

Wireless Communications

# NAVIGATING CTIA CERTIFICATION™ OTA WORKING GROUPS

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# CONTENT

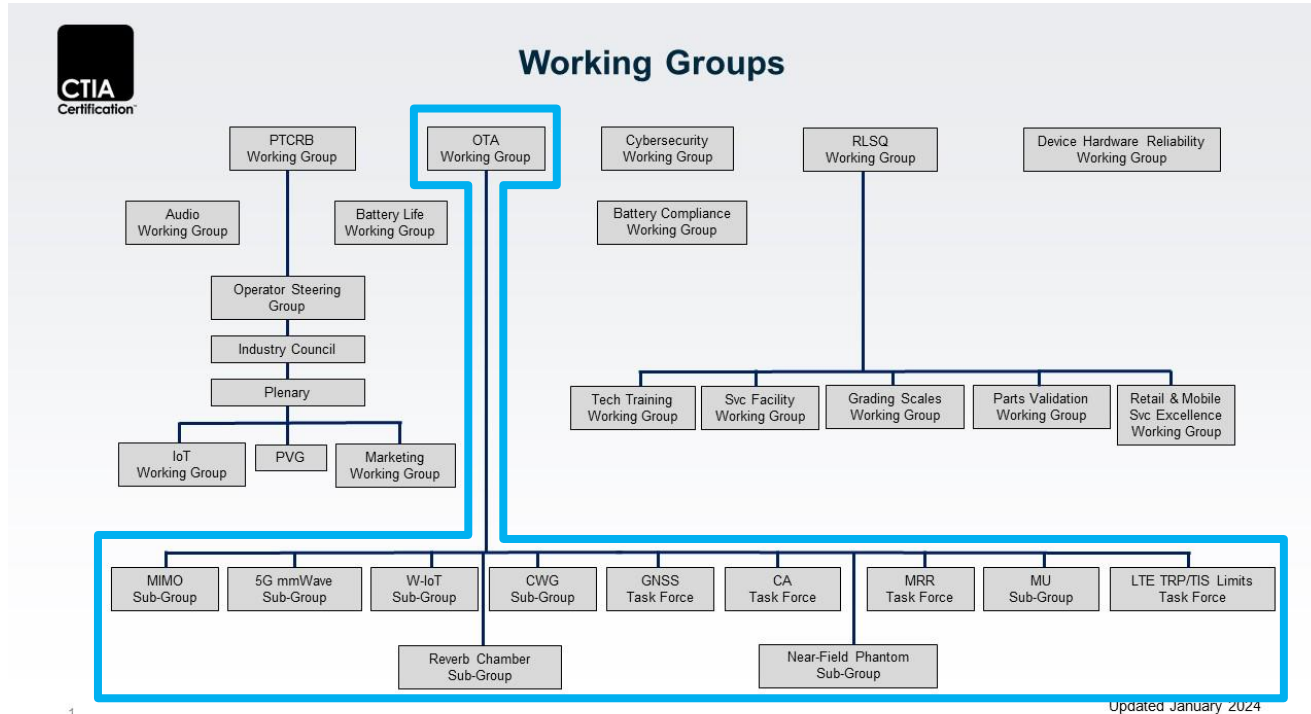
- ▶ Introduction to CTIA Certification and the OTA Working Groups
- ▶ CTIA Certification OTA Test Plan document structure beyond v4.0.x
- ▶ Release schedule, new features and milestones
  - Version 4.0.x
  - Version 6.0.x
  - Version 7.0
  - Version 8.0 and beyond
- ▶ Rohde & Schwarz solutions
  - TS8991 for FR1
  - TS8980FTA-M1 for FR2

# CTIA CERTIFICATION MISSION

- ▶ CTIA Certification is a subsidiary of CTIA which represents the U.S. wireless communications industry. From carriers and equipment manufacturers to mobile app developers and content creators, CTIA brings together a dynamic group of companies that enable consumers to lead a 21<sup>st</sup> Century connected life.
- ▶ CTIA Certification is a global leader in certification for the mobile wireless industry. Since 1991, CTIA Certification programs have set the industry gold standard for device, test labs, technicians, and repair facilities, playing a crucial role in advancing the wireless industry.
- ▶ Besides OTA test plans, CTIA Certification also manages certification programs like PTCRB, battery life, battery compliance and many more.

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# CTIA CERTIFICATION PROGRAM WORKING GROUPS (CPWG)



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# OTA WORKING GROUP, SUB-WORKING GROUPS AND TASK FORCES

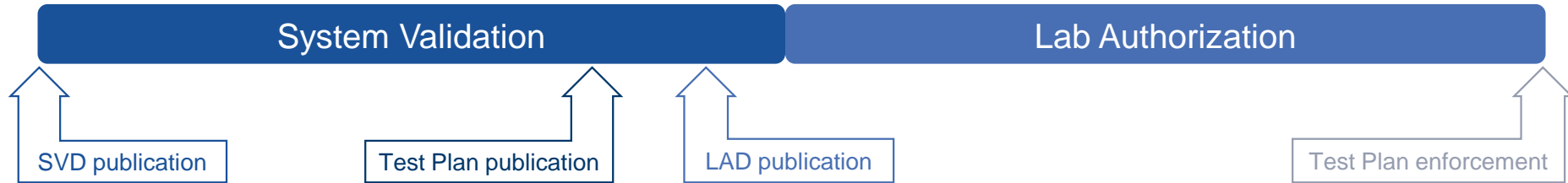
Group	Description
OTA Working Group	Responsible for developing and maintaining the CTIA Certification test plans for wireless device OTA performance. Multiple test plans define the requirements for performing transmit and receive performance measurements on wireless devices.
5G Millimeter Wave OTA Sub Working Group (5GmmW)	Reports to the OTA Working Group. The group is responsible for addressing 5G OTA measurements for UEs operating in the mm-wave bands while complementing the work in 3GPP RAN4/5
OTA Converged Wireless Sub-Working Group (CWG)	Reports to the OTA Working Group. The group is responsible for maintaining the CTIA/Wi-Fi Alliance Test Plan for RF Performance Evaluation of Wi-Fi Mobile Converged Devices.
OTA MU Sub-Working Group (MUSG)	Reports to the OTA Working Group. Its mission is to define the measurement uncertainty requirements within the CTIA Test Plan for Wireless Device Over-the-Air Performance.
Near Field Phantom Sub Working Group (NFP)	Reports to the OTA Working Group. This group is responsible for developing body phantoms used in the CTIA Certification test plans for wireless device OTA performance.
MIMO OTA Sub-Working Group (MOSG)	Reports to the OTA Working Group. The group is responsible for maintaining the CTIA Test Plan for 2x2 Downlink MIMO and Transmit Diversity Over-the-Air Performance.
W-IoT OTA Sub-Working Group (W-IoT)	The OTA Wireless Internet of Things (W-IoT) Sub-Working Group reports to the OTA Working Group. Its mission is to develop and document requirements within the CTIA Test Plan for Wireless Device Over-the-Air Performance that are specific to W-IoT devices
Reverb Chamber Sub-Working Group	This sub-group reports to OTA Working Group and is in charge of developing the test plan using Reverberation Chambers as the baseline methodology.
TRP/TIS Limits Task Force	Reports to the OTA Working Group. Its mission is to develop limits for LTE TRP/TIS.
CA Task Force (CATF)	Reports to the OTA Working Group. Its mission is to define the set of bands and proper approach for Carrier Aggregation OTA measurements. It also covers the definition of FR1 EN-DC methodology.
MRR Task Force (MRR TF)	Reports to the OTA Working Group. Its mission is to define the Machine Readable Report template.
GNSS Task Force (GNSS TF)	Reports to the OTA Working Group. This group is responsible for developing and maintaining the CTIA Certification Test Plan for Location Based Technology and focusing on GNSS Over-the-Air Performance.

# CTIA CERTIFICATION OTA TEST PLAN DOCUMENT STRUCTURE

- ▶ The document reorg framework was discussed and approved during 2020.
- ▶ The main idea was to reorganize previous CTIA Certification test plans to facilitate the future inclusion of additional test methodologies, airlinks, bands, device types, etc., and making each document smaller and easier to work with.
- ▶ Suite of separate documents, all of which replace the previous OTA test plan, MIMO test plan, etc., as well as future extensions of those test plans. The use of references embedded in each document allow users to easily access information within the document package.
- ▶ The version numbering is based on 3 digits (vA.B.C), which identifies:
  - A = major change, like new methods, RATs, phantoms or updates to chamber validation. All documents will follow the update to a new A version, even if there are no changes to it. Not more frequent that one every 6 months.
  - B = minor change including new bands or band combinations, new or updated requirements, resolving technical problems. Expected quarterly to align with PTCRB NAPRD.03.
  - C = editorial changes.

Doc ID	Doc Name
CTIA 01.01	Test Scope, Requirements, and Applicability
CTIA 01.02	Operator Priority List
CTIA 01.03	Normative Reporting Tables
CTIA 01.04	Informative Reporting Tables
CTIA 01.20	Test Methodology, SISO, Anechoic Chamber
CTIA 01.21	Test Methodology, SISO, Reverberation Chamber
CTIA 01.22	Test Methodology, SISO, Millimeter Wave
CTIA 01.40	Test Methodology, MIMO, Static Channel Model, MPAC
CTIA 01.41	Test Methodology, MIMO, Static Channel Model, RTS
CTIA 01.50	Wireless Technology, 3GPP Radio Access Technologies
CTIA 01.51	Wireless Technology, Location Based Technologies
CTIA 01.52	Wireless Technology, Non-3GPP Radio Access Technologies
CTIA 01.70	Measurement Uncertainty
CTIA 01.71	Device Setup and Positioning Guidelines
CTIA 01.72	Near-Field Phantoms
CTIA 01.73	Supporting Procedures
CTIA 01.90	Informative Reference Material
CTIA/Wi-Fi Alliance Test Plan for RF Performance Evaluation of Wi-Fi Mobile Converged Devices	

# PROCESS TO ENFORCE A TEST PLAN VERSION



# OTA TEST PLAN Version 4.0.x

## KEY DATES

Test Plan	Alias	First version publication	Last version published	Last version publication date	SVD/LAD publication date	Date of enforcement for Certification
CTIA 01.01	OTA Scope	2022/02/14	v4.0.5	2024/05/23	-	Same as CTIA 01.20
CTIA 01.20	SISO Anechoic		v4.0.0	2024/02/14	SVD: 2023/04/11 LAD: 2023/05/03	A-GNSS: 2024/07/31 All other features: 2023/07/31
CTIA 01.22	SISO mmW		v4.0.1	2022/11/22	SVD: 2021/09/21 LAD: 2022/07/26	Waiting for 5 <sup>th</sup> lab to become authorized
CTIA 01.40	LTE MIMO MPAC		v4.0.0	2024/02/14	SVD/LAD: 2022/08/31	2023/10/02
CTIA 01.50	3GPP Config		v4.0.2	2024/05/23	-	Same as CTIA 01.20 for FR1 Same as CTIA 01.22 for FR2
CTIA 01.51	LBT Config		v4.0.4	2024/05/23	-	Same as CTIA 01.20
CWG Test Plan	CWG	2023/02/16	v4.0.1	2024/04/02	Same as CTIA 01.20	Same as CTIA 01.20



# OTA TEST PLAN Version 4.0.x

## HIGHLIGHTS

Feature	Topics
SISO Anechoic	NR FR1 EN-DC test procedure Changes to NR FR1 SA test configuration. Additional band n25
	LTE Test Reduction for devices supporting NR FR1 Test scope reduction for 2G and 3G Minimum recommended TRP/TIS limits for IoT devices NB-IoT channel settings to address guard band issues
	A-GPS L1 with NR FR1 NSA A-GPS L5 with LTE A-Galileo E1 with LTE
	Test time reduction for A-GNSS testing based on reuse of results between RATs Band 14 A-GNSS UL RB Allocation Update
	BT LE based on advertising packages as informative
	Weighting changed from $\sin(\theta)$ to Clenshaw-Curtis TRP testing guidance for devices with Time-Averaging Algorithm
	Chest phantom as informative
	Ripple based calibration update Ripple for lower 600MHz frequency bands
	New nomenclature schema for DC/CA
	Clarification of Testing with Battery

Feature	Topics
SISO mmW	Test sequence and test channel harmonization with 3GPP Added band n258
	DUT mounting fixture impact Tablet devices added in alignment options
	Clarification on relative coordinates for QoQZ Fixture misalignment correction for Phase QoQZ Waiver for phase QoQZ at P1 and P7
CWG	Harmonization to OTA Test Plan Version 4.0.x
	Coverage of 802.11ax (SISO), incl. new traffic generation method (HE Trigger Based) Coverage of new frequency bands (6GHz and 5.9GHz)-
	Single carrier 5G NR FR1 (i.e. SA) added

# OTA TEST PLAN Version 6.0.x

## KEY DATES

Test Plan	Alias	First version publication	Last version published	Last version publication date	SVD/LAD publication date	Date of enforcement for Certification
CTIA 01.01	OTA Scope	2023/04/14	v6.0.3	2024/06/13	-	Same as CTIA 01.20
CTIA 01.20	SISO Anechoic		v6.0.2	2024/06/13	N/A	October 1 <sup>st</sup> , 2024, with limited scope
CTIA 01.22	SISO mmW		v6.0.0	2023/04/14	N/A	October 1 <sup>st</sup> , 2024, with limited scope
CTIA 01.40	LTE MIMO MPAC		v6.0.0	2023/04/14	N/A	October 1 <sup>st</sup> , 2024
CTIA 01.50	3GPP Config		v6.0.2	2024/01/02	-	Same as CTIA 01.20 for FR1 Same as CTIA 01.22 for FR2
CTIA 01.51	LBT Config		v6.0.3	2024/06/13	-	Same as CTIA 01.20
CWG Test Plan	CWG	2024/04/02	v6.0.0	-	N/A	October 1 <sup>st</sup> , 2024

# OTA TEST PLAN Version 6.0.x

## HIGHLIGHTS

Feature	Topics
SISO Anechoic	New NR FR1 bands: n12, n14, n26, n30, n48, n77 (including intermediate channel testing for Tx and Rx)
	Test parameters updated and corrections for all NR FR1 Bands
	NR FR1 full signaling configuration tables (like TS 38.508-1)
	Text updates to introduce NR FR1 SA for Power Class 1.5
	NR FR1 SA Downlink CA
	New EN-DC combinations and PC2
	Removal of UMTS IV and LTE Band 17
	A-GNSS (L1, L5 & E1) with NR FR1 SA
	A-GPS L5 with NR FR1 EN-DC, with identified IMD cases
	A-Galileo E1 with NR FR1 EN-DC, with identified IMD cases
	Intermediate channel list for A-GNSS with NR FR1 EN-DC
	Correction of LTE band 14 allocation for A-GNSS for rad sensitivity
	Standalone GPS L5 added as informative
	SIB8_16 changed to informative
MBS changed to informative	
UE based with SUPL as informative	
LTE Cat M1 changed to informative	
Fast TIS category of measurements for IoT, relaxation of MU RSS measurements for single receiver devices	
Test time reductions: overlap between RATs, A-GNSS for NR FR1, Data only devices, grids.	
Ankle phantom as informative	
Clarification of phantom frequency band compliance	

Feature	Topics
SISO mmW	Added 40cm QZ
	Added grey box approach
	Added alignment options for large devices
	Clarification of QoQZ TRP Grids
MIMO LTE	Removed option to apply power validation correction
CWG	Clarification on cellular desensitization cases due to Wi-Fi: RATs with/without limits, intermediate channel testing...
	Corrected channels and parameters for Wi-Fi desensitization cases due to cellular harmonics

# OTA TEST PLAN Version 7.0

## KEY DATES

Test Plan	Alias	First version publication	Last version published	Last version publication date	SVD/LAD publication date	Date of enforcement for Certification
CTIA 01.01	OTA Scope	2024/04/11	v7.0	-	-	<i>Same as CTIA 01.20</i>
CTIA 01.20	SISO Anechoic		v7.0	-	TBD	TBD
CTIA 01.22	SISO mmW		v7.0	-	TBD	TBD
CTIA 01.40	LTE MIMO MPAC		v7.0	-	TBD	TBD
CTIA 01.50	3GPP Config		v7.0	-	-	<i>Same as CTIA 01.20 for FR1 Same as CTIA 01.22 for FR2</i>
CTIA 01.51	LBT Config		v7.0	-	-	<i>Same as CTIA 01.20</i>
CWG Test Plan	CWG	N/A	-	-	-	-

# OTA TEST PLAN Version 7.0

## HIGHLIGHTS

Feature	Topics
SISO Anechoic	NR FR1 SA Uplink CA NR FR1 EN-DC with 2CC DL LTE CA New band: NR FR1 n77 Canada Range 4 n77 Range ID Nomenclature
	CA/DC combo variant nomenclature Clarification on operation of CCs not under test for CA/DC testing
	Correction of Band n14 allocation for A-GNSS for rad sensitivity Missing EN-DC combos from v6.0 for A-GNSS with NR FR1 EN-DC
	Chest and ankle phantoms to normative Clarification on chest phantom positioning guidelines for professional devices
	Test time reductions: additional cases on the test requirements per phantom.

Feature	Topics
SISO mmW	Optional grids for 4x2 PC3 UE antenna array
Reverb FR1	RC method made informative
	Allow continuous stirring during RC pre-char

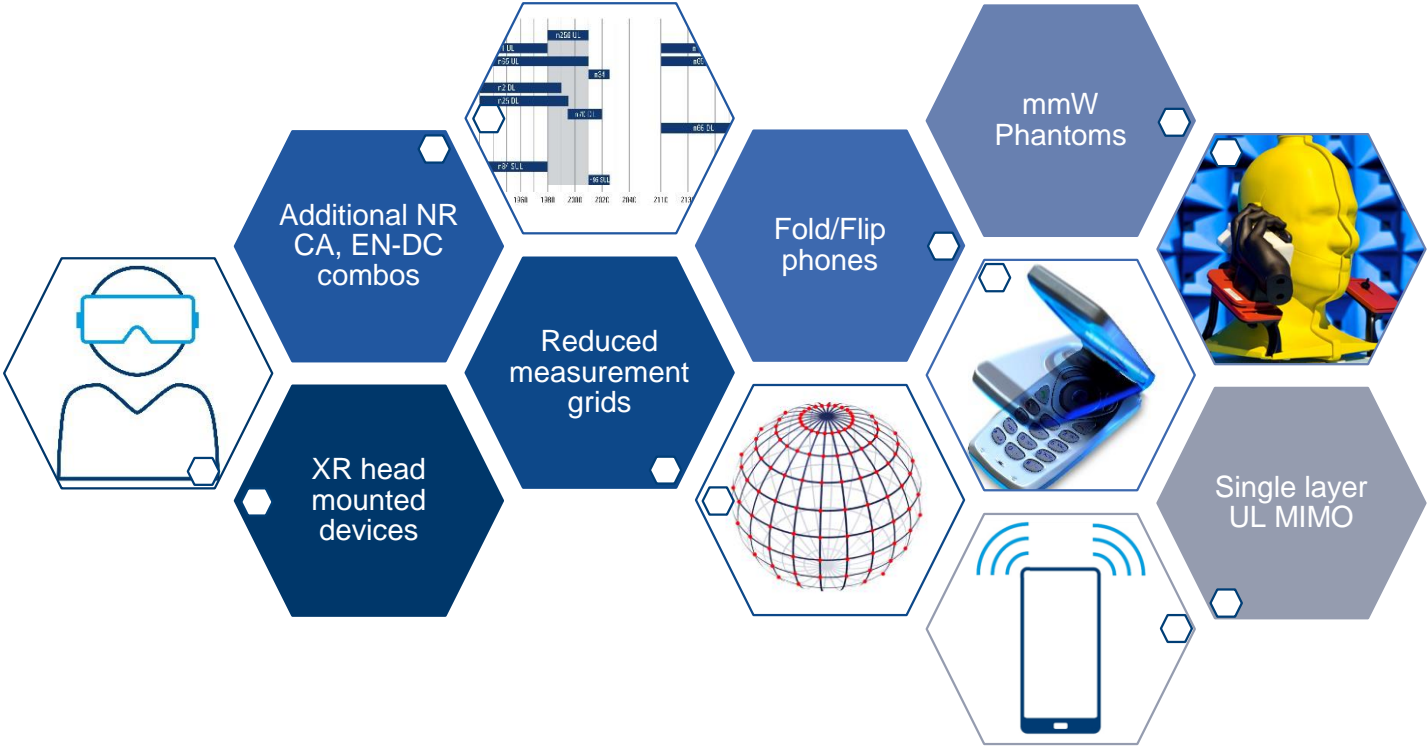
# OTA TEST PLAN Version 8.0

## HIGHLIGHTS

Feature	Topics
SISO Anechoic	NR FR1 RedCap OTA Testing
	NR FR1 Power Measurement Updates Update to SA UL CA for higherPowerLimit-r17
	A-Galileo E5A for LTE and NR FR1 A-GNSS test reduction / consolidation
	Test time reductions: test requirements consolidation, coarse grids for IoT devices.
	Revised definition for dipole/loop

Feature	Topics
SISO mmW	Coarse & Fine for Beam Peak Search Optional Measurement Grids based on 6x2 Ant Array
	Reverb FR1
	RC method made informative Allow continuous stirring during RC pre-char

# TRENDING TOPICS FOR FUTURE VERSIONS



# R&S®TS8991

- ▶ Full solution supporting:
  - 3GPP
  - CTIA SISO
  - A-GNSS
  - 5G NR FR1 and legacy technologies
- ▶ Fast and easy to handle single antenna test system
- ▶ One-stop-shop
- ▶ Worldwide installed base "Made in Germany"





# R&S® TS8980FTA-M1

- ▶ Strongest industrial servo drive:
  - For heavier and larger DUTs.
  - Targets both 3GPP and CTIA.
- ▶ Vertical layout:
  - Most compact solution.
  - More accurate DUT positioning.



# R&S® TS8980FTA-M1

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Find out more

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