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Derivation of test tolerances
for Radio Resource Management (RRM) conformance tests
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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 Radio Resource Management tests, 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 8 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.
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[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 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] 3GPP TS 34.121-1: "Terminal conformance specification, Radio transmission and reception (FDD), Release 8".

[4] 3GPP TS 36.521-1: "User Equipment (UE) conformance specification, Radio transmission and reception Part 1: conformance testing, Release 8".

[5] 3GPP TS 36.521-3: "User Equipment (UE) conformance specification, Radio transmission and reception Part 3: Radio Resource Management (RRM) conformance testing, Release 8".

[6] 3GPP TS 36.141: "E-UTRA Base Station (BS) conformance testing, Release 8"

[7] 3GPP TS 36.211: "E-UTRA Physical Channels and Modulation, Release 8"

[8] 3GPP TS 37.571-1: 'Universal Terrestrial Radio Access (UTRA) and Evolved UTRA (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification for UE positioning; Part 1: Terminal conformance'.

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] 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 36.521-3 [5] or 3GPP TS 36.141 [6].

3.2 Symbols

Symbols used in the present document are listed in 3GPP TR 21.905 [1], 3GPP TS 36.521-3 [5] or 3GPP TS 36.141 [6].

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 36.521-3 [5] or 3GPP TS 36.141 [6].

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 36.521-3 [5] clause F.1. In the RRM 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 [2]. 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.

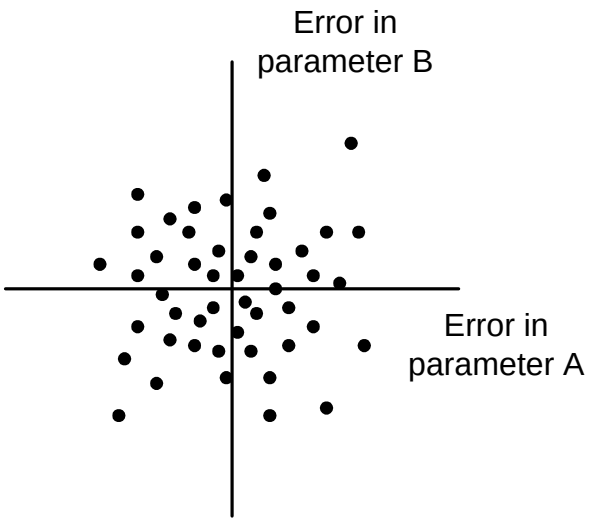

Figure 4.4.1.1: Example of two test system uncertainties affecting a test requirement

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.

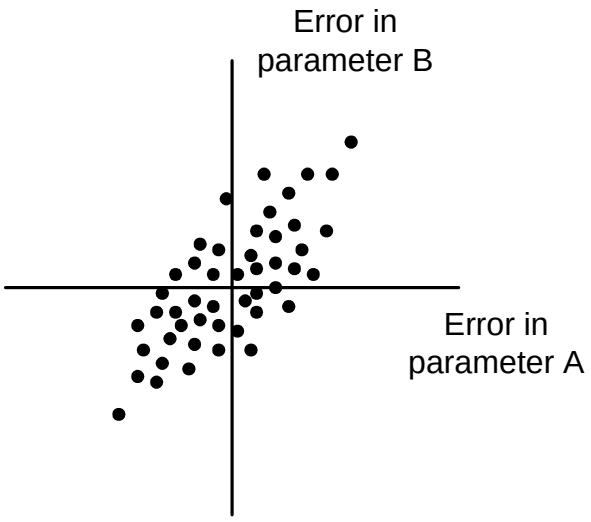

Figure 4.4.2.1: Example of two test system uncertainties affecting a test requirement

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.

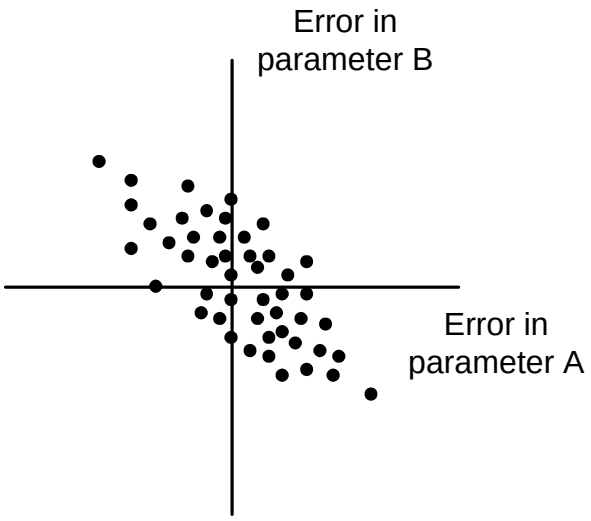

Figure 4.4.3.1: Example of two test system uncertainties affecting a test condition

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 36.521-3

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, given in more detail in Annex B.

A group of test cases having significant differences from those already listed, in respect of uncertainties and test tolerance analysis, will require a new row in the Table.

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

Group	E-UTRA FDD	E-UTRA TDD	E-UTRA FDD/TDD	E-UTRA FDD Inter-RAT	E-UTRA TDD Inter-RAT	Comments
A	4.2.1 5.1.1 6.1.1 8.1.1 8.1.2 8.1.3	4.2.2 5.1.2 6.1.3 8.2.1 8.2.2				Two cell LTE intra 2 or 3 time periods Various number of sub-tests Some tests have fading
B	4.2.3 5.1.3 5.1.5 6.1.2 8.3.1 8.3.2 8.3.3 8.11.1	4.2.6 5.1.4 5.1.6 6.1.4 8.4.1 8.4.2 8.4.3 8.11.2				Two or three cell LTE inter 2 or 3 time periods Some tests have fading
C	9.1.1.1 9.1.1.2 9.2.1.1	9.1.2.1 9.1.2.2 9.2.2.1				Two cell LTE intra 3 sub-tests RSRP, RSRQ
D	9.1.3.1 9.1.3.2 9.2.3.1 9.2.3.2	9.1.4.1 9.1.4.2 9.2.4.1 9.2.4.2				Two cell LTE inter 2 or 3 sub-tests RSRP, RSRQ
E	6.2.1 6.2.2	6.2.3 6.2.4				One cell LTE 1 time period Various number of sub-tests Level, timing
F	7.1.1 7.2.1	7.1.2 7.2.2				One cell LTE Various number of time periods Various number of sub-tests Timing only
G	7.3.1 7.3.2 7.3.5 7.3.6	7.3.3 7.3.4 7.3.7 7.3.8				One cell LTE Various number of time periods Various number of sub-tests
H				4.3.1.1 4.3.1.2 4.3.1.3 4.3.2 5.2.1 5.2.5 5.2.7 8.5.1 8.5.2 8.5.3 8.9.1 9.3.1 9.4.1	 4.3.4.2 4.3.4.1 4.3.4.3 4.3.3 5.2.2 5.2.4 5.2.10 8.6.1 8.7.3 8.7.2 9.3.2 9.4.2	One cell LTE or two cell LTE inter frequency one UTRA cell Various number of time periods Various number of sub-tests Some tests have fading
I				4.4.1 5.2.3 5.2.8 8.8.1 8.8.2	4.4.2 5.2.6 5.2.9 8.10.1 8.10.2	One cell LTE or two cell LTE inter frequency one GSM cell 2 or 3 time periods No fading

5A Grouping of test cases defined in TS 37.571-1

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, given in more detail in Annex C.

A group of test cases having significant differences from those already listed, in respect of uncertainties and test tolerance analysis, will require a new row in the Table.

Table 5 A-1: Test case groups for test tolerance analysis for ECID and OTDOA positioning test cases

Group	E-UTRA FDD	E-UTRA TDD	E-UTRA FDD/TDD	E-UTRA FDD Inter-RAT	E-UTRA TDD Inter-RAT	Comments
[FFS]	8.1.1	8.1.2				One cell LTE Various number of time periods Various number of sub-tests Timing only

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 36.521-3 [5] and Annex C of 37.571-1 [8]. To avoid maintenance issues with figures in separate specifications, the uncertainties are not formally defined within the present document, but informative guidelines are provided in Annex B and Annex C of the present document.

In many cases the default uncertainties in Annex B of the present document are the same as used for UTRA in TS 34.121-1 [3] to allow similar calibration methods to be used. Where E-UTRA has different requirements, or parameters are specified in a different way, the uncertainties may differ.

In some cases the default uncertainties in Annex B of the present document are the same as used for equivalent base station test specifications, which have sometimes been agreed earlier than the UE test specifications.

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: Default uncertainties for test cases defined in TS 36.521-3

This annex contains suggested uncertainties, grouped according to types of test case. The aim is to provide a consistent set of uncertainties across similar test cases to allow efficient implementation.

This Annex is informative only, as the acceptable uncertainties of a test system are defined in Annex F of 36.521-3 [5].

B.0 AWGN and Fading

The following uncertainties and parameters are suggested for E-UTRA AWGN and Fading:

Table B.0-1: Parameters for E-UTRA AWGN and Fading

AWGN Bandwidth	≥ 1.08MHz, 2.7MHz, 4.5MHz, 9MHz, 13.5MHz, 18MHz; N_{RB} x 180kHz according to BW_{Config}
AWGN absolute power uncertainty	Test-specific
AWGN flatness and signal flatness, max deviation for any Resource Block, relative to average over BW_{Config}	±2 dB
AWGN peak to average ratio	≥10 dB @0.001%
Signal-to noise ratio uncertainty	Test-specific
Fading profile power uncertainty - For 1 Tx antenna: - For 2 Tx antenna	 ±0.5 dB ±0.7 dB
Fading profile delay uncertainty, relative to frame timing	±5 ns (excludes absolute errors related to baseband timing)

Values are chosen to be the same as the performance tests in section 8 of TS 36.521-1 [4].

B.1 Group A: E-UTRA Intra-frequency mobility

The following uncertainties and parameters are suggested for E-UTRA Intra-frequency mobility tests:

Table B.1-1: Maximum Test System Uncertainty for E-UTRA Intra-frequency mobility

N_{oc} averaged over BW_{Config}	±1.0 dB
$\hat{E}s_1 / N_{oc}$ averaged over BW_{Config}	±0.3 dB
$\hat{E}s_2 / N_{oc}$ averaged over BW_{Config}	±0.3 dB
Note: $\hat{E}s_1 / N_{oc}$ is the ratio of cell 1 signal / AWGN $\hat{E}s_2 / N_{oc}$ is the ratio of cell 2 signal / AWGN For tests that use fading, the fading uncertainties are given in Table B.0.1	

Values are chosen to be the same as equivalent parameters for UTRA in TS 34.121-1 [3].

This choice forms a minimum set, so the superposition principle can be applied.

B.2 Group B: E-UTRA Inter-frequency mobility

The following uncertainties and parameters are suggested for E-UTRA Inter-frequency mobility tests:

Table B.2-1: Maximum Test System Uncertainty for E-UTRA Inter-frequency mobility

N_{oc1} averaged over BW_{Config}	±0.7 dB
$\hat{E}s_1 / N_{oc1}$ averaged over BW_{Config}	±0.3 dB
N_{oc2} averaged over BW_{Config}	±0.7 dB
$\hat{E}s_2 / N_{oc2}$ averaged over BW_{Config}	±0.3 dB
N_{oc3} averaged over BW_{Config}	±0.7 dB
$\hat{E}s_3 / N_{oc3}$ averaged over BW_{Config}	±0.3 dB
Note: N_{oc1} is the AWGN on cell 1 frequency $\hat{E}s_1 / N_{oc1}$ is the ratio of cell 1 signal / AWGN N_{oc2} is the AWGN on cell 2 frequency $\hat{E}s_2 / N_{oc2}$ is the ratio of cell 2 signal / AWGN N_{oc3} is the AWGN on cell 3 frequency if cell 3 exist $\hat{E}s_3 / N_{oc3}$ is the ratio of cell 3 signal / AWGN if cell 3 exist For tests that use fading, the fading uncertainties are given in Table B.0.1	

N_{oc} values are chosen to be the same as the smallest existing downlink signal uncertainty in TS 36.521-1 [4].

$\hat{E}s / N_{oc}$ values are chosen to be the same as intra-frequency in B.1.

This choice forms a minimum set, so the superposition principle can be applied.

B.3 Group C: E-UTRA Intra-frequency UE reporting accuracy

The following uncertainties and parameters are suggested for E-UTRA Intra-frequency UE reporting accuracy tests:

Table B.3-1: Maximum Test System Uncertainty for E-UTRA Intra-frequency UE reporting accuracy

N_{oc} averaged over BW_{Config}	±0.7 dB
N_{oc} for PRBs #22-27	±1.0 dB
$\hat{E}s_1 / N_{oc}$, $\hat{E}s_2 / N_{oc}$ averaged over BW_{Config}	±0.3 dB
$\hat{E}s_1 / N_{oc}$, $\hat{E}s_2 / N_{oc}$ for PRBs #22-27	±0.8 dB
Note: $\hat{E}s_1 / N_{oc}$ is the ratio of cell 1 signal / AWGN $\hat{E}s_2 / N_{oc}$ is the ratio of cell 2 signal / AWGN	

In these tests the UE measures the power of Cells over specific Physical Resource Block (PRB) numbers #22 to #27. The generic AWGN parameters values similar to those used in performance tests are therefore unsuitable, because the AWGN flatness specification would allow a large deviation for the power in PRBs #22 to #27.

In addition, these tests have separate constraints on the RSRP or RSRQ reported values (derived from UE measurements over PRBs #22 to #27), and on the overall power Io, specified over BW_{Config}.

Two sets of parameters are therefore given. The set averaged over the configured bandwidth have similar values to those already proposed for other tests. The set averaged over PRBs #22 to #27 have wider values, but constraining the deviation enough not to widen the RSRP or RSRQ reporting range too much.

The N_{oc} value averaged over BW_{Config} is chosen to be the same as the smallest existing downlink signal uncertainty in TS 36.521-1 [4].

The N_{oc} value for PRBs #22-27 is chosen to allow some deviation for these specific PRBs compared to the 'averaged over BW_{Config}' figure, but reasonably small compared to the UE reporting accuracy.

The $\hat{E}s / N_{oc}$ values averaged over BW_{Config} are chosen to be the same as intra-frequency in B.1.

The $\hat{E}s / N_{oc}$ values for PRBs #22-27 are chosen to allow some deviation for these specific PRBs compared to the 'averaged over BW_{Config}' figure, but reasonably small compared to the UE reporting accuracy.

This choice forms a minimum set (separately for PRBs #22-27, and for 'averaged over BW_{Config}'), so the superposition principle can be applied.

B.4 Group D: E-UTRA Inter-frequency UE reporting accuracy

The following uncertainties and parameters are suggested for E-UTRA Inter-frequency UE reporting accuracy tests:

Table B.4-1: Maximum Test System Uncertainty for E-UTRA Inter-frequency UE reporting accuracy

N_{oc1}, N_{oc2} averaged over BW_{Config}	±0.7 dB
N_{oc1}, N_{oc2} for PRBs #22-27	±1.0 dB
$\hat{E}s_1 / N_{oc1}$, $\hat{E}s_2 / N_{oc2}$ averaged over BW_{Config}	±0.3 dB
$\hat{E}s_1 / N_{oc1}$, $\hat{E}s_2 / N_{oc2}$ for PRBs #22-27	±0.8 dB
Note: N_{oc1} is the AWGN on cell 1 frequency $\hat{E}s_1 / N_{oc1}$ is the ratio of cell 1 signal / AWGN N_{oc2} is the AWGN on cell 2 frequency $\hat{E}s_2 / N_{oc2}$ is the ratio of cell 2 signal / AWGN	

In these tests the UE measures the power of Cells over specific Physical Resource Block (PRB) numbers #22 to #27. The generic AWGN parameters values similar to those used in performance tests are therefore unsuitable, because the AWGN flatness specification would allow a large deviation for the power in PRBs #22 to #27.

In addition, these tests have separate constraints on the RSRP or RSRQ reported values (derived from UE measurements over PRBs #22 to #27), and on the overall power Io, specified over BW_{Config}.

Two sets of parameters are therefore given. The set averaged over the configured bandwidth have similar values to those already proposed for other tests. The set averaged over PRBs #22 to #27 have wider values, but constraining the deviation enough not to widen the RSRP or RSRQ reporting range too much.

The N_{oc} value averaged over BW_{Config} is chosen to be the same as the smallest existing downlink signal uncertainty in TS 36.521-1 [4].

The N_{oc} value for PRBs #22-27 is chosen to allow some deviation for these specific PRBs compared to the 'averaged over BW_{Config}' figure, but reasonably small compared to the UE reporting accuracy.

The $\hat{E}s / N_{oc}$ values averaged over BW_{Config} are chosen to be the same as inter-frequency in B.2.

The $\hat{E}s / N_{oc}$ values for PRBs #22-27 are chosen to allow some deviation for these specific PRBs compared to the 'averaged over BW_{Config}' figure, but reasonably small compared to the UE reporting accuracy.

This choice forms a minimum set (separately for PRBs #22-27, and for 'averaged over BW_{Config}'), so the superposition principle can be applied.

B.5 Group E: E-UTRA Random Access

The following uncertainties and parameters are suggested for E-UTRA Random Access tests:

Table B.5-1: Maximum Test System Uncertainty for E-UTRA Random Access

Downlink signal:	
N_{oc} averaged over BW_{Config}	±0.7 dB
$\hat{E}s / N_{oc}$ averaged over BW_{Config}	±0.3 dB
Uplink signal:	
Absolute power measurement	±0.7 dB
Power step relative measurement	±0.7 dB
Uplink signal transmit timing relative to downlink	±3Ts T_S = 1/(15000 x 2048) seconds, the basic timing unit defined in TS 36.211

The downlink N_{oc} and $\hat{E}s / N_{oc}$ values are chosen to be the same as intra-frequency in B.3. The downlink signal uncertainties are critical for random access tests because the UE uses RSRP to calculate path loss, and hence to set the uplink power to the desired value.

The uplink power absolute signal measurement uncertainty value is chosen to be the same as the Maximum Output Power test 6.2.2 in Annex F of TS 36.521-1 [4]. The uplink power relative signal measurement uncertainty value is chosen to be the same as the Relative Power control test 6.3.5.2 in Annex F of TS 36.521-1 [4].

The uncertainty for uplink signal transmit timing relative to downlink measurement was derived by taking 25% of the tightest UE core requirement, which is 12 * T_s for ≥3 MHz Channel bandwidth, giving a ±3*Ts uncertainty.

The timing uncertainty is expressed in units of T_S = 1 / (15000 x 2048) seconds, the basic timing unit defined in TS 36.211 [7].

These choices form a minimum set, so the superposition principle can be applied.

B.6 Group F: E-UTRA Transmit timing and Timing advance

The following uncertainties and parameters are suggested for E-UTRA Transmit timing and Timing advance tests:

Table B.6-1: Maximum Test System Uncertainty for E-UTRA Transmit timing and Timing advance

Downlink signal:	
N_{oc} averaged over BW_{Config}	±3.0 dB
$\hat{E}s / N_{oc}$ averaged over BW_{Config}	±0.3 dB
Uplink signal:	
Uplink signal transmit timing relative to downlink	±3Ts T_S = 1/(15000 x 2048) seconds, the basic timing unit defined in TS 36.211
Relative UE timing adjustment	±0.5Ts T_S = 1/(15000 x 2048) seconds, the basic timing unit defined in TS 36.211

The downlink uncertainty values are chosen to be the same as the performance tests in section 8 of TS 36.521-1 [4]. For Transmit timing and Timing advance tests, neither the absolute level of Noc nor the signal to noise ratio is critical.

The uncertainty for uplink signal transmit timing relative to downlink measurement was derived by taking 25% of the tightest UE core requirement, which is 12 * T_s for ≥3 MHz Channel bandwidth, giving a ±3*Ts uncertainty.

The uncertainty for relative UE timing adjustment was derived by taking 25% of the tightest UE core requirement, which is 2 * T_s for ≥10 MHz Channel bandwidth, giving a ±0.5 * T_s uncertainty.

Both timing uncertainties are expressed in units of T_S = 1 / (15000 x 2048) seconds, the basic timing unit defined in TS 36.211 [7].

These choices form a minimum set, so the superposition principle can be applied.

B.7 Group G: E-UTRA In-sync and Out-of-sync

The following uncertainties and parameters are suggested for E-UTRA In-sync and Out-of-sync tests:

Table B.7-1: Maximum Test System Uncertainty for E-UTRA In-sync and Out-of-sync

Downlink signal:	
N_{oc} averaged over BW_{Config}	±3.0 dB
$\hat{E}s / N_{oc}$ averaged over BW_{Config}	±0.3 dB
Note: For tests that use fading, the fading uncertainties are given in Table B.0.1	

Values are chosen to be the same as the performance tests in section 8 of TS 36.521-1 [4]. For In-sync and Out-of-sync tests, as with performance tests, the absolute level of Noc is not critical, but the signal to noise ratio is critical.

This choice forms a minimum set, so the superposition principle can be applied.

B.8 Group H: E-UTRA to UTRA Inter-RAT mobility

The following uncertainties and parameters are suggested for E-UTRAN cell in Table B.8-1 and for UTRAN cell in Table B.8-2.

Table B.8-1: Maximum Test System Uncertainty for E-UTRAN cell E-UTRA to UTRA Inter-RAT mobility

N_{oc1} averaged over BW_{Config}	±0.7 dB
$\hat{E}s_1 / N_{oc1}$ averaged over BW_{Config}	±0.3 dB
N_{oc2} averaged over BW_{Config}	±0.7 dB
$\hat{E}s_2 / N_{oc2}$ averaged over BW_{Config}	±0.3 dB
Note: N_{oc1} is the AWGN on cell 1 frequency $\hat{E}s_1 / N_{oc1}$ is the ratio of cell 1 signal / AWGN N_{oc2} is the AWGN on cell 2 frequency if the second LTE cell exist $\hat{E}s_2 / N_{oc2}$ is the ratio of cell 2 signal / AWGN if the second LTE cell exist For cells that use fading, the fading uncertainties are given in Table B.0.1	

Table B.8-2: Maximum Test System Uncertainty for UTRAN cell E-UTRA to UTRA Inter-RAT mobility

I_{oc}	±0.7 dB
I_{or} / I_{oc}	±0.3 dB
E_c / I_{or}	
CPICH E_c / I_{or} (UTRA FDD)	±0.1dB
PCCPCH E_c / I_{or} (UTRA TDD)	±0.1dB
DwPCH E_c / I_{or} (UTRA TDD)	±0.1dB
Note: I_{oc} is the AWGN on UTRA cell frequency I_{or} / I_{oc} is the ratio of UTRA cell signal / AWGN CPICH E_c / I_{or} is the fraction of UTRA FDD cell power assigned to the CPICH Physical channel PCCPCH E_c / I_{or} is the fraction of UTRA TDD cell power assigned to the PCCPCH Physical channel DwPCH_Ec/Ior is the fraction of UTRA TDD cell power assigned to the DwPCH channel For cell that use fading, .the fading profile power uncertainty of ±0.5 dB shall be considered.	

$\hat{E}s$ / Noc and $\hat{I}or$ / Ioc are chosen to be similar to equivalent parameters in W-CDMA. The absolute levels of Noc and Ioc are specified as ±0.7dB, similar to the uncertainty for other absolute power values such as RefSens. The Ec / Ior is specified as ± 0.1dB, similar to the uncertainty in TS 34.121-1.

This choice forms a minimum set, so the superposition principle can be applied.

B.9 Group I: E-UTRA to GSM Inter-RAT mobility

The following uncertainties and parameters are suggested for E-UTRAN cell in Table B.9-1 and for GSM cell in Table B.9-2.

Table B.9-1: Maximum Test System Uncertainty for E-UTRAN cell E-UTRA to GSM Inter-RAT mobility

N_{oc1} averaged over BW_{Config}	±0.7 dB
$\hat{E}s_1 / N_{oc1}$ averaged over BW_{Config}	±0.3 dB
N_{oc2} averaged over BW_{Config}	±0.7 dB
$\hat{E}s_2 / N_{oc2}$ averaged over BW_{Config}	±0.3 dB
Note: N_{oc1} is the AWGN on cell 1 frequency $\hat{E}s_1 / N_{oc1}$ is the ratio of cell 1 signal / AWGN N_{oc2} is the AWGN on cell 2 frequency if the second LTE cell exist $\hat{E}s_2 / N_{oc2}$ is the ratio of cell 2 signal / AWGN if the second LTE cell exist	

Table B.9-2: Maximum Test System Uncertainty for UTRAN cell E-UTRA to GSM Inter-RAT mobility

Signal level	±0.7 dB
Note: GSM cell has only the wanted signal, without AWGN	

N_{oc} values are chosen to be the same as the smallest existing downlink signal uncertainty in TS 36.521-1 [4].

$\hat{E}s / N_{oc}$ values are chosen to be the same as intra-frequency in B.1.

The GSM cell signal level is specified as ±0.7 dB, similar to the uncertainty for other absolute power values such as E-UTRA RefSens.

This choice forms a minimum set, so the superposition principle can be applied.

Annex C: Default uncertainties for test cases defined in TS 37.571-1

This annex contains suggested uncertainties, grouped according to types of test case. The aim is to provide a consistent set of uncertainties across similar test cases to allow efficient implementation.

This Annex is informative only, as the acceptable uncertainties of a test system are defined in Annex C of 37.571-1 [8].

Annex D:
Change History

Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2010-02	RAN5#46	R5-072185	-	-	TR 36.903 Skeleton proposed for RAN5#46	-	0.0.1
2010-06	-	-	-	-	TR 36.903 update proposed	0.0.1	0.0.x
2010-08	RAN5#48	-	-	-	TR 36.903 update proposed	0.0.x	0.0.2
2010-08	RAN5#48	R5-104409	-	-	TR 36.903 update proposed including all docs agreed on RAN5#48	0.0.2	0.1.0
2010-09	-	-	-	-	Small editorial corrections	0.1.0	0.1.1
2010-09	RAN5#49	R5-106802	-	-	TR 36.903 update proposed including all docs agreed on RAN5#49	0.1.1	1.0.0
2010-12	RAN5#50	R5-101182	-	-	TR 36.903 v1.0.0 on Derivation of test tolerances for multi-cell RRM conformance tests (Approval)	1.0.0	8.0.0
2010-12	RAN5#50	-	-	-	Raised to v9.0.0 with no change	8.0.0	9.0.0
2011-09	RAN5#52	R5-113225	0001	-	Test Tolerance analysis for RRM test case 4.3.1.3	9.0.0	9.1.0
2011-09	RAN5#52	R5-113227	0002	-	RRM Test Tools agreed at RAN5#50 in TR 36.903	9.0.0	9.1.0
2011-09	RAN5#52	R5-113228	0003	-	RRM Test Tools agreed at RAN5#51 in TR 36.903	9.0.0	9.1.0
2011-09	RAN5#52	R5-113248	0004	-	Add Test Tolerance analysis for the inter RAT E-UTRAN handover test cases 5.2.1 and 5.2.2	9.0.0	9.1.0
2011-09	RAN5#52	R5-114008	0005	-	Add Test Tolerance analysis for E-UTRAN to UTRA TDD handover test case 5.2.4	9.0.0	9.1.0
2011-09	RAN5#52	R5-114010	0006	-	RRM Test Tools Updates agreed at RAN5#50 for TR 36.903	9.0.0	9.1.0
2011-09	RAN5#52	R5-114011	0007	-	Update Test Tolerance analysis for Test cases 8.x	9.0.0	9.1.0
2011-09	RAN5#52	R5-114012	0008	-	Test Tolerance analysis for TS36.521-3 FDD SON ANR test case 8.5.2	9.0.0	9.1.0
2011-09	RAN5#52	R5-114015	0009	-	Add Test Tolerance analysis for E-UTRAN FDD/TDD - UTRA FDD CPICH Ec/No absolute measurement accuracy test cases	9.0.0	9.1.0
2011-09	RAN5#52	R5-114017	0010	-	Add Test Tolerance analysis for E-UTRAN FDD- UTRAN TDD event triggered reporting under fading propagation conditions	9.0.0	9.1.0
2011-09	RAN5#52	R5-114018	0011	-	Update analysis for TC 8.3.3+8.4.3 in 36.903	9.0.0	9.1.0
2011-09	RAN5#52	R5-114020	0012	-	Add Uncertainties and TT analysis for TC 4.3.4.3 in 36.903	9.0.0	9.1.0
2011-09	RAN5#52	R5-114058	0013	-	Add Test Tolerance analysis for E-UTRAN to UTRA Cell Re-Selection test cases 4.3.4.1	9.0.0	9.1.0
2011-12	RAN5#53	R5-115149	0014	-	Add Inter-RAT test case groups in 36.903	9.1.0	9.2.0
2011-12	RAN5#53	R5-115825	0015	-	Test tolerances methodology for UE measurement procedures Inter-RAT event triggered reporting when DRX is used under fading test case 8.5.3 in TR 36.903	9.1.0	9.2.0
2011-12	RAN5#53	R5-115188	0016	-	Test Tolerance analysis for RRM test case 8.11.3	9.1.0	9.2.0
2011-12	RAN5#53	R5-115201	0017	-	Test Tolerance analysis for TS36.521-3 TDD SON ANR test case 8.7.3	9.1.0	9.2.0
2011-12	RAN5#53	R5-115402	0018	-	Test Tolerance analysis for RRM test case 4.3.3	9.1.0	9.2.0
2011-12	RAN5#53	R5-115788	0019	-	GCF Priority 2 - Add RRM Test Tolerance analysis for RRM test case 8.11.1 and 8.11.2	9.1.0	9.2.0
2011-12	RAN5#53	R5-115826	0020	-	Update of Test Tolerances analysis for ch.9 test cases	9.1.0	9.2.0
2011-12	RAN5#53	R5-115898	0021	-	Add test tolerance analysis for 6.1.3 and 6.1.4	9.1.0	9.2.0
2012-03	RAN5#54	R5-120108	0022	-	Test Tolerance analysis for TS36.521-3 TDD new CGI test cases 8.2.3 and 8.2.4	9.2.0	9.3.0
2012-03	RAN5#54	R5-120123	0023	-	Test Tolerance analysis for TS36.521-3 TDD Inter-frequency new CGI test cases 8.4.4 and 8.4.5.	9.2.0	9.3.0
2012-03	RAN5#54	R5-120246	0024	-	Update Test Tolerance analysis for RRM test cases 9.1.4.1 and 9.1.4.2	9.2.0	9.3.0
2012-03	RAN5#54	R5-120247	0025	-	Update RRM Test Tolerance analysis for TDD PRACH Test cases 6.2.3+6.2.4	9.2.0	9.3.0
2012-03	RAN5#54	R5-120248	0026	-	Add Test Tolerance analysis for RRM test case 8.11.4	9.2.0	9.3.0
2012-03	RAN5#54	R5-120906	0027	-	Add TT Analysis for TC 4.5.1.1 in 36.903	9.2.0	9.3.0
2012-03	RAN5#54	R5-120916	0028	-	Add TT Analysis for TC 5.3.1 in 36.903	9.2.0	9.3.0
2012-06	RAN5#55	R5-121246	0029	-	Grouping of positioning test cases in TR36.903	9.3.0	9.4.0
2012-06	RAN5#55	R5-121606	0030	-	Add Test Tolerance analysis for RRM test cases 4.2.4 and 4.2.5	9.3.0	9.4.0

2012-06	RAN5#55	R5-121608	0031	-	Add Test Tolerance analysis for RRM test cases 5.1.7 and 5.1.8	9.3.0	9.4.0
2012-06	RAN5#55	R5-121610	0032	-	Add Test Tolerance analysis for RRM test cases 8.14.1	9.3.0	9.4.0
2012-06	RAN5#55	R5-121612	0033	-	Add Test Tolerance analysis for RRM test cases 8.15.1	9.3.0	9.4.0
2012-06	RAN5#55	R5-121614	0034	-	Add Test Tolerance analysis for RRM test case 9.1.5.1	9.3.0	9.4.0
2012-06	RAN5#55	R5-121616	0035	-	Addition of Test Tolerance analysis for FDD - TDD Inter Frequency Relative Accuracy of RSRP test case 9.1.5.2	9.3.0	9.4.0
2012-06	RAN5#55	R5-121926	0036	-	TT 9.6.2 analysis for 36.903	9.3.0	9.4.0
2012-06	RAN5#55	R5-121928	0037	-	Resubmission of TT Analysis for TC 4.5.1.1 in 36.903	9.3.0	9.4.0
2012-06	RAN5#55	-	-	-	Added two missing TT Analysis zip files	9.4.0	9.4.1
2012-09	RAN5#56	R5-123213	0045	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 4.2.7 and 4.2.8	9.4.1	9.5.0
2012-09	RAN5#56	R5-123921	0038	-	Update Test Tolerance analysis for RRM test case 9.1.2.1	9.4.1	9.5.0
2012-09	RAN5#56	R5-123922	0039	-	Update Test Tolerance analysis for RRM test case 9.1.2.2	9.4.1	9.5.0

2012-09	RAN5#56	R5-123923	0040	-	Update Test Tolerance analysis for RRM test cases 9.1.3.1+9.1.4.1	9.4.1	9.5.0
2012-09	RAN5#56	R5-123924	0041	-	Update Test Tolerance analysis for RRM test cases 9.1.3.2+9.1.4.2	9.4.1	9.5.0
2012-09	RAN5#56	R5-123925	0042	-	Update Test Tolerance analysis for RRM test cases 9.2.1.1+9.2.2.1	9.4.1	9.5.0
2012-09	RAN5#56	R5-123926	0043	-	Update Test Tolerance analysis for RRM test cases 9.2.3.1+9.2.4.1	9.4.1	9.5.0
2012-09	RAN5#56	R5-123927	0044	-	Update Test Tolerance analysis for RRM test cases 9.2.3.2+9.2.4.2	9.4.1	9.5.0
2012-12	RAN5#57	R5-125558	0048	-	Addition of uncertainties and test tolerance definition and analysis for TC 9.2.4A.1	9.5.0	9.6.0
2012-12	RAN5#57	R5-125815	0049	-	Addition of uncertainties and test tolerance definition and analysis for TC 4.5.2.1	9.5.0	9.6.0
2012-12	RAN5#57	R5-125816	0050	-	Addition of uncertainties and test tolerance definition and analysis for TC 5.3.5	9.5.0	9.6.0
2012-12	RAN5#57	R5-125817	0051	-	Addition of uncertainties and test tolerance definition and analysis for TC 8.14.2	9.5.0	9.6.0
2012-12	RAN5#57	R5-125818	0052	-	Addition of uncertainties and test tolerance definition and analysis for TC 8.15.2	9.5.0	9.6.0
2012-12	RAN5#57	R5-125819	0053	-	Addition of uncertainties and test tolerance definition and analysis for TC 8.14.3 and 8.15.3	9.5.0	9.6.0
2012-12	RAN5#57	R5-125820	0054	-	Addition of uncertainties and test tolerance definition and analysis for TC 9.2.4A.2	9.5.0	9.6.0
2012-12	RAN5#57	R5-125356	0046	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 8.16.1 and 8.16.2	9.6.0	10.0.0
2012-12	RAN5#57	R5-125362	0047	-	Update TS 36.521-3 Test cases 5.2.3+5.2.6 Test Tolerance analyses for >3GHz	9.6.0	10.0.0
2013-03	RAN5#58	R5-130055	0055	-	Update TS 36.521-3 Test cases 7.1.1+7.1.2 Test Tolerance analyses	10.0.0	10.1.0
2013-03	RAN5#58	R5-130057	0056	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.1.6.1 and 9.1.7.1	10.0.0	10.1.0
2013-03	RAN5#58	R5-130059	0057	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.1.6.2 and 9.1.7.2	10.0.0	10.1.0
2013-03	RAN5#58	R5-130061	0058	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.2.5.1 and 9.2.6.1	10.0.0	10.1.0
2013-03	RAN5#58	R5-130063	0059	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.2.5.2 and 9.2.6.2	10.0.0	10.1.0
2013-03	RAN5#58	R5-130393	0061	-	Addition of test tolerance analysis for TCs 6.3.1+6.3.9	10.0.0	10.1.0
2013-03	RAN5#58	R5-130394	0062	-	Addition of test tolerance analysis for TCs 6.3.3+6.3.10	10.0.0	10.1.0
2013-03	RAN5#58	R5-130933	0063	-	Addition of uncertainties and test tolerance definition and analysis for TC 8.16.3 and TC 8.16.4	10.0.0	10.1.0
2013-06	RAN5#59	R5-131179	0077	-	RRM: Add test tolerance analyses for TCs 8.1.5 and 8.1.6	10.1.0	10.2.0
2013-06	RAN5#59	R5-131181	0065	-	RRM: Add test tolerance analyses for TCs 8.3.4 and 8.3.5	10.1.0	10.2.0
2013-06	RAN5#59	R5-131279	0066	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.2.7.1, 9.2.8.1	10.1.0	10.2.0
2013-06	RAN5#59	R5-131285	0067	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 8.11.5, 8.11.6	10.1.0	10.2.0

2013-06	RAN5#59	R5-131287	0068	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.5.1, 9.5.2	10.1.0	10.2.0
2013-06	RAN5#59	R5-131290	0069	-	Remove superseded analysis zip files	10.1.0	10.2.0
2013-06	RAN5#59	R5-131400	0070	-	Test Tolerance analyses for TS 36.521-3 test cases 5.2.4 and 5.2.5	10.1.0	10.2.0
2013-06	RAN5#59	R5-131401	0071	-	Test Tolerance analyses for TS 36.521-3 test case 8.5.4	10.1.0	10.2.0
2013-06	RAN5#59	R5-131402	0072	-	Test Tolerance analyses for TS 36.521-3 test cases 8.7.4 and 8.9.2	10.1.0	10.2.0
2013-06	RAN5#59	R5-131461	0073	-	Addition of test tolerance analysis for TCs 6.3.2+6.3.12	10.1.0	10.2.0
2013-06	RAN5#59	R5-131464	0074	-	Addition of test tolerance analysis for TCs 6.3.4+6.3.11	10.1.0	10.2.0
2013-06	RAN5#59	R5-131467	0075	-	Addition of test tolerance analysis for TCs 6.3.5+6.3.6+6.3.7+6.3.8	10.1.0	10.2.0
2013-09	RAN5#60	R5-133100	0078	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.1.8.1+9.1.9.1	10.2.0	10.3.0
2013-09	RAN5#60	R5-133102	0079	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.1.8.2+9.1.9.2	10.2.0	10.3.0
2013-09	RAN5#60	R5-133104	0080	-	Update Test Tolerance analyses for TS 36.521-3 Test cases 9.1.3.x and 9.1.4.x	10.2.0	10.3.0
2013-09	RAN5#60	R5-133106	0081	-	Test Tolerances update for eICIC absolute RSRQ Test cases 9.2.7.1+9.2.8.1	10.2.0	10.3.0
2013-09	RAN5#60	R5-133219	0082	-	RRM: Test tolerance analyses for TCs 9.6.1 and 9.6.2	10.2.0	10.3.0
2013-09	RAN5#60	R5-133349	0083	-	Update Test Tolerance analyses for TS 36.521-3 Test cases 9.1.1.1 and 9.1.2.1	10.2.0	10.3.0
2013-09	RAN5#60	R5-133374	0084	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 9.1.1 and 9.1.2	10.2.0	10.3.0
2013-09	RAN5#60	R5-133376	0085	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 9.1.3 and 9.1.4	10.2.0	10.3.0
2013-09	RAN5#60	R5-133843	0086	-	LBS Perf: Test tolerance analyses for TCs 8.1.1 and 8.1.2	10.2.0	10.3.0
2013-12	RAN5#61	R5-134144	0087	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.1.12.1 and 9.1.13.1	10.3.0	10.4.0
2013-12	RAN5#61	R5-134146	0088	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.1.12.2 and 9.1.13.2	10.3.0	10.4.0
2013-12	RAN5#61	R5-134148	0089	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.2.11.1 and 9.2.12.1	10.3.0	10.4.0
2013-12	RAN5#61	R5-134150	0090	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 9.2.11.2 and 9.2.12.2	10.3.0	10.4.0
2013-12	RAN5#61	R5-134220	0091	-	Add Test Tolerance analysis for TS 36.521-3 Test case 8.20.3	10.3.0	10.4.0
2013-12	RAN5#61	R5-134222	0092	-	Add Test Tolerance analysis for TS 36.521-3 Test cases 9.2.9.1 and 9.2.10.1	10.3.0	10.4.0
2013-12	RAN5#61	R5-135015	0093	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 9.2.1 and 9.2.2	10.3.0	10.4.0
2013-12	RAN5#61	R5-135017	0094	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 9.2.4 and 9.2.5	10.3.0	10.4.0
2013-12	RAN5#61	-	-	-	Upgraded to Rel-11 with no change	10.4.0	11.0.0
2013-12	RAN5#61	R5-134215	0108	-	Add Test Tolerance analyses for TS 36.521-3 Test case 9.1.17.1	11.0.0	12.0.0
2013-12	RAN5#61	R5-134217	0109	-	Add Test Tolerance analyses for TS 36.521-3 Test case	11.0.0	12.0.0

					9.2.17.1 and update 9.2.1.1+9.2.2.1		
2013-12	RAN5#61	R5-134611	0102	-	Add Test Tolerance analyses for TS 36.521-3 Test case 7.2.3	11.0.0	12.0.0
2013-12	RAN5#61	R5-135050	0095	-	Add Test Tolerance analyses for TS 36.521-3 Test case 4.2.9 and update 4.2.1+4.2.2	11.0.0	12.0.0
2013-12	RAN5#61	R5-135051	0096	-	Add Test Tolerance analyses for TS 36.521-3 Test case 4.3.1.4 and update 4.3.1.2+4.3.3	11.0.0	12.0.0
2013-12	RAN5#61	R5-135052	0097	-	Add Test Tolerance analyses for TS 36.521-3 Test case 5.1.9 and update 5.1.1+5.1.2	11.0.0	12.0.0
2013-12	RAN5#61	R5-135053	0098	-	Add Test Tolerance analyses for TS 36.521-3 Test case 5.2.11 and update 5.2.1+5.2.2	11.0.0	12.0.0
2013-12	RAN5#61	R5-135054	0099	-	Add Test Tolerance analyses for TS 36.521-3 Test case 6.1.5 and update 6.1.1+6.1.3	11.0.0	12.0.0
2013-12	RAN5#61	R5-135055	0100	-	Add Test Tolerance analyses for TS 36.521-3 Test case 6.2.5	11.0.0	12.0.0
2013-12	RAN5#61	R5-135056	0101	-	Add Test Tolerance analyses for TS 36.521-3 Test case 6.2.6	11.0.0	12.0.0
2013-12	RAN5#61	R5-135058	0103	-	Add Test Tolerance analyses for TS 36.521-3 Test case 7.3.23	11.0.0	12.0.0
2013-12	RAN5#61	R5-135059	0104	-	Add Test Tolerance analyses for TS 36.521-3 Test case 7.3.25	11.0.0	12.0.0
2013-12	RAN5#61	R5-135060	0105	-	Add Test Tolerance analyses for TS 36.521-3 Test case 8.1.9	11.0.0	12.0.0
2013-12	RAN5#61	R5-135061	0106	-	Add Test Tolerance analyses for TS 36.521-3 Test case 8.1.10	11.0.0	12.0.0
2013-12	RAN5#61	R5-135062	0107	-	Add Test Tolerance analyses for TS 36.521-3 Test case 8.5.7	11.0.0	12.0.0
2014-03	RAN5#62	R5-140083	0110	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 8.20.1 and 8.20.2	12.0.0	12.1.0
2014-03	RAN5#62	R5-140233	0113	-	Add Test Tolerance analyses for TS 36.521-3 Test case 9.1.16.2 and update 9.1.1.2+9.1.2.2	12.0.0	12.1.0
2014-03	RAN5#62	R5-140235	0114	-	Add Test Tolerance analyses for TS 36.521-3 Test case 9.1.18.1 and update 9.2.3.1+9.2.4.1	12.0.0	12.1.0
2014-03	RAN5#62	R5-140237	0115	-	Add Test Tolerance analyses for TS 36.521-3 Test case 9.1.18.2 and update 9.2.3.2+9.2.4.2	12.0.0	12.1.0
2014-03	RAN5#62	R5-140239	0116	-	Add Test Tolerance analysis for TS 36.521-3 Test case 8.20.4	12.0.0	12.1.0
2014-03	RAN5#62	R5-140288	0118	-	Addition of test tolerance analysis for TC 7.3.24	12.0.0	12.1.0
2014-03	RAN5#62	R5-140292	0119	-	Addition of test tolerance analysis for TC 9.1.17.2	12.0.0	12.1.0
2014-03	RAN5#62	R5-140294	0120	-	Addition of test tolerance analysis for TC 9.3.3	12.0.0	12.1.0
2014-03	RAN5#62	R5-140296	0121	-	Addition of test tolerance analysis for TC 9.4.3	12.0.0	12.1.0
2014-03	RAN5#62	R5-140864	0122	-	Addition of test tolerance analysis for TC 9.1.16.1	12.0.0	12.1.0
2014-03	RAN5#62	R5-141051	0117	-	Addition of test tolerance analysis for TC 7.1.5	12.0.0	12.1.0
2014-06	RAN5#63	R5-142373	0123	-	Update Test Tolerance analyses for TS 36.521-3 Test cases 9.1.8.1+9.1.9.1	12.1.0	12.2.0
2014-06	RAN5#63	R5-142377	0124	-	Update Test Tolerance analyses for TS 36.521-3 Test cases 9.1.8.2+9.1.9.2	12.1.0	12.2.0
2014-06	RAN5#63	R5-142381	0125	-	Update Test Tolerance analyses for TS 36.521-3 Test cases 9.2.7.1+9.2.8.1	12.1.0	12.2.0
2014-06	RAN5#63	R5-142545	0126	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 8.1.7 and 8.2.5	12.1.0	12.2.0

2014-06	RAN5#63	R5-142552	0127	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 7.3.11,7.3.12,7.3.15 and 7.3.16	12.1.0	12.2.0
2014-06	RAN5#63	R5-142712	0128	-	Test Tolerance analysis for eICIC RRM TC 9.1.10.1, 9.1.11.1	12.1.0	12.2.0
2014-06	RAN5#63	R5-142751	0129	-	Update Test Tolerance analyses for TS 36.521-3 Test cases 9.2.9.1+9.2.10.1	12.1.0	12.2.0
2014-06	RAN5#63	R5-142763	0130	-	Addition of test tolerance analysis for 36.521-3 test case 9.1.10.2, 9.1.11.2	12.1.0	12.2.0
2014-06	RAN5#63	R5-143021	0131	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 7.3.9,7.3.10,7.3.13 and 7.3.14	12.1.0	12.2.0
2014-09	RAN5#64	R5-144126	0132	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 8.16.5 and 8.16.6	12.2.0	12.3.0
2014-09	RAN5#64	R5-144128	0133	-	Add Test Tolerance analyses for TS 36.521-3 Test cases 8.16.7 and 8.16.8	12.2.0	12.3.0
2014-09	RAN5#64	R5-144144	0134	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 10.3 and 10.4	12.2.0	12.3.0
2014-09	RAN5#64	R5-144146	0135	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 10.3A and 10.4A	12.2.0	12.3.0
2014-09	RAN5#64	R5-144290	0136	-	Add Test Tolerance analysis for TS 36.521-3 Test case 8.3.6	12.2.0	12.3.0
2014-09	RAN5#64	R5-144292	0137	-	Add Test Tolerance analysis for TS 36.521-3 Test case 8.5.6	12.2.0	12.3.0
2014-09	RAN5#64	R5-144294	0138	-	Update Test Tolerance analyses for TS 36.521-3 Test cases 8.3.3+8.4.3	12.2.0	12.3.0
2014-09	RAN5#64	R5-144834	0139	-	Addition of test tolerance analysis for 36.521-3 test case 9.4.1, 9.4.2 and 9.4.3	12.2.0	12.3.0
2014-12	RAN5#65	R5-145167	0140	-	Update Test Tolerance Analyses for TS 37.571-1 Test Cases 9.1.1 and 9.1.2	12.3.0	12.4.0
2014-12	RAN5#65	R5-145168	0141	-	Update Test Tolerance Analyses for TS 37.571-1 Test Cases 9.2.1 and 9.2.2	12.3.0	12.4.0
2014-12	RAN5#65	R5-145298	0142	-	Update Test Tolerance analyses for TS 36.521-3 Test case 8.5.3	12.3.0	12.4.0
2014-12	RAN5#65	R5-145300	0143	-	Add Test Tolerance analysis for feICIC RSRQ absolute accuracy Test cases	12.3.0	12.4.0
2014-12	RAN5#65	R5-145302	0144	-	Add Test Tolerance analysis for TS 36.521-3 Test cases 9.2.21.1 and 9.2.22.1	12.3.0	12.4.0
2014-12	RAN5#65	R5-145304	0145	-	Add Test Tolerance analysis for TS 36.521-3 Test cases 9.2.21.2 and 9.2.22.2	12.3.0	12.4.0
2014-12	RAN5#65	R5-145321	0146	-	Add Test Tolerance analysis for TS 36.521-3 feICIC test cases 9.1.14.1 and 9.1.15.1	12.3.0	12.4.0
2014-12	RAN5#65	R5-145323	0147	-	Add Test Tolerance analysis for TS 36.521-3 feICIC test cases 9.1.14.2 and 9.1.15.2	12.3.0	12.4.0
2014-12	RAN5#65	R5-145828	0148	-	Test Tolerance Analysis for TS 37.571-1 TC 8.1.5+8.1.6	12.3.0	12.4.0
2014-12	RAN5#65	R5-145829	0149	-	Add Test Tolerance analysis for TS 36.521-3 feICIC test cases 7.3.17 and 7.3.18	12.3.0	12.4.0
2014-12	RAN5#65	R5-145830	0150	-	Add Test Tolerance analysis for TS 36.521-3 feICIC test cases 7.3.19, 7.3.20, 7.3.21 and 7.3.22	12.3.0	12.4.0
2014-12	RAN5#65	R5-145924	0151	-	Test Tolerance Analysis for TS 36.521-3 TC 8.1.8+8.2.6	12.3.0	12.4.0
2015-03	RAN5#66	R5-150078	0152	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 10.1 and 10.2	12.4.0	12.5.0
2015-03	RAN5#66	R5-150079	0153	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases	12.4.0	12.5.0

					10.1A and 10.2A		
2015-03	RAN5#66	R5-150080	0154	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 10.1B and 10.2B	12.4.0	12.5.0
2015-03	RAN5#66	R5-150081	0155	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 10.1C and 10.2C	12.4.0	12.5.0
2015-03	RAN5#66	R5-150083	0156	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 10.3B and 10.4B	12.4.0	12.5.0
2015-03	RAN5#66	R5-150084	0157	-	Add Test Tolerance Analyses for TS 37.571-1 Test Cases 10.3C and 10.4C	12.4.0	12.5.0
2015-03	RAN5#66	R5-150219	0158	-	Update Test Tolerance Analysis for TS 36.521-3 TC 4.3.1.3	12.4.0	12.5.0
2015-03	RAN5#66	R5-150221	0159	-	Update Test Tolerance Analysis for TS 36.521-3 TC 4.3.4.3	12.4.0	12.5.0
2015-03	RAN5#66	R5-150223	0160	-	Update Test Tolerance Analysis for TS 36.521-3 TC 8.5.2	12.4.0	12.5.0
2015-03	RAN5#66	R5-150225	0161	-	Update Test Tolerance Analysis for TS 36.521-3 TC 8.7.3	12.4.0	12.5.0
2015-03	RAN5#66	R5-150227	0162	-	Update Test Tolerance Analysis for TS 36.521-3 TC 8.9.1	12.4.0	12.5.0
2015-03	RAN5#66	R5-150229	0163	-	Update Test Tolerance Analysis for TS 36.521-3 TC 8.8.1+8.10.1	12.4.0	12.5.0
2015-03	RAN5#66	R5-150231	0164	-	Update Test Tolerance Analysis for TS 36.521-3 TC 8.8.2+8.10.2	12.4.0	12.5.0
2015-03	RAN5#66	R5-150293	0165	-	Add Test Tolerance analysis for TCs 8.16.9+8.16.10 36.903 CR	12.4.0	12.5.0
2015-03	RAN5#66	R5-150305	0166	-	Add Test Tolerance analysis for TCs 8.16.11+8.16.12 36.903 CR	12.4.0	12.5.0
2015-03	RAN5#66	R5-150307	0167	-	Add Test Tolerance analysis for TCs 8.16.13+8.16.14 36.903 CR	12.4.0	12.5.0
2015-03	RAN5#66	R5-150309	0168	-	Add Test Tolerance analysis for TCs 8.16.15+8.16.16 36.903 CR	12.4.0	12.5.0
2015-03	RAN5#66	R5-150311	0169	-	Add Test Tolerance analysis for TCs 9.1.18.1+9.1.19.1 36.903 CR	12.4.0	12.5.0
2015-03	RAN5#66	R5-150313	0170	-	Add Test Tolerance analysis for TCs 9.1.18.2+9.1.19.2 36.903 CR	12.4.0	12.5.0
2015-03	RAN5#66	R5-150315	0171	-	Add Test Tolerance analysis for TCs 9.1.20.1+9.1.21.1 36.903 CR	12.4.0	12.5.0
2015-03	RAN5#66	R5-150317	0172	-	Add Test Tolerance analysis for TCs 9.1.20.2+9.1.21.2 36.903 CR	12.4.0	12.5.0
2015-03	RAN5#66	R5-150319	0173	-	Add Test Tolerance analysis for TCs 9.2.23.1+9.2.24.1 36.903 CR	12.4.0	12.5.0
2015-03	RAN5#66	R5-150325	0174	-	Add Test Tolerance analysis for TCs 9.2.23.2+9.2.24.2 36.903 CR	12.4.0	12.5.0
2015-03	RAN5#66	R5-150853	0175	-	Update Test Tolerance analyses for TS 36.521-3 Test case 5.1.5	12.4.0	12.5.0
2015-03	RAN5#66	R5-150854	0176	-	Update Test Tolerance analyses for TS 36.521-3 Test case 5.1.6	12.4.0	12.5.0
2015-03	RAN5#66	R5-150855	0177	-	Update Test Tolerance analyses for TS 36.521-3 Test case 5.2.3, 5.2.6	12.4.0	12.5.0
2015-06	RAN5#67	R5-151078	0178	-	Update Test Tolerance Analyses for TS 37.571-1 Test Cases 9.1.3 and 9.1.4	12.5.0	12.6.0
2015-06	RAN5#67	R5-151079	0179	-	Update Test Tolerance Analyses for TS 37.571-1 Test Cases 9.2.4 and 9.2.5	12.5.0	12.6.0

2015-06	RAN5#67	R5-151080	0180	-	Update Test Tolerance Analyses for TS 37.571-1 Test Cases 10.3 and 10.4	12.5.0	12.6.0
2015-06	RAN5#67	R5-151081	0181	-	Update Test Tolerance Analyses for TS 37.571-1 Test Cases 10.3A and 10.4A	12.5.0	12.6.0
2015-06	RAN5#67	R5-151082	0182	-	Add Test Tolerance Analysis for TS 37.571-1 Test Case 10.2D	12.5.0	12.6.0
2015-06	RAN5#67	R5-151084	0183	-	Add Test Tolerance Analysis for TS 37.571-1 Test Case 10.4D	12.5.0	12.6.0
2015-06	RAN5#67	R5-151132	0184	-	Add Test Tolerance analysis for TS 36.521-3 Test cases 9.9.1.1 and 9.9.2.1	12.5.0	12.6.0
2015-06	RAN5#67	R5-151134	0185	-	Add Test Tolerance analysis for TS 36.521-3 Test cases 9.9.1.2 and 9.9.2.2	12.5.0	12.6.0
2015-06	RAN5#67	R5-151263	0186	-	Update Test Tolerance Analysis for TS 36.521-3 TC 8.3.1+8.3.2+8.14.1+8.14.2	12.5.0	12.6.0
2015-06	RAN5#67	R5-151264	0187	-	Update Test Tolerance Analysis for TS 36.521-3 TC 8.4.1+8.4.2+8.15.1+8.15.2	12.5.0	12.6.0
2015-06	RAN5#67	R5-151265	0188	-	Update Test Tolerance Analysis for TS 36.521-3 TC 9.2.4A.1	12.5.0	12.6.0
2015-06	RAN5#67	R5-151266	0189	-	Update Test Tolerance Analysis for TS 36.521-3 TC 9.2.4A.2	12.5.0	12.6.0
2015-06	RAN5#67	R5-151541	0198	-	Add Test Tolerance analysis for TC 8.16.21 36.903 CR	12.5.0	12.6.0
2015-06	RAN5#67	R5-151543	0199	-	Add Test Tolerance analysis for TC 8.16.22 36.903 CR	12.5.0	12.6.0
2015-06	RAN5#67	R5-151545	0200	-	Add Test Tolerance analysis for TCs 9.1.24.1 36.903 CR	12.5.0	12.6.0
2015-06	RAN5#67	R5-151547	0201	-	Add Test Tolerance analysis for TCs 9.1.24.1_1 36.903 CR	12.5.0	12.6.0
2015-06	RAN5#67	R5-151549	0202	-	Add Test Tolerance analysis for TC 9.1.24.2 36.903 CR	12.5.0	12.6.0
2015-06	RAN5#67	R5-151553	0204	-	Add Test Tolerance analysis for TC 9.2.27.2 36.903 CR	12.5.0	12.6.0
2015-06	RAN5#67	R5-151837	0190	1	Update Test Tolerances and Test requirements for TS 36.521-3 Test cases 4.2.3, 4.2.4, 4.2.5, 4.2.6	12.5.0	12.6.0
2015-06	RAN5#67	R5-151839	0191	1	Update Test Tolerance analyses for TS 36.521-3 Test case 9.1.5.1	12.5.0	12.6.0
2015-06	RAN5#67	R5-151841	0192	1	Update Test Tolerances and Test requirements for TS 36.521-3 Test case 9.1.5.2	12.5.0	12.6.0
2015-06	RAN5#67	R5-151843	0194	1	Add Test Tolerance analysis for Rel-12 Improved RSRP accuracy Test cases	12.5.0	12.6.0
2015-06	RAN5#67	R5-151845	0195	1	Update Test Tolerance analysis for TCs 8.11.1+8.11.2 for frequencies above 3GHz 36.903 CR	12.5.0	12.6.0
2015-06	RAN5#67	R5-151847	0196	1	Update Test Tolerance analysis for TC 8.11.3 for frequencies above 3GHz 36.903 CR	12.5.0	12.6.0
2015-06	RAN5#67	R5-151849	0197	1	Update Test Tolerance analysis for TC 8.11.4 for frequencies above 3GHz 36.903 CR	12.5.0	12.6.0
2015-06	RAN5#67	R5-151851	0203	1	Add Test Tolerance analysis for TC 9.2.27.1 36.903 CR	12.5.0	12.6.0

History

Document history		
V12.3.0	September 2014	Publication
V12.4.0	January 2015	Publication
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