9.3.8.1.2)	12.0.0	12.1.0
2016-03	RAN#71	R5-160036	0028	-	Addition of LTE Type B groups into TR 36.904	12.0.0	12.1.0

2016-03	RAN#71	R5-160040	0029	-	Add Test Tolerance analysis for FDD PDSCH Transmit Diversity 2x2 with TM2 Interference Model - Enhanced Performance Requirement Type B (8.2.1.2.5)	12.0.0	12.1.0
2016-03	RAN#71	R5-160157	0032	-	Test Tolerance Analysis for TS 36.521-1 TC 9.3.7.1+9.3.7.2	12.0.0	12.1.0
2016-03	RAN#71	R5-160160	0033	-	Test Tolerance Analysis for TS 36.521-1 TC 9.4.1.4.1+9.4.1.4.2+9.4.2.3.3+9.4.2.3.4	12.0.0	12.1.0
2016-03	RAN#71	R5-161124	0031	2	Test Tolerance Analysis for TS 36.521-1 TC 9.6.1.3.1+9.6.1.3.2+9.6.1.4.1+9.6.1.4.2	12.0.0	12.1.0
2016-06	RAN#72	R5-162173	0036	-	Add Test Tolerance analysis for Power Control Relative power tolerance for CA (intra-band contiguous DL CA and UL CA) test case	12.1.0	12.2.0
2016-06	RAN#72	R5-162899	0037	1	Update of NAICS demod TT analyses to clarify handling of flatness	12.1.0	12.2.0
2016-06	RAN#72	R5-162950	0034	1	Add Test Tolerance analysis for FDD PDSCH Closed Loop Single Layer Spatial Multiplexing 2x2 with TM4 Interference Model - Enhanced Performance Requirement Type B (8.2.1.4.4)	12.1.0	12.2.0
2016-06	RAN#72	R5-162951	0035	1	Add Test Tolerance analysis for TDD PDSCH Closed Loop Single Layer Spatial Multiplexing 2x2 with TM4 Interference Model - Enhanced	12.1.0	12.2.0
2016-12	RAN#74	R5-168690	0041	-	Add Test Tolerance analysis for FDD PDSCH Closed Loop Single-layer Spatial Multiplexing on antenna ports 7 or 8 with TM9 Interference Model - Enhanced Performance Requirement Type B (8.3.1.1.4)	12.2.0	12.3.0
2016-12	RAN#74	R5-168691	0042	-	Add Test Tolerance analysis for FDD PDSCH Closed Loop Single-layer Spatial Multiplexing on antenna ports 7 or 8 with TM3 interference Model - Enhanced Performance Requirement Type B (8.3.1.1.6)	12.2.0	12.3.0
2016-12	RAN#74	R5-168692	0043	-	Add Test Tolerance analysis for TDD PDSCH Closed Loop Single-layer Spatial Multiplexing on antenna ports 7 or 8 with TM9 Interference Model - Enhanced Performance Requirement Type B (8.3.2.1.5)	12.2.0	12.3.0
2016-12	RAN#74	R5-168693	0044	-	Add Test Tolerance analysis for TDD PDSCH Closed Loop Single-layer Spatial Multiplexing on antenna ports 7 or 8 with TM3 interference Model - Enhanced Performance Requirement Type B (8.3.2.1.7)	12.2.0	12.3.0
2016-12	RAN#74	R5-168694	0045	-	Add Test Tolerance analysis for FDD and TDD CQI Reporting under fading conditions - PUCCH 1-1 (CSI Reference Symbol) TM9 - Enhanced Receiver Type B (9.3.8.2.1 and 9.3.8.2.2)	12.2.0	12.3.0
2016-12	RAN#74	R5-169739	0046	-	Add Test Tolerance analysis for FDD PDSCH Closed Loop Single Layer Spatial Multiplexing 2x4 with TM4 Interference Model – Enhanced Performance Requirement Type A	12.3.0	13.0.0
2016-12	RAN#74	R5-169740	0047	-	Add Test Tolerance analysis for FDD PDSCH Single-layer Spatial Multiplexing 2x4 on antenna ports 7 or 8 with TM9 interference model – Enhanced Performance Requirement Type A	12.3.0	13.0.0
2017-03	RAN#75	R5-171044	0051	-	Test Tolerance analysis for CQI reporting enhanced receiver typeB test cases	13.0.0	13.1.0
2017-03	RAN#75	R5-171045	0052	-	Add Test Tolerance analysis for TDD PDSCH Single-layer Spatial Multiplexing 2x4 on antenna ports 7 or 8 with TM9 interference model – Enhanced Performance Requirement Type A	13.0.0	13.1.0
2017-03	RAN#75	R5-171747	0053	1	Test Tolerance analysis for NAICS demod test cases with CRS interference (8.3.1.1.5, 8.3.2.1.6)	13.0.0	13.1.0
2017-03	RAN#75	R5-171749	0048	1	Addition of Test Tolerance analysis for TS36.521-1 TC 9.9.2.1.1 and 9.9.2.1.2.	13.0.0	13.1.0

| 2017-03 | RAN#75 | R5-171750 | 0049 | 1 | Addition of Test Tolerance analysis for TS36.521-1 TC 9.9.2.2.1 and 9.9.2.2.2. | 13.0.0 | 13.1.0 |
| 2017-03 | RAN#75 | R5-171751 | 0050 | 1 | Add Test Tolerance analysis for TDD PDSCH Closed Loop Single Layer Spatial Multiplexing 2x4 with TM4 Interference Model – Enhanced Performance Requirement Type A | 13.0.0 | 13.1.0 |

History

Document history		
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