Permanent Reference Document NAPRD03

Version Specific Technical Overview of PTCRB Certification Program

Version 6.0.1

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Table of Contents

List of Figures

No table of figures entries found.

List of Tables

Section 1   Introduction

1.1   Purpose

The purpose of this Permanent Reference Document (PRD) is to provide version specific technical framework within which GERAN, UTRA, E-UTRA, and NR device certification can take place.

Refer to the latest version of the PTCRB Program Management Document (PPMD) for the process requirements

Section 2   Wireless Device Certification Test Requirements

2.1   Scope

This section of NAPRD03 specifies a common approach to the certification testing of GSM/UTRA/E-UTRA/NR wireless devices (referred to as "Devices" throughout this document).

The object of this document is to define the criteria such that certification testing of Devices may be performed on a common basis. This document is maintained by the PTCRB Working Group within CTIA Certification LLC and is updated on a regular basis.

2.2   Introduction

This document is intended to advise PTCRB authorized test laboratories on how to establish Device conformity with the reference specifications below. Information is presented to clearly identify which conformance requirements may be evaluated using the reference test system configuration as defined in the PTCRB TC (Test Case) Database and which conformance requirements may be evaluated using other defined methods or equipment.

TC Database includes a concise report of the technical status of the reference certification test equipment implementation. Where necessary, additional information may be presented to enable tests to be performed and the results of tests to be interpreted in a harmonized manner. TC Database provides a separate listing of the test cases. TC Database shall be used as the primary reference for the actual test cases and applicable categories.

2.3   Reference Specifications

GSM:

- 3GPP TS 51.010 (formerly GSM 11.10)
- 3GPP TS 51.010-4.

UTRA:

- 3GPP TS 34.121
- 3GPP TS 34.123
- 3GPP TS 31.121 (USIM)
- 3GPP TS 31.124 (USAT)
- 3GPPTS 26.132 (Audio)
- 3GPP TS 34.108
- ETSI TS 102 230 (UICC)
- ETSI TS 102 384 (UICC)
- 3GPP TS 34.124 (RSE)

E-UTRA:

- 3GPP TS 36.521
- 3GPP TS 36.523
- 3GPP TS 36.124
- 3GPP TS 36.508

NR:

- 3GPP TS 38.521
- 3GPP TS 38.523
- 3GPP TS 38.508

LTE Data Throughput:

- 3GPP TR 37.901

UICC Based NFC:

- ETSI TS 102 694 (SWP)
- ETSI TS 102 695 (HCI)
- GSMA PRD TS.27

Positioning:

- 3GPP TS 34.171
- 3GPP TS 37.571

Cybersecurity Evaluation:

- CTIA Cybersecurity Certification Test Plan for IoT Devices

Note 1: In the case of UTRA A-GNSS test cases (3GPP TS 34.171 5.x and 3GPP TS 34.123-1 17.x), the requirements have been moved to 3GPP TS 37.571-1 and 3GPP TS 37.571-2 respectively. Cross reference information has been added to 3GPP TS 34.123-1 and 3GPP TS 34.171 detailing the mapping of test cases to the new specifications.

Note 2: PTCRB accepts the 3GPP applicability for test cases defined in 3GPP TS 51.010-1/2 and 37.571-1/3 with the following exceptions:

TABLE 2.3-1 3GPP GERAN TEST CASES EXCEPTIONS

3GPP TS 51.010-1 GERAN test for A-GPS L1 C/A only			3GPP TS 51.010-1 GERAN test for A-GPS L1 C/A and A-GLONASS combined	
70.11.5.1	Sensitivity Coarse Time Assistance	⇔	70.16.5.1-4	Sensitivity Coarse Time Assistance: Sub-Test 4
70.11.5.2	Sensitivity Fine Time Assistance	⇔	70.16.5.2-4	Sensitivity Fine Time Assistance: Sub-Test 4
70.11.6	Nominal Accuracy	⇔	70.16.6-4	Nominal Accuracy: Sub-Test 4
70.11.7	Dynamic Range	⇔	70.16.7-4	Dynamic Range: Sub-Test 4
70.11.8	Multi-Path scenario	⇔	70.16.8-4	Multi-Path scenario: Sub-Test 4

TABLE 2.3-2 3GPP UTRA TEST CASES EXCEPTIONS

3GPP TS 37.571-1 UTRA test for A-GPS L1 C/A only			3GPP TS 37.571-1 UTRA tests for A-GPS L1 C/A and A-GLONASS combined	
5.2.1	Sensitivity Coarse Time Assistance	⇔	6.2.1-4	Sensitivity Coarse Time Assistance: Sub-Test 4
5.2.2	Sensitivity Fine Time Assistance	⇔	6.2.2-4	Sensitivity Fine Time Assistance: Sub-Test 4
5.3	Nominal Accuracy	⇔	6.3-4	Nominal Accuracy: Sub-Test 4
5.4	Dynamic Range	⇔	6.4-4	Dynamic Range: Sub-Test 4
5.5	Multi-path Performance	⇔	6.5-4	Multi-path Performance: Sub-Test 4
5.6	Moving Scenario and Periodic Update Performance	⇔	6.6-4	Moving Scenario and Periodic Update Performance: Sub-Test 4

TABLE 2.3-3 3GPP E-UTRA TEST CASES EXCEPTIONS

3GPP TS 37.571-1 E-UTRA test for A-GPS L1 C/A only			3GPP TS 37.571-1 E-UTRA Requirement A-GPS L1 C/A and A-GLONASS combined	
7.1.1-1	Sensitivity Coarse Time Assistance: Sub-Test 1	⇔	7.1.1-5	Sensitivity Coarse Time Assistance: Sub-Test 5
7.1.2-1	Sensitivity Fine Time Assistance: Sub-Test 1	⇔	7.1.2-5	Sensitivity Fine Time Assistance: Sub-Test 5
7.2-1	Nominal Accuracy: Sub-Test 1	⇔	7.2-5	Nominal Accuracy: Sub-Test 5
7.3-1	Dynamic Range: Sub-Test 1	⇔	7.3-5	Dynamic Range: Sub-Test 5
7.4-1	Dynamic Range: Sub-Test 1	⇔	7.4-5	Multi-path Performance: Sub-Test 5
7.5-1	Moving Scenario and Periodic Update Performance: Sub-Test 1	⇔	7.5-5	Multi-path Performance: Sub-Test 5

For Devices supporting both A-GPS L1 C/A and A-GLONASS, and where the corresponding test case is not yet validated, the A-GPS L1 C/A only test case shall be performed for PTCRB certification. Assessment of tests is required across GERAN / UTRA / E-UTRA / NR and relevant PTCRB bands.

Device RF Performance Evaluation:

- CTIA Test Plan for Wireless Device Over-the-Air Performance
- CTIA Test Plan for 2X2 Downlink MIMO and Transmit Diversity Over-the-Air Performance

Wi-Fi RF Performance Evaluation:

- CTIA/Wi-Fi Alliance Test Plan for RF Performance Evaluation of Wi-Fi Mobile Converged Devices

MMS:

- OMA-IOP-MMS-ETS

OMA SUPL 1.0, 2.0:

- OMA-ETS-SUPL-V1_0
- OMA-ETS-SUPL-V2_0

IMS:

- 3GPP TS 34.229

OMA DM 1.2:

- OMA-ETS-DMV1_2

TTY:

- PTCRB Bearer-Agnostic TTY Test Specification, Version 2.0
  Found at https://members.ptcrb.com/
- 2G TTY Test Specification, Rev. 4.31
- TTY 3G Test Specification, Rev. 2.0

Note 3: For clarification, test cases from PTCRB Bearer-Agnostic TTY Test Specification shall be performed for PTCRB certification instead test cases from 2G TTY Test Specification and/or TTY 3G Test Specification.

Test case applicability as per PTCRB Bearer-Agnostic TTY Test Specification Section 8 shall apply.

A-GNSS Radiated Performance:

- CTIA Test Plan for Wireless Device Over-the-Air Performance

AT-Command:

- PTCRB Bearer Agnostic AT-Command Test Specification (latest version)

OMA FUMO 1.0:

- OMA ETS FUMO V1.0

Connection Efficiency:

- GSMA PRD TS.35

Remote SIM Provisioning:

- GSMA PRD SGP.23

General Notes:

Note 4: For clarification, the core specifications from 3GPP, OMA, and other Standards Bodies mentioned above, are the definitive statements of expected behavior.

For protocol tests, where 3GPP or OMA has developed TTCN, the official TTCN is the definitive description of test cases. Other protocol test implementations are allowed as long as they are based on prose for which there is a corresponding 3GPP or OMA specification.

In the event of conflicting results between test platforms, the equipment using the 3GPP- or OMA-developed TTCN, if available, will be taken as the correct implementation until proven otherwise.

2.4 Participating Organizations

Technical validation of the test systems included in this document has been conducted by the PTCRB Validation Group (PVG). A list of members can be obtained from document PVG.02.

2.5 List of Tests for Accredited Testing

TC Database shows the status of validated tests approved for certification testing. Where a variation or specific interpretation of a test specification or test method is required by the PTCRB Primary Test Laboratory, this will be recorded in the TC Database.

2.6 Document Amendments

Any amendment proposals shall be submitted as a contribution to the PTCRB Working Group.

2.7 Key to TC Database

2.7.1 Test Specification

A document defining the test approach for a feature or combination of features, and the initial conditions execution conditions, and the pass/fail criteria for the related tests.

2.7.2 TC (Test Case) Name

Test case as defined in the associated test specification. Note: When the test case is a multi-band, carrier aggregation inter-band or multi-RAT test, it is qualified with a band combination. This qualification is contained within square brackets where the initial band of the test case is named first and subsequent band(s) follow adhering to these rules:

TABLE 2.7-1 TEST CASE NAME RULES

Technology	Test Case Parameter: Example Allowed Values	Comment
E-UTRA bands	FDD17	Numeric values for the bands shall be used without any leading zeros.
	FDD4	
	TDD41	
UTRA bands	FDDII	Roman numerals shall be used to differentiate between UTRA & E-UTRA.
	FDDIV	
	FDDV	
	FDDI	
GERAN bands	1900	The GSM bands with no qualification before or after the actual band definition. **Note** that the multi-band GSM tests are not qualified.
	850	
	900	
	1800	

2.7.3   TC (Test Case) Description

Test case description as defined in the associated test specification.

2.7.4   RFT (Request For Test)

An RFT is a request by the PTCRB Working Group to include test cases for a specific requirement (i.e., feature / function). The RFT indication in TC Database shows the association between the test case and a specific RFT. The full collection of RFTs is maintained in PTCRB PVG.03.

2.7.5   Test Platform

Test Platform number of validated test equipment.

2.7.5.1   Validation Status Information:

- V (Validated): A Test Platform having fully fulfilled the validation criteria complying with the latest version(s) of the test specification(s).

- E (Exception): A Test Platform partially fulfilling the validation criteria and/or just partially complying to the latest version(s) of the test specification(s).

- D (Downgrade): A Test Platform that has been downgraded and is currently not recommended to be used for certification testing process.

2.7.6 Category (PTCRB Test Case Category)

The following test case categories shall be used

TABLE 2.7-2 PTCRB TEST CASE CATEGORY DEFINITIONS

Category "A"	Test case is fully validated, and available in PTCRB authorized test laboratories
Category "B"	Test case is available in PTCRB authorized test laboratories with exceptions
Category "C"	Reserved category
Category "D"	Test case is downgraded and is not a certification requirement
Category "E"	Test case is validated and results are provided in the certification test report. Failure of DUT to pass test case will not prevent its certification.
Category "N (all versions)"	Not applicable (all versions)
Category "N (next version)"	Not applicable for this version and all later NAPRD03 versions. This test case may be applicable for previous NAPRD03 versions.
Category "P"	New test case not yet va lidated or a test case that has been downgraded for more than 45 days.

2.7.6.1 Category "A"

TABLE 2.7-3 CATEGORY "A" DEFINITION

Definition of this category:
Device conformance is tested by a PTCRB authorized test laboratory as indicated in the "tested band" column. Conformity of the DUT is demonstrated in a PTCRB authorized test laboratory using validated test programs on appropriate test equipment reference configuration listed in TC Database.
Interoperability testing:
This test purpose is tested according to Section 3.2 of this document.
This category is used for:
All test purposes covered by validated Means of Test or a defined interoperability methodology
Test case result:
A Category A test case shall be passed for the DUT to obtain PTCRB certification. See the guidelines of PVG.12 for the process on how to deal with test case failures during certification.

2.7.6.2   Category "B"

TABLE 2.7-4 CATEGORY "B" DEFINITION

Definition of this category:
Device conformance is tested to the extent possible by a PTCRB authorized test laboratory as indicated in the "tested band" column. Conformity of the DUT is demonstrated to the extent possible in a PTCRB authorized test laboratory using validated test programs on an appropriate test equipment reference configuration listed in TC Database.
This category is used for:
a) Means of Test where test purposes are not fully tested, because parts of the Means of Test are incorrect and therefore not valid for accredited testing.
b) Means of Test where a "PASS" verdict is a valid verdict, but a "FAIL" verdict may not be valid.
c) Means of Test not validated for a special DUT configuration.
Example:
1) Parts of a Means of Test are validated because some sections of the test program are faulty and therefore the referenced test purpose might be partly covered or other referenced test purposes are not covered at all.
2) A Means of Test is running up to a specific test section where more than one correct DUT behavior would be possible but only one specific behavior is allowed by the test program and therefore it might unfairly "FAIL" in this section.
3) A Method of Test is written for TCH/S DUT and DATA-only DUT, but the test can be performed for TCH/S DUT only.
Test case result:
A Category "B" test case shall be passed for the DUT to obtain PTCRB certification, with exception to certain cases.
See the guidelines of PVG.12 for the process on how to deal with test case failures during certification.

2.7.6.3   Category "D"

TABLE 2.7-5 CATEGORY "D" DEFINITION

Definition of this category:
The test has previously been in category "A", "B" or "E" but has been "downgraded" due to an issue with the test case implementation, test platform and/or test specification and there are no valid Means of Test available. Unless the test case issue is resolved and the test case re-validated within 45 days of approval of the test case downgrade, the test case will revert to Category "P" (45 day rule).
This category is used for:
An indication that a test case was earlier a certification requirement but has been downgraded due to an issue with the test case; and that the test case can be revalidated by "5 day rule" and immediately be re-introduced as a certification requirement.
Example:
A PTCRB authorized test laboratory has found an issue with a test case implementation that means the test case cannot be used for certification testing. The PTCRB Full Test Laboratory or PTCRB Associate Test Laboratory has raised a change request by "5 day rule" explaining the issue and proposing to downgrade the test case. On approval of the 5 day rule the test case category is changed to "D" indicating the test case is downgraded and not a certification requirement. If the test case is not corrected and re-validated with 45 days it will revert to Category "P" and be treated as though it was a new test case.
Test case result:
A Category "D" test case is not executed.

2.7.6.4   Category "E"

TABLE 2.7-6 CATEGORY "E" DEFINITION

Definition of this category:
Tests that have been validated but are under evaluation are allocated to Category "E". Category "E" tests shall be performed by a PTCRB authorized test laboratory on DUTs as indicated in the "tested band" column; the results of which will not gate issuance of an IMEI. The results of these tests shall be presented as part of the certification test results. The results shall also include comments pertaining to the reason of any failures experienced within a Category "E" test case. This shall include whether the test case is believed to be at fault and an indication that the test equipment manufacturer has been contacted. If it is believed to be a DUT failure, the comment shall include what type of error was indicated by the test equipment. Where a Category "E" test case has failed on a previous certification of the DUT or is leveraging results from a related DUT (i.e., Parent, Module), if changes have been made to the DUT which may alter the result of the test case, the test shall be re-run for the subsequent certifications. Where a Category "E" test case has failed due to a fault of the test implementation on a previous certification of the DUT or is leveraging results from a related DUT (i.e., Parent, Module), if changes have been made to the test implementation, the test shall be re-run for the subsequent certifications. Interoperability tests may be executed by the manufacturer as defined in Section 3.2 of this document.
This category is used for:
Test for features that were new or not supported by all operators, will also include recently validated tests prior to being moved to Category "A".
Example:
Tests that have been validated but have not been moved to Category "A" such as new GPRS test cases or features not supported by all operators such as PBCCH or NMO I
Test case result:
A Category "E" test case shall be executed. However, a Pass result is not required for the Device to obtain PTCRB certification. See the guidelines of PVG.12 for the process on how to deal with test case failures during certification.

2.7.6.4.1.   Addition of Tests to Category "E"

A PTCRB Working Group member may request inclusion of a specific test in Category "E". The PTCRB Operator Steering Group shall review the test and if approved by the group, the test is moved to Category "E". All new tests submitted by the PVG will initially become Category "E".

2.7.6.4.2. Moving Tests from Category "E" to Any Other Category:

A PTCRB Working Group member may request the movement of a specific test from Category "E" into another Category ("A", "B"). Alternatively, the test may be removed. The PTCRB Operator Steering Group shall review the change request proposal. If the change request proposal is approved by the group, the test will change to the proposed category.

2.7.6.5 Category "N (all versions)"

TABLE 2.7-7 CATEGORY "N" DEFINITIONS

Definition of this category:
This listed test does not require any testing nor declaration for all NAPRD03 versions
This category is used for:
Test execution not required
Example:
Band specific tests required testing in 1900 but not required in 850.
Test case result:
A Category "N (all versions)" test case is not executed.

2.7.6.6 Category "N (next version)"

TABLE 2.7-8 CATEGORY "N" DEFINITION

Definition of this category:
This listed test does not require any testing nor declaration for this version and all later NAPRD03 versions. This test case may be applicable for previous NAPRD03 versions.
This category is used for:
Test execution not required for this version and all later NAPRD03 versions. It may be required to execute this test case for previous NAPRD03 versions.
Example:
A test case has been replaced by a re-defined test case.
Test case result:
A Category "N (next version)" test case is not executed for this version and all later NAPRD03 versions.

2.7.6.7 Category "P"

TABLE 2.7-9 CATEGORY "P" DEFINITION

Definition of this category:
Based on tests which have been specified by an RFT and not validated on commercially available test equipment. Validation reports shall be submitted to PVG meetings for PTCRB approval, and test cases can only change to category "E" in a new version of NAPRD03 as defined above.
This category is used for:
Instances where no test solution presently available
Test case result:
A Category "P" test case is not executed.

2.7.7 Technology Area

This identifies the technology area of the test case. This is primarily used to determine capabilities of a PTCRB Full Test Laboratory or PTCRB Associate Test Laboratory.

2.7.8 Test Case Cluster

This identifies clusters (groupings) of test cases for transfer validation purposes.

2.7.9 Test Case Classifications

2.7.9.1 Bearer Agnostic

A test case which is independent of the radio access bearer or frequency band used during the test (typically used for Application Enablers).

2.7.9.2 Band Independent

The performance of test cases is not influenced by the bearer band used for the test scenario. The test case can be performed with any PTCRB bearer band within a radio technology, supported by the DUT.

2.7.9.3 Network Independent

A test case which is validated without the use of a radio access bearer (e.g., SIM interface specific tests).

2.7.9.4 Bearer Band

A test case that has been validated for specific frequency bands and/or technology (e.g., GSM1900, FDD2).

Test Case Sub-Classifications for all "Bearer Band" Tests.

Bearer to be tested: Defines the radio access bearer(s) and band(s) in which the Device shall be tested.

- "Single" indicates that the applicable test case (e.g., protocol testing) shall be tested in a single PTCRB Band.

Note: Inter-band test cases shall be tested if the frequency band combinations are supported by the mobile.

- "All" indicates that the mobile shall be tested in all PTCRB Bands. Section 2.8 of this document identifies PTCRB Bands. Test cases defined for GCF Bands shall be executed as indicated within the applicable GCF-CC. Bands identified by both PTCRB and GCF are defined as PTCRB Bands and shall be executed according to the PTCRB rules. Inter-RAT test cases shall be tested in all frequency band combinations supported by the Device.

Test cases defined for GCF Bands shall comply with the category assigned by GCF-CC. Therefore, compliance shall be ensured for all category "A" test cases.

- "I-RAT Single" – indicates an InterRAT test case that shall be tested in a single band combination. InterRAT test cases are split into separate test case parts for each possible band combination. InterRAT test cases shall be tested in PTCRB Bands.

- "multi" – indicates that a band combination is required, e.g., GSM1900/850 MHz bands.

- Blank – indicates that the test does not require a bearer

- "RAT All" indicates that the applicable test case shall be tested once in each supported RAT and in PTCRB Bands.

- "TS Rule" indicates that the applicable test case has specific execution requirements as detailed in the relevant test specification.

Where test cases have been identified as redundant between UTRA and GSM, or where a mixture of test capabilities for UTRA and GSM band support exist, testing shall be performed according to the following rules:

- If UTRA FDD is supported by the Device and the test case in question has been validated for FDD Band II, IV, or V, then execute the test in one of these UTRA-FDD PTCRB Bands. Note: For instances in which the test case is only available in bands supported by GCF-CC, execution of the test in a GCF-CC UTRA band is preferred over GCF-CC GERAN.

- If UTRA FDD is not supported by the Device but GSM1900 or GSM850 is supported by the Device and the test case in question has been validated for GSM1900 or GSM850, then execute the test in one these GERAN PTCRB Bands.

Special Rules and Exceptions:

Audio testing shall be performed according to the rules as defined in Section 2.9.6 of this document.

Conducted or RSE GCF Certification test results for GCF Bands will be recognized as a substitute for PTCRB conducted or RSE test results in the GCF bands, provided the GCF laboratory executing the tests is, at a minimum, an active observing member of the PVG. Otherwise, GCF Band conducted or RSE test cases shall be performed in a PTCRB Full Test Laboratory or PTCRB

Associate Test Laboratory as delegated by the PTCRB Primary Test Laboratory. The PTCRB Primary Test Laboratory will be responsible for uploading the GCF Certification test results to the PTCRB certification database along with their own test results.

Application enabler tests are not bearer dependent and can be performed in any frequency band supported by the Device.

If the primary PTCRB band tested on the certified Parent Device is disabled for any technology on the Variant Device, results for all "single" and "I-RAT single" band test cases from the Parent Device can be re-used on the Variant Device for certification.

If primary band test cases were executed according to GCF-CC only in any technology on the Parent Device, then testing of all "single" and "I-RAT single" band test cases shall be executed on the Variant Device if a PTCRB band is enabled, even if the band tested according to GCF-CC is still enabled.

For bearer-agnostic testing refer to NAPRD section "Application Enabler (AE) Test Applicability".

2.8 PTCRB Bands

The following bands and band combinations are identified as PTCRB Bands.

TABLE 2.8-1 PTCRB GERAN FREQUENCY BANDS

850 MHz
1900 MHz

TABLE 2.8-2 PTCRB UTRA FREQUENCY BANDS

Band II
Band IV
Band V

TABLE 2.8-3 PTCRB E-UTRA FREQUENCY BANDS

E-UTRA Operating Band	Duplex Mode	Category 1 and higher	Category 0	Category 1bis	Category M1 + M2	Category NB1 + NB2
2	FDD	Yes	Yes	Yes	Yes	Yes
4	FDD	Yes	Yes	Yes	Yes	Yes
5	FDD	Yes	Yes	Yes	Yes	Yes
7	FDD	Yes	No	Yes	Yes	No
12	FDD	Yes	No	Yes	Yes	Yes
13	FDD	Yes	Yes	Yes	Yes	Yes
14	FDD	Yes	No	No	Yes	Yes
17	FDD	Yes	No	No	No	Yes
25	FDD	Yes	Yes	No	Yes	Yes
26	FDD	Yes	Yes	Yes	Yes	Yes
30	FDD	Yes	No	No	No	No
41	TDD	Yes	Yes	Yes	Yes	Yes
42	TDD	Yes	No	No	No	No
43	TDD	Yes	No	No	No	No
48	TDD	Yes	No	No	No	No
66	FDD	Yes	No	Yes	Yes	Yes
71	FDD	Yes	No	No	Yes	Yes
85	FDD	Yes	No	No	Yes	Yes

TABLE 2.8-4 PTCRB 5G NR FR1 FREQUENCY BANDS

n2
n5
n7
n38
n66
n71
n78

TABLE 2.8-5 PTCRB 5G NR FR2 FREQUENCY BANDS

n257
n260
n261

2.9   RF Performance Evaluation

2.9.1   RF Performance Test Plan

The test plan to be utilized for the evaluation of RF Performance for GSM, GPRS, EGPRS, UMTS and LTE Devices is the version of "CTIA Test Plan for Wireless Device Over-the-Air Performance" in effect at the time the request is submitted to the PTCRB certification database. The latest version of the test plan can be downloaded from CTIA's web site at https://testplans.ctia.org. A listing of CTIA Authorized Test Labs (CATLs) capable of conducting this testing can be found on the same web site (under OTA Performance authorized testing capability).

Devices supporting the following bands shall be tested for RF performance as part of PTCRB certification:

- GSM/GPRS/EGPRS 850
- GSM/GPRS/EGPRS 1900
- UMTS Band II
- UMTS Band IV
- UMTS Band V
- LTE Band 2
- LTE Band 4
- LTE Band 5

- LTE Band 7

- LTE Band 12

- LTE Band 13

- LTE Band 14

- LTE Band 17

- LTE Band 25

- LTE Band 26

- LTE Band 30

- LTE Band 41

- LTE Band 48 (Not required until the band is included in the mandatory CTIA Test Plan for Wireless Device Over-the-Air Performance)

- LTE Band 66

- LTE Band 71 (Not required until the band is included in the mandatory CTIA Test Plan for Wireless Device Over-the-Air Performance)

If the Device supports 802.11x (Note: the Wi-Fi feature checkbox shall be checked in the PTCRB certification database), the Device shall also be tested to the CTIA/Wi-Fi Alliance Test Plan for RF Performance Evaluation of Wi-Fi Mobile Converged Devices (CWG Test Plan) subject to the RF Performance Test Applicability defined in Section 2.9.2of this document. Notebooks and Tablets are exempt from testing to the CWG Test Plan. Until an M2M OTA methodology is codified and made mandatory for CATLs, M2M Devices are exempt from testing to Revision 2.0.2 of the CWG Test Plan and subsequent releases. The latest version of this test plan can be downloaded from CTIA's web site at https://testplans.ctia.org. A listing of labs authorized to conduct this testing can be found on the same web site (under Converged Device authorized testing capability).

If the Device supports GNSS or A-GNSS (Note: the GNSS or A-GNSS feature checkbox shall be checked in the PTCRB certification database), it shall be tested according to the CTIA Test Plan for Wireless Device Over-the-Air Performance. The latest version of this test plan can be downloaded from CTIA's web site https://testplans.ctia.org. A listing of labs authorized to conduct this testing can be found on the same web site (under OTA Performance authorized testing capability). A-GNSS tests may include the optional System Information Broadcast (SIB) messages SIB8 and/or SIB16 according to the requirements of the Device's target operator(s). Prior to lab submission, Device manufacturers shall contact the target operator(s) for operator requirements on A-GNSS testing with SIB8 and/or SIB16, and then make the appropriate declaration in their lab submission with respect to A-GNSS testing with SIB8 and/or SIB16. In their lab submission, the Device manufacturer shall identify the option to be used as defined in sections 6.13.5.4.2 and 6.13.5.4.3 concerning the possible use of SIB8 and/or SIB16.

Devices which support Carrier Aggregation shall be tested for performance of the CA combinations according to the latest required versions of the CTIA Test Plan for Wireless Device Over-the-Air Performance and the corresponding Operator Priority List for the set of target operator(s) identified by the manufacturer. No other CA combinations shall be tested unless specifically requested by the target operator(s).

The Device manufacturer shall consult with the operator(s) to which they intend to sell the Device to determine whether the operator has unique requirements.

2.9.2 RF Performance Test Applicability

Test applicability shall be as described in Appendix O of the CTIA Test Plan for Wireless Device Over-the-Air Performance, with these special considerations:

- Free-Space testing is optional for notebooks which qualify as "Child" platforms in the PPMD.

- Some DUTs include sensors which reduce the transmitter's RF output power when in close proximity to the user. TRP measurements of any DUT that includes user proximity RF power reduction shall be made when the proximity sensor is not activated (e.g., DUT is operating at full RF output power). The lab shall also measure the DUT's RF output power when the proximity sensor is activated. This measurement may be made using either conducted or radiated techniques, and the lab shall document the proximity sensor's RF power reduction in dB.

2.9.2.1 RF Performance Test Applicability – IoT (Internet of Things) Devices

Test applicability for IoT/M2M Devices shall be determined through a combination of the use of Appendices O.5 or O.6 (as applicable) of the CTIA Test Plan for Wireless Device Over-the-Air Performance (Version 3.5.2 or later) and the IoT Device characteristics listed in Table 2.9-1.

TABLE 2.9-1 IoT DEVICE CHARACTERISTICS

	IoT Device Characteristic	Response (Y/N)
1	In its intended application, does the IoT Device transmit more than 100 kbytes in a transaction?	
2	On average, is the IoT Device expected to send more than 24 transactions per day?	
3	Is the IoT Device and its antenna intended for installation in a fixed orientation relative to the horizon?	

The following requirements apply regardless of the responses in Table 2.9-1 above:

- OTA testing shall only be required in the highest-order RAT supported by the Device

- OTA testing is required in each supported band within the highest-order RAT supported by the Device

- If the Device supports a band in a lower-order RAT that's not supported in the high-order RAT, the band in the lower-order RAT shall also be tested for OTA performance

If the Device vendor's response to all of the questions (1) through (3) in Table 2.9-1 above is "N", then the following test requirements (d) through (g) shall apply:

- TRP Testing shall be performed on all supported bands and all channels as required by (a) through (c) above

- TIS testing shall be performed only in the mid-channel for each supported band above 1 GHz

- TIS testing shall be performed in the low, mid and high channel for each supported band below 1 GHz

- Testing shall be performed using an anechoic chamber or a reverberation chamber by a CATL.

    o If the Device vendor's response to questions (1) and (2) in Table 2.9-1 is "N", but the response to question (3) is "Y", then in place of TRP and TIS, this type of IoT Device shall be tested for near-horizon radiated performance as described below:

    o NHPRP ±30° Testing shall be performed on all bands and all channels as required by (a) through (c) above

    o NHPIS ±30° Testing shall be performed only in the mid channel for each band supported by (a) through (c) above

    o NHPRP and NHPIS testing shall be performed in an anechoic chamber by a CATL. If the DUT is physically too large to test in the anechoic chamber, then testing shall be performed in a reverberation chamber, and the reported metrics shall be TRP and TIS.

2.9.3   Applicability of RF Performance Testing to ECOs

RF Performance testing shall be conducted on an ECO if the associated changes impact any of the following areas:

- Hardware design

- Calibration data/procedure

- Maximum output (radiated) power

If the changes do not impact these areas AND conducted RF output power in all supported bands has not changed by more than +/- 1 dB, then RF performance testing on the ECO is not necessary. The lab shall then upload a document to the PTCRB certification database, in the Test Results area, providing this justification (see Laboratory Test Report Content section of PPMD).

ECOs for Devices supporting MIMO, which were not required to execute MIMO OTA for the initial certification, are not required to execute the MIMO OTA testing called for in Section 2.9.4 of this document.

2.9.4   Receive Diversity / MIMO

If the Device supports receive diversity, the diversity test conditions shall be in accordance with the CTIA Test Plan for Wireless Device Over-the Air Performance.

If the Device supports MIMO, the Device shall be tested using the methodology described in the CTIA Test Plan for 2x2 Downlink MIMO and Transmit Diversity Over-the-Air Performance.

Per 3GPP TS 36.306, Category 1 and higher LTE Devices by definition are required to support 2 antennas. Any Device unable to support the secondary antenna shall be required to submit a waiver request. If the waiver request is approved, the PTCRB Primary Test Laboratory shall check the LTE Single-Antenna Receiver checkbox in the OTA Performance Test area of the PTCRB certification database and upload the waiver request here. This requirement shall be checked on all Devices regardless of whether they undergo RF Performance testing.

2.9.5   Deleted

2.9.6   Audio Testing

If the Device implements audio according to 3GPP Release 4 or later, the audio test cases in 3GPP TS 51.010-2 applicable for Release 4 or later release shall be applied as certification criteria instead of the Audio test cases applicable for Phase 2 and up to R99 terminals.

In addition to the above, terminals which support both GSM and FDD bands shall conduct the AUDIO testing in accordance with the Test Guidelines for test case redundancy for dual mode terminals as defined in PVG05.

Reference test position according to section 5.3.2 of IEEE 269 – 2002 can be used and shall accordingly be recorded in the test report if used.

The test report shall contain the following information if appropriate and where it is not available from the manufactures PICS statement:

- Ear type used for testing
- Positioning used in the HATS, as per ITU-T P.64
- Nominal volume setting used for receiving related testing

Note: The PTCRB TC database audio test specification 26.132 contains all test cases from all released specification versions.

The test specification is release specific which is different to any other test specifications within PTCRB TC DB. So, tests may differ in their requirements depending on the release version of the test spec. PTCRB TC DB does not take this into account.

Therefore, the manufacturer has to declare against which release the DUT is compliant.

The conclusion is that Devices with an acoustic implementation according to a given release shall be tested against the latest version of the corresponding release of 3GPP TS 26.131 and 3GPP TS 26.132.

2.9.7   Radiated Spurious Emissions

Radiated Spurious Emissions (RSE) testing shall be conducted according to the guidelines established in PVG.04, "Guideline for Spurious Emission Radiated Testing".

Radiated Spurious Emissions testing of a Device supporting multiple RATs shall be tested according to the RAT priority below on a per band basis.

RAT Priority (highest to lowest):

1. E-UTRA
2. UTRA
3. GERAN

Devices indicating support of E-UTRA FDD 25 and (E-UTRA FDD 2 or UTRA FDD II or GSM 1900 MHz) shall test in E-UTRA FDD 25.

Devices indicating support of E-UTRA FDD 12 and E-UTRA FDD 17 shall test in E-UTRA FDD 12.

IoT Device configurations which support both Category M1 and NB-IoT airlink technologies, may conduct idle-mode RSE testing only in Category M1 mode. Active-mode RSE testing of these Devices shall be executed for both the Category NB1 and Category M1 airlink technologies.

2.9.8 Method for Measuring Power Reduction Due to Proximity Sensor

2.9.8.1 Measuring Power Reduction Due to Proximity Sensor Applicability

The tests described in this section are applicable to all Devices which utilize a proximity sensor for transmit power reduction.

This test shall be performed in all supported bands and in all supported RATs for Low, Mid and High Channels.

Channels used shall be as described in the TRP measurement portion (Section 5) of the CTIA Test Plan for Wireless Device Over-the-Air Performance.

2.9.8.2 Test case redundancy

- If the Device supports Band 4 and Band 66, then testing is only required to be completed in Band 66.

- If the Device supports Band 25 and Band 2, then testing is only required to be completed in Band 25.

- If the Device supports Band 26 and Band 5, then testing is only required to be completed in Band 26.

- If the Device supports Band 12 and Band 17, then testing is only required to be completed in Band 12.

2.9.8.3 Proximity Sensor PIXIT Declaration

The Device manufacturer shall include a PIXIT declaration describing the Device's maximum power reduction and power tolerance for each supported band in the Low, Mid and High channels.

2.9.8.4 Measuring Power Reduction Due to Proximity Sensor

Measuring Power Reduction due to Proximity Sensor test case is captured in the TC Database.

2.9.8.5 Test Methodology

To perform these tests a System Simulator (SS) and/or spectrum analyzer (or power meter) are required.

1. Ensure that the cable loss of the connection from the DUT to the spectrum analyzer or power meter or SS has been compensated.
2. Measure the maximum average conducted output power by direct connection to the DUT when the proximity is sensor disabled for all supported bands in Low, Mid and High channels.
3. Measure the maximum average conducted output power by direct connection to the DUT when the proximity sensor is manually activated and set to Maximum Power Reduction. This measurement shall be made in all supported bands in Low, Mid and High channels.
4. Steps 2 and 3 shall be repeated for all RATs supported by the DUT.

5. If the DUT does not support a direct connection as required in Steps 1-4 above, power measurement due to activation of a proximity sensor may be accomplished by executing free-space TRP measurements per the most current version of the CTIA Test Plan for Wireless Device Performance, Section 5, as appropriate for the RAT under evaluation. The DUT's TRP shall be measured with the proximity sensor deactivated and with the proximity sensor activated as described above

2.9.8.6 Result Reporting Requirements

The results from measurements made according to Section 2.9.8.4 of this document shall be recorded in a table as a separate test report. The test report shall include the following:

- Test equipment configuration and corresponding calibration

- Configuration of the DUT:

- HW

- SW

- IMEI

- SVN

- Manufacturer documentation of declared power reduction

TABLE 2.9-2 POWER REDUCTION DUE TO PROXIMITY SENSOR TEST RESULT

Band	Channel	Maximum Power Reduction (dB) Declared by Manufacturer	Average Conducted Output Power with Sensor Manually Disabled	Average Conducted Output Power with Sensor Manually Set to Maximum Power Reduction	Power Reduction in Measured power reduction (in dB) when the proximity sensor is enabled	Free-space TRP with Sensor Manually Disabled	Free-space TRP with Sensor Manually Set to Maximum Power Reduction
	Low						
	Mid						
	High						

2.10 LTE / LTE Carrier Aggregation (CA) Interoperability Testing

2.10.1 LTE / LTE CA Interoperability Test Plan

The test plans are the CTIA Test Plan for LTE Interoperability and CTIA Test Plan for LTE Carrier Aggregation Interoperability. The latest version of the test plans can be downloaded from CTIA's web site at https://testplans.ctia.org. A listing of labs authorized to conduct the testing can be found on the same web site (under LTE Interoperability and LTE CA Interoperability authorized testing capabilities).

2.10.2 LTE Interoperability Test Applicability

LTE Interoperability testing is an optional PTCRB certification requirement and applies only to LTE Devices. The Device manufacturer shall consult with the operator(s) to which they intend to sell the Device to determine whether this testing is required and, if so, which infrastructure vendors the Device shall be tested against. Should this testing be required, the Device vendor shall check the "LTE Interoperability Testing" checkbox when submitting the PTCRB certification request.

2.10.3 LTE CA Interoperability Test Applicability

LTE CA Interoperability testing is an optional PTCRB certification requirement and applies only to LTE Devices capable of Carrier Aggregation. The Device manufacturer shall consult with the operator(s) to which they intend to sell the Device to determine whether this testing is required and, if so, which infrastructure vendors the Device shall be tested against. Should this testing be required, the Device vendor shall check the "LTE CA Interoperability Testing" checkbox when submitting the PTCRB certification request.

2.11 Test Case Execution Environment

Device certification shall be conducted with all frequency bands enabled according to its capabilities. Devices shall not be reconfigured for any testing purposes.

2.12 UE Capability Audit

For Initial Certifications and Parent Devices, the PTCRB Primary Test Laboratory shall ensure that the contents of the UE capability Information Elements are correctly reported to the network as specified in the Device's relevant PICS/PIXIT statements.

This shall be achieved by successfully running the validated test cases as follows:

- GERAN only: TS 51.010-1 test case 26.6.11.2

- GERAN/UTRA Device: TS 34.123-1 test case 8.1.5.7

- UTRA only Device: TS 34.123-1 test case 8.1.5.7

- UTRA/E-UTRA Device: TS 34.123-1 test case 8.1.5.7 and TS36.523-1 test case 8.5.4.1

- GERAN/UTRA/E-UTRA Device: TS 34.123-1 test case 8.1.5.7 and TS36.523-1 test case 8.5.4.1

- E-UTRA only Device: TS 36.523-1 test case 8.5.4.1

For any PTCRB Variant / ECO Request, a UE Capability Audit shall be conducted by PTCRB Full Test Laboratory. This audit is required for all Variant / ECO Requests where the GSM, WCDMA or LTE functionality of the Device has been changed or there have been any changes to any feature group functionality. Where MMI only changes have been implemented that have no impact on these areas, the UE Capability Audit will not be required.

These requirements do not apply to Integrated Devices, i.e., Devices embedding a PTCRB-certified module.

2.13 AT-Command Assessment Requirements

2.13.1 AT-Command Applicability

AT-Command assessment is applicable to Devices that support GSMNA AT-Commands. It is limited to all AT-commands supported by the Device and is limited to the PTCRB Bearer Agnostic AT-Command Test Specification.

2.13.2 AT-Command Test Specification

The evaluation of AT-Command is the PTCRB Bearer Agnostic AT-Command Test Specification. The latest specification version can be downloaded from PTCRB's web site at https://members.ptcrb.com/.

2.13.3 AT-Command Certification Criteria

All supported AT-commands have to be assessed by the PTCRB Full Test Laboratory or PTCRB Associate Test Laboratory according to the AT-command test specification.

- PTCRB Full Test Laboratory or PTCRB Associate Test Laboratory may decide how to perform the test cases and if they wish to use a commercially available test platform.
- Test cases are not required to be performed under ISO 17025 accreditation.
- Test cases are not required to be validated, but it is recommended.

2.13.4 AT-Command Technical Reference

The following AT-Command specifications shall be used as further references.

- 3GPP TS 27.005: "3rd Generation Partnership Project; Use of Data Terminal Equipment   Data Circuit terminating Equipment(DTE   DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)".
- 3GPP TS 27.007: "3rd Generation Partnership Project; Technical Specification Group Terminals; AT command set for User Equipment (UE)"
- GSMNA AT Commands Specification

2.14 Execution of E-UTRA Channel Bandwidth Test Cases

2.14.1 Test Case Reduction Based on Multiple Channel Bandwidth Requirements

LTE test cases for Category 1 and higher Devices shall be executed in accordance with the channel bandwidth requirements defined in 3GPP TS 36.521-1, Table 5.4.2.1-1: (E-UTRA Channel Bandwidth) with the following exceptions: :

- Devices supporting FDD Bands 2, 4, 12, 25, and 66 shall not be tested with a channel bandwidth of 1.4 or 3 MHz
- Devices supporting FDD Band 25 shall not be tested with a channel bandwidth of 15 or 20 MHz
- Devices supporting FDD Band 30 shall only be tested with a channel bandwidth of 10 MHz

2.14.2 3GPP TS 36.523-1, Clause 7.1.7.x Test Case Reduction Based on Maximum Channel Bandwidth Requirements

The execution of 3GPP TS 36.523-1 Clause7.1.7.x test cases may be simplified by applying the following rules:

1. All bands supported by the Device shall be grouped by the maximum channel bandwidth specified in 3GPP TS 36.521-1, Table 5.4.2.1-1. Within each of these channel bandwidth groups, one band shall be selected for test execution.
2. All applicable 3GPP TS 36.523-1 Clause 7.1.7.x tests shall be executed on a single band per bandwidth group as determined in (1) above.
3. The maximum bandwidth for each E-UTRA band under test shall be that specified in the "Pre-test conditions" section for each test case.
4. For Devices supporting FDD Band 25, and FDD Band 30, the uplink and downlink channel bandwidth shall be 10MHz).

Example:

If the Device supports the following bands: FDD 2, 4, 7, 12, 17, 25:

1. The Device shall be tested in either FDD 2, FDD 4 or FDD7 using a channel bandwidth of 20MHz.
2. The Device shall be tested in either FDD 12, FDD 17 or FDD 25 using channel bandwidth of 10MHz.

2.14.3 3GPP TS 36.521-1, TC 8.2.1.1.1 & TC 8.2.1.1.1_1 Bandwidth Requirements

The execution of 3GPP TS 36.521-1 TC 8.2.1.1.1 test cases may be simplified by applying the following rules:

- The test 8.2.1.1.1 shall be executed in the following bandwidths: 1.4, 3, 5, 10, 15 and 20MHz (3GPP TS 36.521-1 table 8.2.1.1.1.3-2).

- The tests 8.2.1.1.1_1 shall be executed in the following bandwidths: 5, 10, 15 and 20MHz (3GPP TS 36.521-1 table 8.2.1.1.1_1.3-2).

- All the bandwidths supported by the Device have to be tested only once. It is at the discretion of the test lab to select the bands that are used for testing.

Example:

If a Device supports a band which covers all the above bandwidths, then all bandwidths can be tested on that band alone.

If a Device does not support a band which supports all the bandwidths listed above, then multiple bands will need be tested to ensure all the bandwidths are covered.

2.15 TTY Total Character Error Rate Reporting Requirement

This section defines the requirements for reporting TTY Total Character Error Rate (TCER) measurements.

2.15.1 Reporting

TTY TCER measurements results used for conformance testing shall be included in the associated test report. TCER shall be reported to a precision of one-tenth of a percent.

2.15.2 Applicability

Requirement applies to all TCER test cases in the PTCRB Bearer Agnostic TTY Test Specification; specifically test cases 9.3, 9.4, 9.5, 9.6, 9.8, 9.9, and 9.10.

2.16 Connection Efficiency

This section defines the requirements for the applicability of the current version of TS.35 IoT Device Connection Efficiency testing.

2.16.1 Applicability

Testing requirements apply to all Release 8 – 12 IoT Devices.

Devices implementing eUICC shall be exempt until eUICCs are incorporated into TS.34 and TS.35.

Test requirement is based on Test Applicability and Classification from GSMA TS.35 Annex C.

Device shall test to the highest RAT (E-UTRA or GERAN) supported by the test case which is also supported by the Device.

2.17 Supplementary Services and NITZ

This section identifies the requirements for Devices supporting Supplementary Services or NITZ. This applies to the test cases of 3GPP TS 34.123-1, section 15, and 3GPP TS 51.010, section 31, which may be considered redundant. See PVG.05 – Guideline for Test Case Redundancy for Dual Mode (GERAN / UTRA-FDD) Terminals.

2.17.1 New Testing

Any new Device testing or required retesting shall be done utilizing the validated test cases of 3GPP TS 34.123-1.

2.17.2 Previously Certified Devices

Devices previously certified with the test cases of 3GPP TS 51.010 will not be required to retest with the test cases of 3GPP TS 34.123-1 unless the ECO changes have warranted retesting of the functionality. In this case, the 3GPP TS 34.123-1 version of the test case shall be utilized.

2.18 UICC Based NFC

This section identifies the requirements for Devices supporting UICC Based NFC. This refers to the requirements of GSMA's NFC Test Book.

2.18.1 Applicability

This requirement applies to any new Device or Devices being recertified due to changes to the NFC capability. Previously certified Devices will not be required to retest with the test cases of NFC Test Book unless the ECO changes have warranted retesting of the NFC functionality.

2.18.2 NFC Forum Test Cases Referenced in NFC Test Book

This testing may only be conducted by a NFC Forum authorized test laboratory. The PTCRB Primary Test Laboratory will be responsible for uploading the NFC Forum test report to the PTCRB certification database.

2.18.3 All other NFC Test Book Testing

This testing may only be conducted by a PTCRB Full Test Laboratory technology qualified for UICC Based NFC. The PTCRB Primary Test Laboratory will upload the UICC Based NFC report to the PTCRB certification database. The PTCRB Full Test Laboratory may use test results acquired from a PTCRB Associate Test Laboratory technology qualified for UICC Based NFC, of which they sponsor.

2.19 Extreme Test Conditions

The PTCRB certification requirement is to execute the test cases listed below in the extreme conditions listed below. Any test not included in the list below shall be tested under the conditions, including temperature and voltage extreme conditions, specified by the 3GPP standard (3GPP TS51.010-1).

TABLE 2.19-1 EXTREME TEST CONDITIONS TEST CASES

Test Specification	Test Case Reference	Test Case Title	Band	3GPP Test Requirement	PTCRB Test Requirement
3GPP TS34.121-1	5.2A	Maximum Output Power with HS-DPCCH	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	5.2AA	Maximum Output Power with HS-DPCCH (Release 6 and later)	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV

Test Specification	Test Case Reference	Test Case Title	Band	3GPP Test Requirement	PTCRB Test Requirement
3GPP TS34.121-1	5.2B	Maximum Output Power with HS-DPCCH and E-DCH	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	5.3	Transmitter Characteristics - Frequency Error	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	5.4.1	Transmitter Characteristics - Output Power Dynamics in the Uplink/ Open Loop Power Control in the Uplink	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	5.5.2	Transmitter Characteristics - Transmit ON/OFF Power/Transmit ON/OFF Time Mask	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.4.2.1	RRC Connection Control - Random Access - Correct behaviour when receiving an ACK	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV

Test Specification	Test Case Reference	Test Case Title	Band	3GPP Test Requirement	PTCRB Test Requirement
3GPP TS34.121-1	8.4.2.1A	RRC Connection Control - Random Access - Correct behaviour when receiving an ACK (Release - and later)	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.4.2.2	RRC Connection Control - Random Access - Correct behaviour when receiving an NACK	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.4.2.3	RRC Connection Control - Random Access - Correct behaviour at Time-out	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.4.2.4	RRC Connection Control - Random Access - Correct behaviour when reaching maximum transmit power	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.4.3.1	RRC Connection Control - Transport format combination selection in UE - Interactive or Background, PS, UL: 64 kbps	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV

Test Specification	Test Case Reference	Test Case Title	Band	3GPP Test Requirement	PTCRB Test Requirement
3GPP TS34.121-1	8.4.4.1	E-TFC restriction in UE - 10mS TTI E-DCH E-TFC restriction	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.4.4.2	E-TFC restriction in UE - 2mS TTI E-DCH E-TFC restriction	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.1.1.1	Measurements Performance Requirements - CPICH RSCP - Intra frequency measurements accuracy - Absolute accuracy requirement	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.1.1.2	Measurements Performance Requirements - CPICH RSCP - Intra frequency measurements accuracy - Relative accuracy requirement	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.1.2.1	Measurements Performance Requirements - CPICH RSCP - Inter frequency measurements accuracy - Relative accuracy requirement	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV

Test Specification	Test Case Reference	Test Case Title	Band	3GPP Test Requirement	PTCRB Test Requirement
3GPP TS34.121-1	8.7.2.1.1	Measurements Performance Requirements - CPICH RSCP - Inter frequency measurements accuracy - Relative accuracy requirement	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.2.1.2	Measurements Performance Requirements /CPICH Ec/Io - Intra frequency measurements accuracy - Relative accuracy requirement	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.2.2.2	Measurements Performance Requirements /CPICH Ec/Io - Inter frequency measurement accuracy - Relative accuracy requirement	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.3.1	Measurements Performance Requirements - UTRA Carrier RSSI - Absolute measurement accuracy requirement	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.3.2	Measurements Performance Requirements /UTRA Carrier RSSI - Relative measurement accuracy requirement	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV

Test Specification	Test Case Reference	Test Case Title	Band	3GPP Test Requirement	PTCRB Test Requirement
3GPP TS34.121-1	8.7.3C	Measurements Performance Requirements - UE transmitted power	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.3D	UE transmitted power (Rel-5 and later)	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.4.1	Measurements Performance Requirements - SFN-CFN observed time difference - Intra frequency measurement requirements	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.4.2	Measurements Performance Requirements /SFN-CFN observed time difference /Inter frequency measurement requirement	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.9	UE transmission power head room	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV

Test Specification	Test Case Reference	Test Case Title	Band	3GPP Test Requirement	PTCRB Test Requirement
3GPP TS34.121-1	8.7.10	E-UTRAN FDD RSRP absolute accuracy	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS34.121-1	8.7.12	E-UTRAN FDD RSRQ absolute accuracy	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS51.010-1	14.5.1.1	Adjacent channel rejection – speech channels	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS51.010-1	14.5.2	Adjacent channel rejection – speech channels	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS51.010-1	14.6.1	Intermodulation rejection - speech channels	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV

Test Specification	Test Case Reference	Test Case Title	Band	3GPP Test Requirement	PTCRB Test Requirement
3GPP TS51.010-1	14.6.2	Intermodulation rejection - control channels	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS51.010-1	14.18.3	Adjacent channel Rejection	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV
3GPP TS51.010-1	14.18.4	Intermodulation Rejection	All	Nominal HTLV HTHV LTLV LTHV	Nominal HTLV LTLV

2.20   Execution of Test Cases for E-UTRA Carrier Aggregation (CA)

2.20.1   Band 66 and Carrier Aggregation (CA)

For a Device supporting Band 66 and CA, the following LTE CA intra-band component carrier combinations shall be tested:

- CA_66A-66A
- CA_66B
- CA_66C

2.21   IoT Cybersecurity Assessment Requirements

2.21.1   IoT Cybersecurity Certification Test Plan

The test plan is the CTIA Cybersecurity Certification Test Plan for IoT Devices. The latest version of this test plan can be downloaded from https://testplans.ctia.org. A list of labs authorized to conduct this testing can be found on the same website (under cybersecurity authorized testing capability).

2.21.2   IoT Cybersecurity Test Applicability

IoT Cybersecurity testing is an optional PTCRB certification requirement and applies only to IoT Devices. The Device manufacturer shall consult with the operator(s) to which they intend to sell the Device to determine whether this testing is required. Should this testing be required, the Device vendor shall check the "IoT Cybersecurity" checkbox when submitting the PTCRB certification request.

Section 3   Application Enablers Evaluation, General Information

This section defines the requirements for the certification of the Application Enablers that are implemented in the Device and are required for PTCRB certification.

3.1   Application Enabler (AE) Test Applicability

3.1.1   AE Testing Required

All Devices supporting application enablers that are applicable for PTCRB certification. Specific details on individual application enabler certification requirements are given in the following sections.

3.1.2   AE Testing Not Required

- Devices that do not support application enablers
- PCMCIA cards
- Variants, re-branded Devices having no altered AE implementation from their Parent Device

3.1.3   AE Test Specification

This section lists test specifications applicable to application enablers required for PTCRB certification. The latest approved version of the listed test specification shall be used. If the SDO or standardization forum who has the ownership of the test specification has approved any change requests which are yet to be incorporated into the test specification, then these change requests should be used for validations and referenced in the validation report.

3.1.4   ECOs

AE testing shall be conducted on an ECO if the associated changes impact any of the following areas:

- AE protocol implementation
- Underlying protocols

If the changes do not impact these areas then AE testing for an ECO is not necessary and the PTCRB Primary Test Laboratory shall provide a declaration to the PTCRB certification database stating that testing was not required.

3.1.5   Application Enabler Certification Criteria

Devices supporting application enablers required for PTCRB certification shall fulfill all applicable application enabler conformance criteria.

The Certification Criteria for application enabler can include both Conformance and Interoperability tests.

Conformance testing shall be performed in a PTCRB Full Test Laboratory, which is approved for the application enabler being tested.

Interoperability test results shall be provided by the manufacturer and testing does not have to be performed by a PTCRB Full Test Laboratory. Interoperability testing can be proved through Field

Trials, bi-lateral testing and/or multi-lateral events (e.g., Test Fests hosted by OMA). The conditions for the I-lateral testing and/or multi-lateral event results to be accepted for PTCRB certification are:

- The manufacturer shall submit a declaration stating that the changes (if any) introduced in the implementation tested in the test event, the results of which are being presented for certification, have not changed the behavior of the functionality tested. These results will be accepted to apply for certification if they comply to the Certification Criteria

- All test results shall be submitted to the PTCRB Primary Test Laboratory for inclusion in the test report, to obtain the certification

- The test configuration shall be described and made available in the Certification Declaration

- Manufacturers are responsible for making all the necessary arrangements to be able to disclose results of I-lateral and/or multi-lateral testing for Certification purposes

- Where test Certification Criteria includes client-to-client testing, manufacturers are also responsible for seeking the appropriate Device to test against, contacting other Device manufacturers on a "reasonable effort" basis

    As a general recommendation, in 'client-t- client' testing, the DUT should run the applicable tests against already certified Devices if available.

    If the application enabler implementation has already obtained GCF or PTCRB certification, the manufacturer may choose to re-use the test results under the following conditions:

    - The manufacturer can guarantee that no changes in the protocol stack of the enabler for which certification is sought, and in the applicable underlying application protocol stacks like WAP, HTTP, SIP, RTP, RTCP etc., that could affect the AE functionality have been introduced from the AE client version that obtained certification.

    - The manufacturer can guarantee that no changes in the overall AE behavior have been introduced from the version that obtained certification, and no features not included in the original version that obtained certification are added to the AE client that is seeking certification.

    The manufacturer shall provide all the test results from the testing that was conducted for original certification and any further latest test results, as appropriate.

3.1.6   AE Technical Requirements

This section gives details of the application enabler core specifications relevant for PTCRB certification. For validation' the latest approved version, if available, of all the listed specifications should be used. If the SDO or standardization forum that has ownership of the specification has approved any change requests of the content of the specification, which are yet to be incorporated into the document, then these change requests should be used for validations and referenced in the validation report.

3.1.7 AE Options Table/ICS/Test Case Mapping Document

The Options table, ICS or Test Case Mapping Table, as appropriate, shall be filled out by the manufacturer to indicate the features implemented in the client. This shall be submitted by the manufacturer to the PTCRB certification database as part of the certification submission.

If the Options table, ICS or Test Case Mapping table is contained in external specifications a reference to the document should be added to this section.

All mandatory features, of the implemented enablers for which certification is sought, as specified in the applicable SDO enabler release specifications shall be implemented in the Device.

3.1.8 AE Interoperability Test Results

This section details how to present IOP test results and information on tested configurations.

3.2 Specific Application Enabler Test Requirements

3.2.1 Multimedia Messaging Service (MMS)

3.2.1.1 MMS Applicability

MMS testing is applicable to Devices that support OMA MMS version 1.0, 1.1, 1.2 or 1.3.

3.2.1.2 Effective Date for MMS Testing

This requirement is effective for Devices submitted to a lab for testing on or after October 1, 2004.

3.2.1.3 Transition Period for MMS 1.x Certification

Following the introduction of MMS 1.x certification in PTCRB and GCF there may be a period whereby a manufacturer would have to certify against different versions of MMS schemes for PTCRB and GCF certification due to different validity periods of the NAPRD03 and GCF-CC.

If the situation arises that the NAPRD03 and GCF-CC versions that a manufacturer is certifying against would require different MMS certification schemes to be used, the manufacturer may choose to certify against the same MMS certification scheme as used by GCF.

For ECOs, manufacturers may choose to re-certify against the original MMS certification scheme used for initial PTCRB certification.

3.2.1.4 MMS Test Specification

The test plan to be utilized for the evaluation of MMS is the OMA IOP MMS ETS. This test plan can be downloaded from OMA's web site at http://openmobilealliance.org/.

The following OMA MMS Core specifications shall be used as the basis for all validations:

- MMS_1.0: http://technical.openmobilealliance.org/Technical/technical-information/material-from-affiliates/wap-forum

- MMS_1.1: http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/mms-v1-1

- MMS_1.2: http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/mms-v1-2

- MMS_1.3: http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/mms-v1-3

3.2.1.5 MMS Certification Criteria

The test requirements can be found in TC Database.

In Client-to-Server tests, the Device shall be tested against (at least) three different MMSCs per test case. If there are less than three MMSCs from different manufacturers, the Device manufacturer will make the "best effort" to maximize testing and ensure interoperability. PTCRB may tune the number of different MMSCs to test against depending on the test case. It should be noted that different network radio elements will not be considered as different configurations.

In client-to-client tests, the Device shall be tested against (at least) five different independent clients per test case. If there are less than five different independent clients from different manufacturers, the Device manufacturer will make the 'best effort' to maximize testing to ensure interoperability. PTCRB may tune the number of different clients to test against depending on the test case. Client-to-client tests may be performed on a single server and client-to-server/server-to-client tests on a single client.

3.2.1.6 MMS Technical Requirements

The following OMA MMS Core specifications shall be used as the basis for all validations.

- MMS_1.0: http://technical.openmobilealliance.org/Technical/technical-information/material-from-affiliates/wap-forum

- MMS_1.1: http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/mms-v1-1

- MMS_1.2: http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/mms-v1-2

- MMS_1.3: http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/mms-v1-3

3.2.1.7 Test Case Mapping Table for Devices supporting MMS

The MMS mapping table is specified in appendix B of the OMA MMS ETS. Appendix B.3 contains the ICS, Appendix B.4 contains the IXIT statements. The ICS/IXIT statements should be completed by the manufacturer and submitted as part of the certification submission.

The mapping table is specified OMA-ETS-ETC-MMS-V1_2-20060614-D and OMA-ETS-MMS_CON-V1_3-20060725-C for MMS v1.3, respectively or later versions.

3.2.1.8 MMS Interoperability Test Results

3.2.1.8.1. Conformance Test Results for Devices Supporting MMS

Manufacturers shall submit the test results and details of tested configurations for the Interoperability Test cases (as specified in TC Database) using the following format.

Note: The Client to Client Interoperability Test Cases shall be executed in both directions to test the behavior for sending and receiving. For the sending test cases the Device to be certified will act as client A as specified in the OMA ETS and for the receiving test cases the Device to be certified will act as client B.

See example below for instructions in filling out the test results table.

TABLE 3.2-1 CLIENT-TO-CLIENT INTEROPERABILITY TEST CASES

OMA MMS ETS Reference		Test Count					Comments
No.	Description	#1	#2	#3	#4	#5	
1.1	Interoperability Test Case 1	C7	C2	C5	C4	C6	
		S2					
1.2	Interoperability Test Case 1	C7	C2	C5	C4	C6	
		S1					
1.3	Interoperability Test Case 1	C7	C2	C5	C4	C6	
		S2					
1.4	Interoperability Test Case 1	C7	C2	C5	C4	C6	
		S3					

TABLE 3.2-2 CLIENT-TO-SERVER/SERVER-TO-CLIENT INTEROPERABILITY TEST CASES

OMA MMS ETS Reference		Test Count			Comments
No.	Description	#1	#2	#3	
2.1	Interoperability Test Case 6	S1	S2	S3	
2.2	Interoperability Test Case 7	n/a	n/a	n/a	
2.3	Interoperability Test Case 8	S1	nS	nS	

The following abbreviations are used in the Interoperability Test Results tables to identify the Test Configuration.

In the Header

#1…#N	=	Test Execution Count

In the Entry Field

C1…CN	=	Test Case executed, client or server with identifier N used
S1…N	=	Test Case executed, server with identifier N used
n/a	=	Test is not applicable since the MMS Option is not supported by the Device
nC	=	No further clients supporting this test are commercially available
nS	=	No further servers supporting this test are commercially available

"Test Case executed" means that no fault or problem with the DUT was encountered during this Interoperability Test.

TABLE 3.2-3 CONFIGURATION USED FOR CLIENT-TO-CLIENT INTEROPERABILITY TESTING

TEST CLIENTS TESTED AGAINST I				
C	Manufacturer	Model	IMPS Release	SW version (opt.)
1				
2				
3				
4				
5				
N				

TABLE 3.2-4 CONFIGURATION USED FOR CLIENT-TO-SERVER/SERVER-TO-CLIENT INTEROPERABILITY TESTING

Infrastructure Information			
II	**Details**		
1	**IM Server**		**Presence Server**	
	Manufacturer	SW Version	Manufacturer	SW Version
	Group Server		**SMS Server (optional)**	
	Manufacturer	SW Version	Manufacturer	SW Version
2	**IM Server**		**Presence Server**	
	Manufacturer	SW Version	Manufacturer	SW Version
	Group Server		**SMS Server (optional)**	
	Manufacturer	SW Version	Manufacturer	SW Version
3	**IM Server**		**Presence Server**	
	Manufacturer	SW Version	Manufacturer	SW Version
	Group Server		**SMS Server (optional)**	
	Manufacturer	SW Version	Manufacturer	SW Version

Note: In case the server manufacturer's server includes all services in one "IMPS" server, only IM Server needs to be filled in.

3.2.2 Deleted

3.2.3 Deleted

3.2.4 Deleted

3.2.5 Deleted

3.2.6 Device Management

3.2.6.1 Device Management Applicability

Device Management testing is applicable to all Devices that support OMA Device Management version 1.2

3.2.6.2 Device Management Test Specification

The evaluation of Device Management is the OMA ETS-DM. This test specification can be downloaded from OMA's web site at

http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/dm-v1-2

3.2.6.3 Device Management Certification Criteria

The Device Management test cases are captured in TC Database.

3.2.6.4 Device Management Technical Requirements

The following OMA Device Management Core specifications shall be used as the basis for all validations.

DM 1.2: http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/dm-v1-2

3.2.7 Secure User Plane Location (SUPL)

3.2.7.1 Secure User Plane Location (SUPL) Applicability

SUPL testing is applicable to Devices that support OMA SUPL version 1.0 or 2.0.

3.2.7.2 SUPL Test Specification

The evaluation of SUPL is the OMA ETS-SUPL. This test specification can be downloaded from OMA's web site at http://openmobilealliance.org/.

3.2.7.3 SUPL Certification Criteria

The SUPL Conformance test cases are captured in TC Database.

3.2.7.4 SUPL Technical Requirements

The following OMA SUPL Core specifications shall be used as the basis for all validations.

SUPL_1.0: http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/secure-user-plane-location-v1-0

SUPL 2.0: http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/secure-user-plane-location-v2-0-2

3.2.8 Deleted

3.2.9 FUMO

3.2.9.1 FUMO Applicability

FUMO testing is applicable to all Devices that support OMA FUMO version 1.0.

3.2.9.2 FUMO Test Specification

The test plan for the evaluation of FUMO is OMA ETS FUMO V1.0. This test specification can be downloaded from OMA's web site at http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/fumo-v1-0

3.2.9.3 FUMO Certification Criteria

The FUMO test cases are captured in TC Database.

3.2.9.4 FUMO Technical Requirements

The following OMA FUMO Core specifications shall be used as the basis for all validations.

FUMO 1.0: http://technical.openmobilealliance.org/Technical/technical-information/release-program/current-releases/fumo-v1-0

3.2.9.5 FUMO Interoperability Test Results

The Client-to-Server test cases from NAPRD03 shall be executed at least once against any OMA-DM server supporting FUMO (S1…S3).

Client-to-Server Interoperability Test Cases

The following abbreviations are used to identify the Test Verdict:

- Ex   = Test Case executed, no fault or problem with the DUT was encountered.
- n/a   = Test is not applicable since the FUMO Option is not supported by the device
- nS   = No server supporting this test is commercially available

Manufacturers shall submit the test results and details of tested configurations for the Interoperability Test cases (as specified in TC Database) using the following formats:

TABLE 3.2-5 CLIENT-TO-SERVER INTEROPERABILITY TEST RESULTS TABLE

OMA FUMO ETS Reference		Test Count			Comments
No.	**Description**	**S1**	**S2**	**S3**	
1	Interoperability test case 1				
2	Interoperability test case 2				
3	Interoperability test case 3				

TABLE 3.2-6 CONFIGURATION USED FOR CLIENT-TO-SERVER INTEROPERABILITY TESTING

Servers tested against (S)			
S1	**OMA-DM/ FUMO Server**		
	Manufacturer	SW Version	Enabler Release
S2	**OMA-DM/ FUMO Server**		
	Manufacturer	SW Version	Enabler Release
S3	**OMA-DM/ FUMO Server**		
	Manufacturer	SW Version	Enabler Release

Appendix A Revision History

Date	Version	Description
1997 - 2019	1.0 – 5.42	
April 2020	6.0	Document restructured
April 2020	6.0.1	No change is made to the NAPRD03 document. This version is released to be consistent with the latest PTCRB Test Case Database changes.