Template for submitting comments/inputs on Draft Test Guide titled “IoT Gateway” (Draft Test Guide No. TEC 33011:2026)”

Name of Manufacturer/Stakeholder:

Organization:

Contact details:

Clause No.	Clause Description	Comments, if any	Remarks, if any

Note: The comments/inputs on the draft Test Guide (Draft Test Guide No. TEC 33011:2026 may be furnished in the above format through email to adet.iottec-dot@gov.in with copy to dir.iot-tec@gov.in and ddgiot.tec@gov.in at the earliest and within prescribed time period (60 days).

परीक्षण मार्गदर्शिकाटीईसी 33011:2026

TEST GUIDE TEC 33011:2026

for

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IoT Gateway

(STANDARD No. TEC 33010:2025)

ISO 9001:2015

दूरसंचार अभियांत्रिकी केंद्र
खुर्शीद लाल भवन, जनपथ, नई दल्ली–110001, भारत
TELECOMMUNICATION ENGINEERING CENTRE
KHURSHID LAL BHAWAN, JANPATH, NEW DELHI–110001, INDIA
www.tec.gov.in

Release: March, 2026

FOREWORD

Telecommunication Engineering Centre (TEC) is the technical arm of Department of Telecommunications (DOT), Government of India. Its activities include:

- Framing of TEC Standards for Generic Requirements for a Product/Equipment, Standards for Interface Requirements for a Product/Equipment, Standards for Service Requirements & Standard document of TEC for Telecom Products and Services
- Formulation of Essential Requirements (ERs) under Mandatory Testing and Certification of Telecom Equipment (MTCTE)
- Field evaluation of Telecom Products and Systems
- Designation of Conformity Assessment Bodies (CABs)/Testing facilities
- Testing & Certification of Telecom products
- Adoption of Standards
- Support to DoT on technical/technology issues

For the purpose of testing, four Regional Telecom Engineering Centers (RTECs) have been established which are located at New Delhi, Bangalore, Mumbai, and Kolkata.

ABSTRACT

This Test Guide enumerates detailed test schedule and test procedure for evaluating conformance / functionality / requirements / performance of IoT Gateway, working on wired or wireless (cellular/ non cellular) communication technologies including short range technologies (NFC, RFID etc.) that are used for translation from one protocol to another and accessing Cellular/Non-Cellular Communication Network, as per GR No. TEC 33010:2025.

CONTENTS

A. HISTORY SHEET

Sl. No.	Test Guide No.	Title	Remarks
1.	TEC 33011:2026	Test Guide for IoT Gateway	Release 1

B. INTRODUCTION

As per ITU-T Y.4101/Y.2067, an IoT Gateway is a unit in the Internet of things which interconnects the devices with the communication networks. It performs the necessary translation between the protocols used in the communication networks and those used by devices.

The functions of IoT Gateway include some or all of the functions below:

a) Communication with cloud/backend server/external network,

b) Device management and Communication with end devices,

c) Routing the Traffic,

d) Support multiple transfer protocols,

e) Isolation of sensor and/or actuators nodes,

f) Aggregation, Filtering and processing of the data,

g) Security and Authentication,

h) Local storage of data,

i) Edge Computing and Analytics.

This Test Guide, prepared as per exhaustive consultations with stakeholders, enumerates detailed test schedule and test procedure for evaluating requirements of IoT Gateway working on wired or wireless (cellular/ non cellular) communication technologies including short range technologies (NFC, RFID etc.).

C. General information:

S. No.	General Information	Details (to be filled by testing team)	
1	Name and Address of the Applicant		
2	Date of Registration		
3	Name and No. of Specifications against which the approval sought		
4	Details of Equipment		
	Type of Equipment	Model No.	Serial No.
(i)			
(ii)			
5	Declaration by Vendor/Applicant of systems already deployed in India with Name of Distribution Platform Operator(DPOs), Address, Model Number and Serial Number.		
6	Any other relevant Information:-		

D. Testing team: (to be filled by testing team)

S. No.	Name	Designation	Organization	Signature
1.				
2.				

E. List of the Test Instruments:(to be filled by testing team)

S. No.	Name of the test instrument	Make /Model (to be filled by testing team)	Validity of calibration (to be filled by testing team)
1			dd/mm/yyy
2			

F. Equipment Configuration Offered: (to be filled by testing team)

(a) <Equipment/product name> Configuration:

S.N.	Item	Details	Remarks

Relevant information like No. of cards, ports, slots, interfaces, size etc. may be filled as applicable for the product.

(b) <Other equipment name> Configuration:

S. No.	Item	Details	Remarks

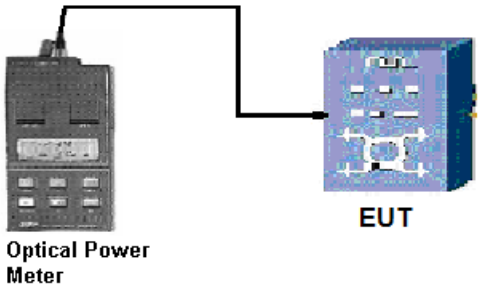
Relevant information like No. of cards, ports, slots, interfaces, size etc. may be filled as applicable for the product.

G. Equipment/System Manuals: (to be filled by testing team)

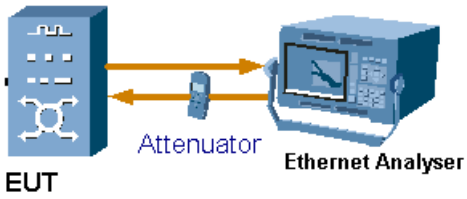
Availability of Maintenance manuals, Installation manual, Repair manual & User Manual etc. (**Y/N**)

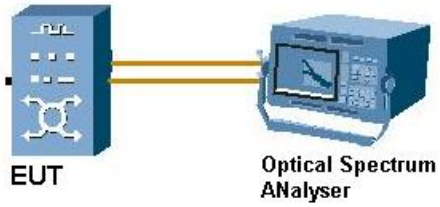
H. Clause-wise Test Type and Test No

1.5.1 Interface 1: 1 G Optical Ethernet

Test No. as per GR	1.5.1 (i)
Test Name	Test for Average Launch Power for 1 GE Opt
Standards Reference	IEEE 802.3 Sec-3 Cl 38.3.1 (Short Haul) and Cl 38.4.1 (Long Haul).
Test Instruments Required	Optical Power Meter / Optical Network Tester
Test Setup	
Test Limits	For Short Haul: Max shall be lesser of hazard level 1 safety limit as def by 38.7.2 or avg receive power (max) def by table 38-4 Min = -9.5 dBm For Long Haul: Max = -3 dBm Min = -11.5 dBftime m for 62.5 µm MMF, - 11.5 dBm for 50 µm MMF, - 11.0 dBm for SMF
Test Procedure	1. EUT is connected to Optical Power Meter. 2. Enable the optical laser port. Select the proper wavelength. 3. Measure the optical power.
Expected Results	

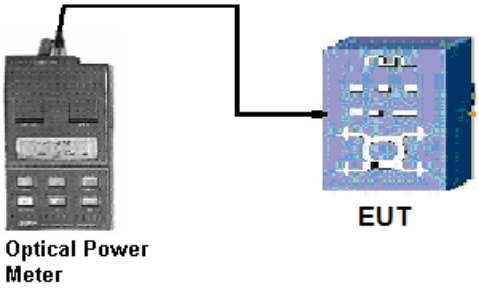
Test No. as per GR	1.5.1 (ii)
Test Name	Test for Receiver Sensitivity for 1 GE Opt
Standards Reference	IEEE 802.3 Sec-3 Cl 38.3.2 (Short Haul) and Cl 38.4.2 (Long Haul)
Test Instruments Required	Ethernet Tester , Optical Power Meter, Optical Attenuator

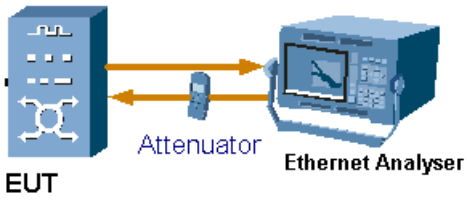
Test Setup	
Test Limits	For Short Haul: -17 dBm For Long Haul: -19 dBm
Test Procedure	EUT is connected to ETHERNET Tester & attenuator connected in series. Generate the traffic towards the EUT. Gradually increase the attenuation till error comes. Remove the input side patch cord & measure the optical power.
Expected Results	

Test No. as per GR	1.5.1 (iii)
Test Name	Test for Wavelength for 1 GE opt
Standards Reference	IEEE 802.3z Cl.38, Short Haul and Long Haul
Test Instruments Required	Optical Spectrum Analyzer
Test Setup	
Test Limits	For Short Haul: 770 – 860 nm For Long Haul: 1270 – 1355 nm
Test Procedure	EUT is connected to Optical Spectrum Analyzer (OSA). Clean all connectors. Connect EUT's Tx port to Optical Spectrum Analyzer Note down the wavelength.
Expected Results	

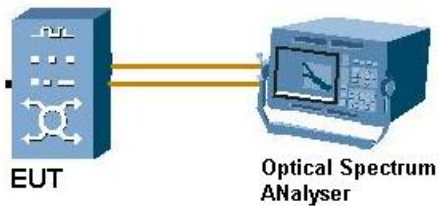
1.5.2 Interface 2: 10 G Optical Ethernet

Test No. as per GR	1.5.2 (i)
Test Name	Test for Average Launch Power for 10 GE Opt

Standards Reference	IEEE 802.3ae table 52-7 for SR, 52-12 for LR and 52-16 for ER
Test Instruments Required	Optical Power Meter/ Optical Network Tester
Test Setup	
Test Limits	For Short Haul: Max shall be lesser of the hazard level 1 safety limit as def by 52.10.2 or the avg receive power(max) def by table 52-9 Min = -7.3 dBm For Long Haul: Max = 0.5 dBm Min = -8.2 dBm ER: Max = 4.0 dBm Min = -4.7 dBm
Test Procedure	EUT is connected to Optical Power Meter. Enable the optical laser port. Select the proper wavelength. Measure the optical power.
Expected Results	

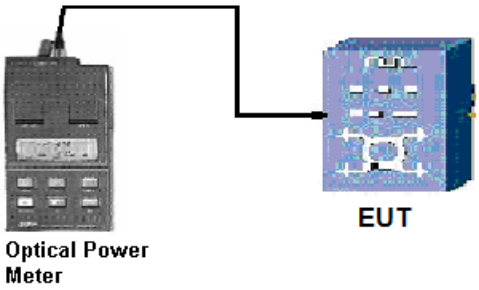
Test No. as per GR	1.5.2 (ii)
Test Name	Test for Receiver Sensitivity for 10 GE Int
Standards Reference	IEEE 802.3ae table 52-9 for SR, 52-13 for LR and 52-17 for ER
Test Instruments Required	Ethernet Tester , Optical Power Meter, Optical Attenuator
Test Setup	
Test Limits	SR: -11.1 dBm LR: -12.6 dBm ER: -14.1 dBm

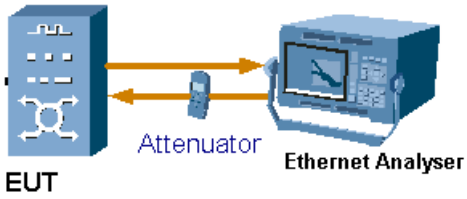
Test Procedure	EUT is connected to ETHERNET Tester & attenuator connected in series. Generate the traffic towards the EUT. Gradually increase the attenuation till error comes. Remove the input side patch cord & measure the optical power.
Expected Results	

Test No. as per GR	1.5.2 (iii)
Test Name	Test for Wavelength for 10 GE Int
Standards Reference	IEEE 802.3ae Cl 52 (Short Haul and Long Haul) and IEEE 802.3 2018 (ER)
Test Instruments Required	Optical Spectrum Analyzer
Test Setup	
Test Limits	Short Haul: 840 - 860 nm Long Haul: 1260 – 1355 nm ER: 1530 – 1565 nm
Test Procedure	EUT is connected to Optical Spectrum Analyzer (OSA). Clean all connectors. Connect EUT's port to Optical Spectrum Analyzer Note down the wavelength
Expected Results	

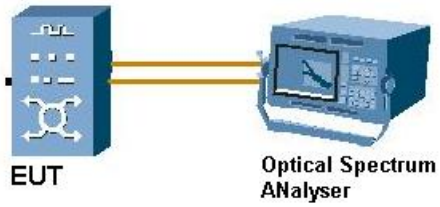
1.5.3 Interface 3: 40 G Optical Ethernet

Test No. as per GR	1.5.3 (i)
Test Name	Test for Average Launch power for 40 GE Opt
Standards Reference	IEEE 802.3ba Cl. 86 87
Test Instruments Required	Optical Network Tester/ Power Meter

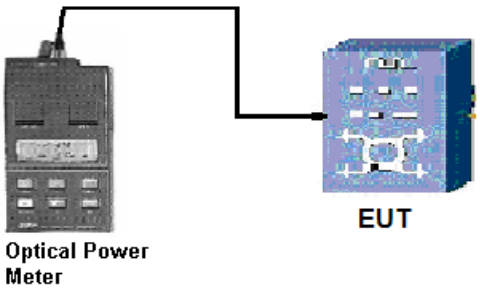
Test Setup	
Test Limits	SR4: Max = 2.4 dBm Min = -7.6 dBm LR4: Max = 2.3 dBm Min = -7 dBm ER4: Max=4.5 dBm Min=-2.7 dBm
Test Procedure	EUT is connected to Optical Network Tester / Power Meter Enable the optical laser port. Select the proper wavelength. Measure the optical power. Note down the test result
Expected Results	

Test No. as per GR	1.5.3 (ii)
Test Name	Test for Receiver Sensitivity 40 GE Opt
Standards Reference	IEEE 802.3ba Cl. 86 87
Test Instruments Required	Optical Network Tester , Optical Power Meter, Optical Attenuator
Test Setup	
Test Limits	SR4: -5.4 dBm LR4: -11.5 dBm ER4: -19 dBm
Test Procedure	EUT is connected to ETHERNET Tester & attenuator connected in series. Gradually increase the attenuation till error comes. Remove the input side patch cord & measure the optical power.
Expected Results	

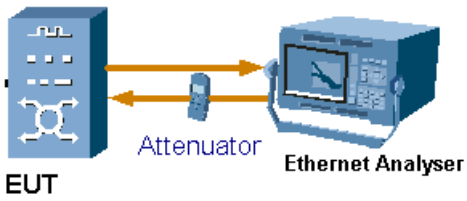
Test No. as per GR	1.5.3 (iii)
Test Name	Test for Wavelength for 40 GE Opt

Standards Reference	IEEE 802.3ba Cl. 86 87
Test Instruments Required	Optical Spectrum Analyzer
Test Setup	
Test Limits	SR4: 840 – 860 nm LR4, ER4: 1264.5 to 1277.5 nm 1284.5 to 1297.5 nm 1304.5 to 1317.5 nm 1324.5 to 1337.5 nm
Test Procedure	EUT is connected to Optical Spectrum Analyzer (OSA). Clean all connectors. Connect EUT's port to Optical Spectrum Analyzer Note down the wavelength
Expected Results	

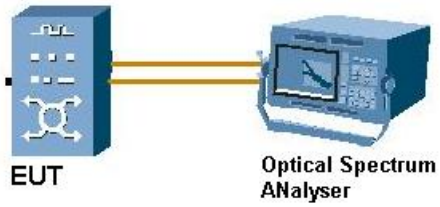
1.5.4 Interface 4: 100 G Optical Ethernet

Test No. as per GR	1.5.4 (i)
Test Name	Test for Average Launch power for 100 GE Opt
Standards Reference	IEEE 802.3ba Cl. 86 88
Test Instruments Required	Optical Network Tester / Power Meter
Test Setup	
Test Limits	SR10: Max = 2.4 dBm Min = -7.6 dBm SR4: Max = 2.4dBm Min = -8.4dBm LR4: Max = 4.5 dBm Min = -4.3 dBm ER4: Max=2.9 dBm Min=-2.9 dBm

Test Procedure	EUT is connected to Optical Network Tester / Power Meter. Enable the optical laser port. Select the proper wavelength. Measure the optical power. Note down the test result
Expected Results	

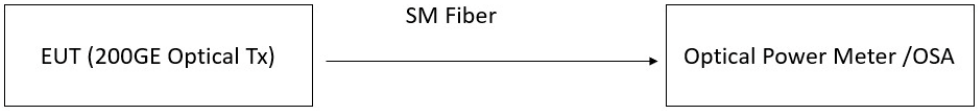
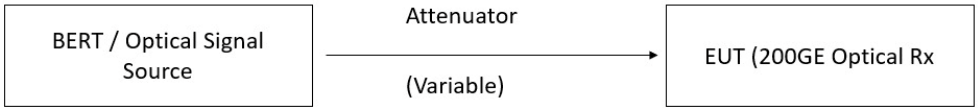
Test No. as per GR	1.5.4 (ii)
Test Name	Test for Receiver Sensitivity 100 GE Opt
Standards Reference	IEEE 802.3ba Cl. 86 88
Test Instruments Required	Optical Network Tester , Optical Power Meter, Optical Attenuator
Test Setup	
Test Limits	SR10: -5.4 dBm SR4: -5.2 dBm (Stressed) LR4: -8.6 dBm ER4: -21.4 dBm FR1: -4.5 dbm for TECQ<1.4dbm / -5.9dBm+TECQ for 1.4dB<=TECQ<=3.4dBm
Test Procedure	EUT is connected to ETHERNET Tester & attenuator connected in series. Gradually increase the attenuation till error comes. Remove the input side patch cord & measure the optical power.
Expected Results	

Test No. as per GR	1.5.4 (iii)
Test Name	Test for Wavelength for 100 GE Opt
Standards Reference	IEEE 802.3ba Cl. 86 88
Test Instruments Required	Optical Spectrum Analyzer

Test Setup	
Test Limits	SR10: 840 – 860 nm SR4: 840 to 860 nm LR4/ER4: 1294.53 to 1296.59 nm 1299.02 to 1301.09 nm 1303.54 to 1305.63 nm 1308.09 to 1310.19 nm FR1: 1304.5 to 1317.5 nm
Test Procedure	EUT is connected to Optical Spectrum Analyzer (OSA). Clean all connectors. Connect EUT's port to Optical Spectrum Analyzer Note down the wavelength
Expected Results	

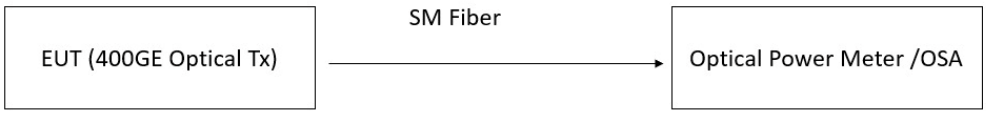
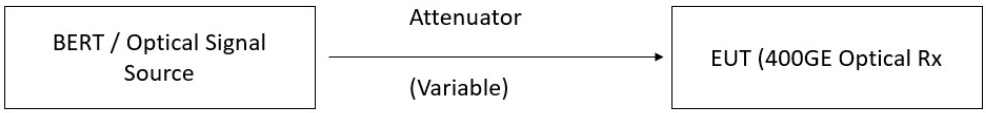
1.5.5 Interface 5: 200 G Optical Ethernet

Test No. as per GR	1.5.5
Test Name	i. Test for Average Launch Power for 200 GE Opt ii. Test for Receiver Sensitivity for 200GE Optical Interface iii. Test for Wavelength for 200GE Optical Interface
Standards Reference	i. Average Launch Power for 200GE Optical Interface – As per IEEE 802.3cn Cl 121 Cl 122 ii. Receiver Sensitivity for 200GE Optical Interface – As per IEEE 802.3cn Clause 121, Clause 122 iii. Wavelength for 200GE Optical Interface – As per IEEE 802.3cn Clause 121, Clause 122
Test Instruments Required	i. Optical Power Meter (200G-compatible) ii. Optical Spectrum Analyzer (OSA) iii. Bit Error Rate Tester (BERT) iv. Variable Optical Attenuator v. Optical Patch Cords (Single-Mode Fiber) vi. Reference Optical Cables vii. Optical Loopback / Test Module (if applicable)

Test Setup	**Average Launch Power / Wavelength Measurement**  **Receiver Sensitivity Measurement** 
Test Limits	i. For Average Launch Power for 200 GE Opt: DR4: Max=3 dBm Min=-5.1 dBm SR4: Max=4dBm Min=-6.5dBm LR4: Max=5.3 dBm Min=-3.4 dBm FR4: Max=4.7dBm Min=-4.2 dBm ii. For Receiver Sensitivity for 200 GE Opt: DR4: Max= 3dBm Min= -8.1dBm SR4: Max(–6.5, SECQ – 7.9) LR4: Max= 5.3dBm Min= -9.7dBm FR4: Max= 4.7dBm Min= -8.2dBm iii. For Wavelength for 200 GE Opt: DR4: 1304.5 to 1317.5 nm SR4: 840 to 860 nm LR4: 1294.53 to 1296.59 nm 1299.02 to 1301.09 nm 1303.54 to 1305.63 nm 1308.09 to 1310.19 nm FR4: 1264.5 to 1277.5 1284.5 to 1297.5 1304.5 to 1317.5 Units (nm) to be mentioned 1324.5 to 1337.5
Test Procedure	1. Power ON the EUT and configure the 200GE optical interface. 2. Connect the EUT Tx port to the optical power meter / OSA. 3. Measure and record average launch power and optical wavelength. 4. For receiver sensitivity, connect a calibrated optical signal source through a variable attenuator to the EUT Rx port. 5. Gradually reduce input power until the specified BER limit is reached. 6. Record the minimum received power meeting the BER requirement. 7. Repeat tests for all supported lanes and optical ports.
Expected Results	i. Average launch power shall be within limits specified in IEEE 802.3cn Clause 121 / 122.

	ii. Receiver sensitivity shall meet or exceed the specified requirement at the defined BER. iii. Optical wavelength shall remain within the specified range. iv. ▯ The EUT shall be declared PASS if all parameters comply with the standard.

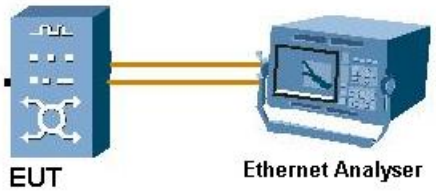
1.5.6 Interface 6: 400 G Optical Ethernet

Test No. as per GR	1.5.6
Test Name	i. Test for Average Launch Power for 400 GE Opt ii. Test for Receiver Sensitivity for 400GE Optical Interface iii. Test for Wavelength for 400GE Optical Interface
Standards Reference	i. Average Launch Power for 400GE Optical Interface – As per IEEE 802.3cn Cl 122 Cl 124 ii. Receiver Sensitivity for 400GE Optical Interface – As per IEEE 802.3cn Clause 122, Clause 124 iii. Wavelength for 400GE Optical Interface – As per IEEE 802.3cn Clause 122, Clause 124
Test Instruments Required	i. Optical Power Meter (400G capable) ii. Optical Spectrum Analyzer (OSA) iii. Bit Error Rate Tester (BERT) iv. Variable Optical Attenuator v. Optical Patch Cords (Single-Mode Fiber) vi. Reference Optical Cables vii. ▯ Optical Signal Source / Test Module
Test Setup	**Average Launch Power / Wavelength Measurement**  **Receiver Sensitivity Measurement** 
Test Limits	For Average Launch Power for 400 GE Opt: DR4: Max=4 dBm Min=-2.9 dBm SR8: Max=4dBm Min=-6.5dBm LR8: Max=5.3 dBm Min=-2.8 dBm FR8: Max=5.3 dBm Min=-3.5 dBm

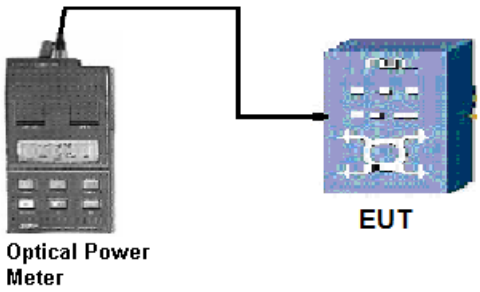
	For Receiver Sensitivity for 400GE Optical Interface: DR4: Max= 4dBm Min= -5.9dBm SR8: Max (–6.5, SECQ – 7.9) LR8: Max= 5.3dBm Min= -9.1dBm FR8: Max= 5.3dBm Min= -7.5dBm For Wavelength for 400GE Optical Interface: DR4: 1304.5 to 1317.5 nm SR8: 840 to 860 nm LR8 and FR8: 1272.55 to 1274.54 nm 1276.89 to 1278.89 nm 1281.25 to 1283.27 nm 1285.65 to 1287.68 nm 1294.53 to 1296.59 nm 1299.02 to 1301.09 nm 1303.54 to 1305.63 nm 1308.09 to 1310.19 nm
Test Procedure	i. Power ON the EUT and configure the 400GE optical interface. ii. Connect the EUT Tx port to the optical power meter / OSA using SM fiber. iii. Measure and record average launch power and optical wavelength. iv. For receiver sensitivity, connect a calibrated optical signal source to the EUT Rx port through a variable attenuator. v. Reduce input power until the specified BER limit is reached. vi. Record the minimum received power meeting the BER requirement. vii. Repeat the test for all supported lanes and optical ports.
Expected Results	i. Average launch power shall comply with IEEE 802.3cn Clause 122 / 124 limits. ii. Receiver sensitivity shall meet or exceed the specified requirements at the defined BER. iii. Optical wavelength shall remain within the specified range. iv. The EUT shall be declared PASS if all measured parameters comply with the standard.

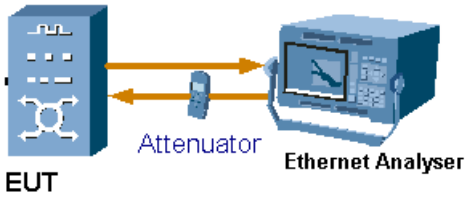
1.5.7 Interface 7: Fast Ethernet Electrical

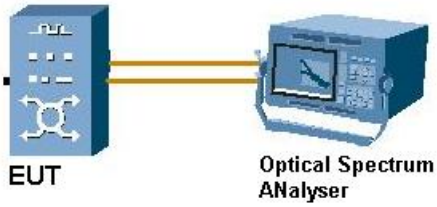
Test No. as per GR	1.5.7 (i)
Test Name	Test for Link Speed and Autonegotiation Test FE
Standards Reference	IEEE 802.3 Annex-A of Standard No. TEC 33010:2025
Test Instruments Required	Ethernet Analyser

Test Setup	
Test Limits	
Test Procedure	EUT is connected to Analyser. Set Highest speed of Ethernet interface in Ethernet Analyser. Ethernet Analyser set was at lower speed & check the speed. Note down the test result
Expected Results	

1.5.8 Interface 8: Fast Ethernet Optical

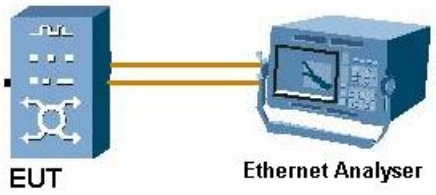
Test No. as per GR	1.5.8 (i)
Test Name	Test for Average Launch power for FE Opt
Standards Reference	IEEE 802.3u
Test Instruments Required	Optical Power Meter
Test Setup	
Test Limits	
Test Procedure	EUT is connected to Optical Power Meter. Enable the optical laser port. Select the proper wavelength. Measure the optical power.
Expected Results	

Test No. as per GR	1.5.8 (ii)
Test Name	Test for Receiver Sensitivity for FE Opt
Standards Reference	IEEE 802.3u
Test Instruments Required	Ethernet Tester , Optical Power Meter, Optical Attenuator
Test Setup	
Test Limits	
Test Procedure	EUT is connected to ETHERNET Tester & attenuator connected in series. Gradually increase the attenuation till error comes. Remove the input side patch cord & measure the optical power.
Expected Results	

Test No. as per GR	1.5.8 (iii)
Test Name	Test for Wavelength for FE Opt
Standards Reference	IEEE 802.3u
Test Instruments Required	Optical Spectrum Analyzer
Test Setup	
Test Limits	
Test Procedure	EUT is connected to Optical Spectrum Analyzer (OSA). Clean all connectors. Connect EUT's port to Optical Spectrum Analyzer Note down the wavelength

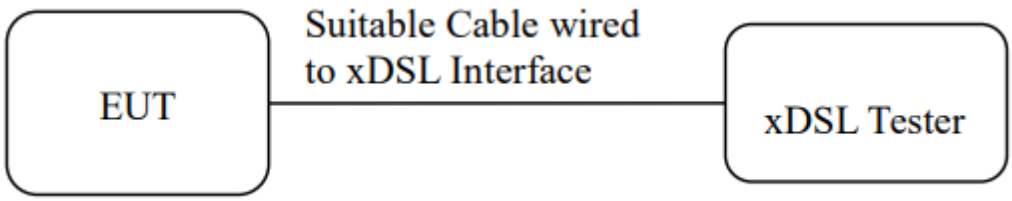
Expected Results	

1.5.9 Interface 9: Gigabit Ethernet Electrical

Test No. as per GR	1.5.9 (i)
Test Name	Test for Link Speed and Autonegotiation Test GE
Standards Reference	IEEE 802.3
Test Instruments Required	Ethernet Tester
Test Setup	
Test Limits	
Test Procedure	EUT is connected to Ethernet tester. Set Highest speed of Ethernet interface & check the communication using ping command. Ethernet tester set was at lower speed & check the speed. Note down the test result
Expected Results	

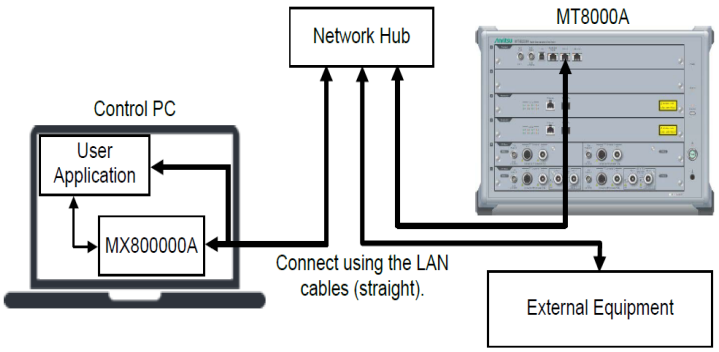
1.5.10 (Interface 10), 1.5.11 (Interface 11) and 1.5.12 (Interface 12): SHDSL, VDSLx and ADSL

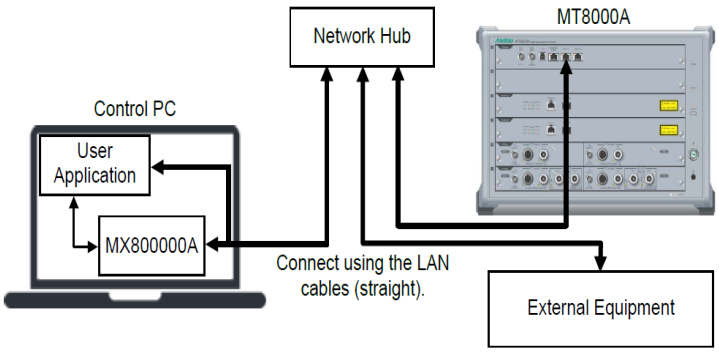
Test No. as per GR	1.5.10, 1.5.11 and 1.5.12
Test Name	xDSL Line Tests
Standards Reference	ADSL Tests: Conformity Tests as per G.992.1, G.992.3, G.992.5 VDSL Tests: Conformity Tests as per G.993.1, G.993.2 SHDSL Tests: Conformity Tests as per G.991.2 Annex G of Standard No. TEC 33010:2025 Other Tests for all xDSL interfaces: Support of Protocols - PPPoE as per RFC2516, PVC, VPI/VCI support FTP Speed Test Metallic Loop Tests (Loop Resistance, Insulation, Resistance, Capacitance) Impulse Noise Protection

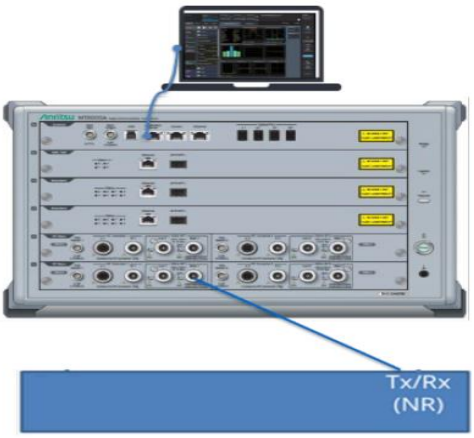
<table>
<tr><td>Test Instruments Required</td><td>1. xDSL Tester [Capable of testing xDSL CPE’s].
2. In case the tester do not have the capability to measure some of the above tests, separate tester can be used
3. For Impulse Noise Tests test results from the OEM can be obtained.</td></tr>
<tr><td>Test Setup</td><td> 
</td></tr>
<tr><td>Test Limits</td><td><table>
<tr><td>G.992.1</td><td>PSD [Power Spectral Density] as per Annexure-A of Standard No. TEC 33010:2025</td></tr>
<tr><td>G.992.3</td><td>PSD</td></tr>
<tr><td>G.992.5</td><td>PSD</td></tr>
<tr><td>G.993.1</td><td>PSD and Return Loss as per clause 6.2 and 6.5</td></tr>
<tr><td>G.993.2</td><td>Profiles as per Clause 6.3, PSD as per clause 7.2</td></tr>
<tr><td>G.991.2</td><td>Return Loss as per Clause 11.3 and PSD as per Clause 11.5</td></tr>
<tr><td>PPPoE</td><td>Shall support PPPoE configuration as per RFC2516</td></tr>
<tr><td>PVC</td><td>Shall support PVC configuration</td></tr>
<tr><td>VPI/VCI</td><td>Shall support VPI/VCI configuration</td></tr>
<tr><td>FTP Speed Tests</td><td>1. ADSL2+ interface supporting 16Mbps speeds using 0.5mm copper loop distance of 2Km
2. VDSL2 interface supporting 30Mbps speeds using 0.5mm copper loop distance of 500m
3. SHDSL interface supporting 1.5Mbps speeds using 0.5mm copper loop distance of 2Km</td></tr>
<tr><td>Loop Resistance</td><td>As per Telephone line requirements</td></tr>
<tr><td>Insulation Resistance</td><td>As per Telephone line requirements</td></tr>
<tr><td>Capacitance</td><td>As per Telephone line requirements</td></tr>
<tr><td>Impulse Noise Protection[INP]</td><td>INP shall be better than 2</td></tr>
</table></td></tr>
<tr><td>Test Procedure</td><td>1. Connect the test setup as shown in figure
2. Measure the various parameters as per the test details and verify whether they are within the Test Limits.</td></tr>
<tr><td>Expected Results</td><td>Enclose the Test Results / Screen Shots</td></tr>
</table>

1.5.13 Interface 13: 5G NR (FR1)

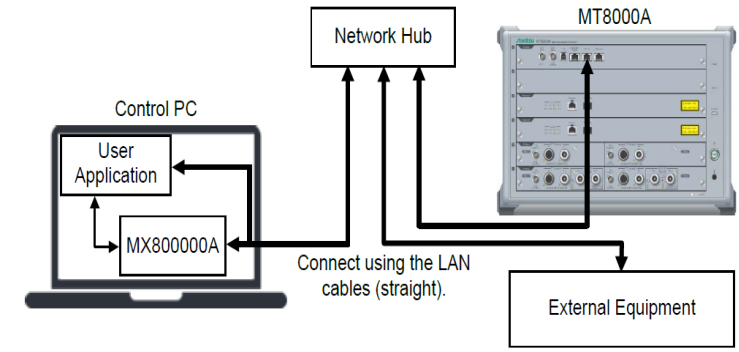
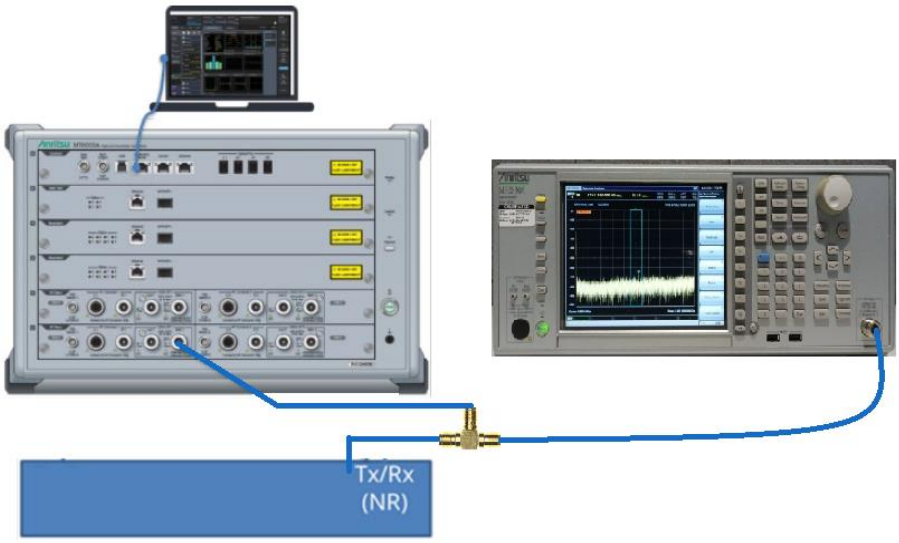
Test No. as per GR	1.5.13 (i)

Test Name	Test for Additional spectrum emission mask for UL MIMO
Standards Reference	3GPP TS 38.521-1 Clause 6.5D.2.3
Test Instruments Required	5G Communications Tester (signaling) ; Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Emission to be within the mask
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Allow the EUT to connect with the tester. Ensure connection is in MIMO mode by checking the connection status on the tester screen. Select the test to perform from the menu and save the test results
Expected Results	

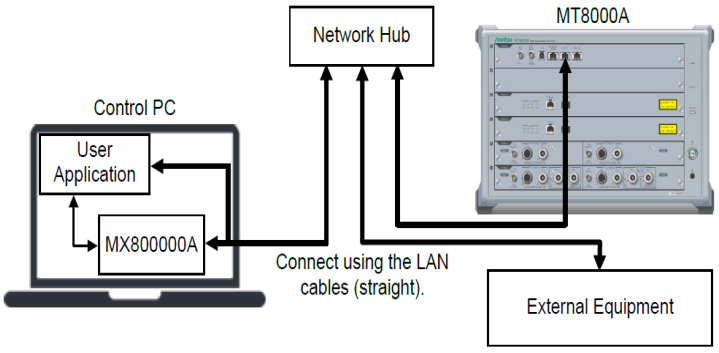
Test No. as per GR	1.5.13 (ii)
Test Name	Test for Additional spectrum emission mask- Transmitter
Standards Reference	3GPP TS 38.521-1 Clause 6.5.2.3
Test Instruments Required	Anritsu, Signal Analyser.
Test Setup	

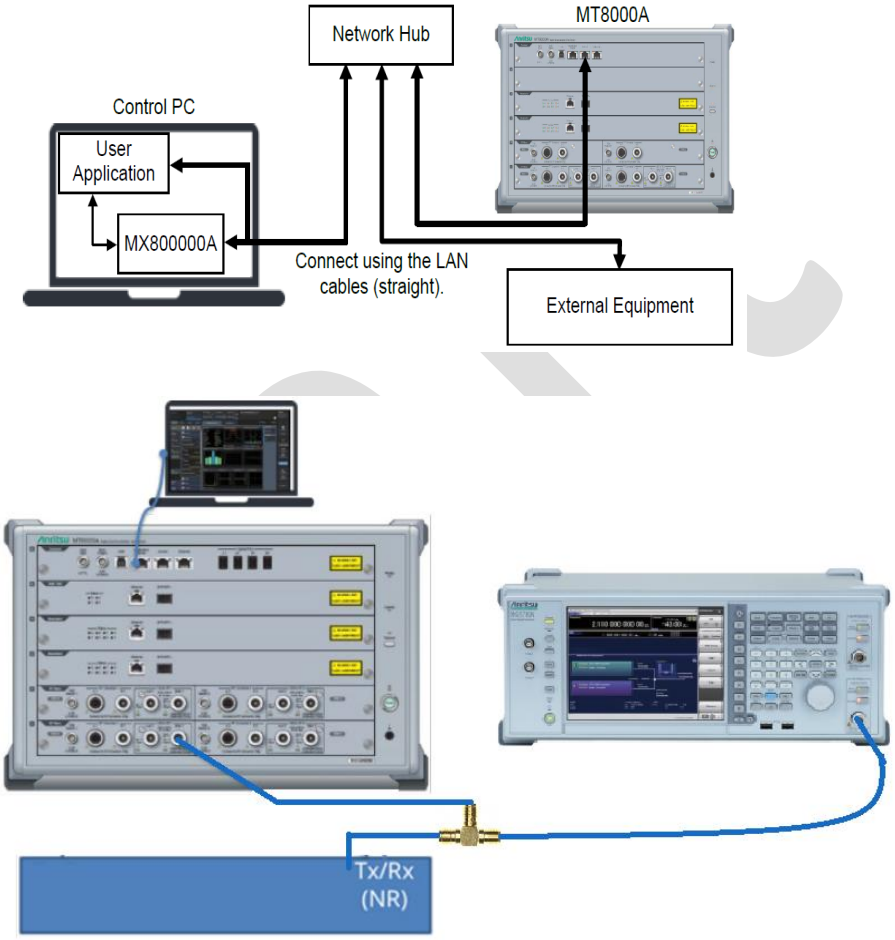
	
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed software. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

Test No. as per GR	1.5.13 (iii)

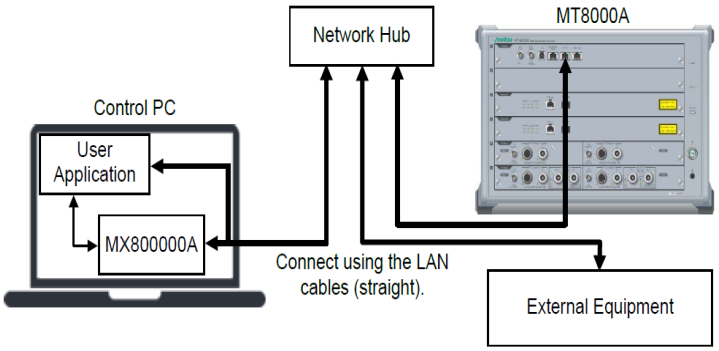
Test Name	Test for Additional spurious emissions
Standards Reference	3GPP TS 38.521-1 Clause 6.5.3.3
Test Instruments Required	Anritsu, Signal Generator, Signal Analyser
Test Setup	 
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester, Signal Analyzer & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed softwares. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester.

	11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

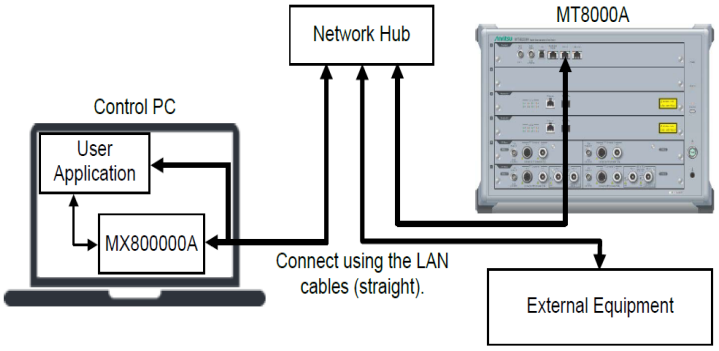
Test No. as per GR	1.5.13 (iv)
Test Name	Test for Additional spurious emissions for UL MIMO
Standards Reference	3GPP TS 38.521-1 Clause 6.5D.3.3
Test Instruments Required	5G Communications Tester (signaling) ; Spectrum Analyzer (pre-loaded with appropriate masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Emission to be within the mask
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the splitter to connect one of the ports to the spectrum analyzer. Allow the EUT to connect with the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (v)
Test Name	Test for Adjacent channel selectivity
Standards Reference	3GPP TS 38.521-1 Clause 7.5
Test Instruments Required	Anritsu, Signal Generator, Signal Analyser
Test Setup	
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester, Vector Signal Generator & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed softwares. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram

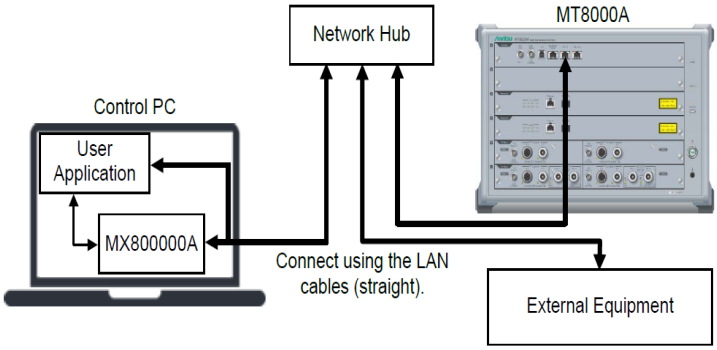
	8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

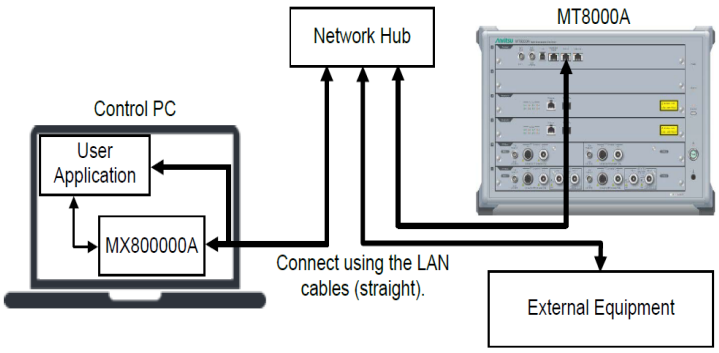
Test No. as per GR	1.5.13 (vi)
Test Name	Test for Adjacent channel selectivity for 2DL CA
Standards Reference	3GPP TS 38.521-1 Clause 7.5A.1
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Selectivity to be within limits (as preset in tester)

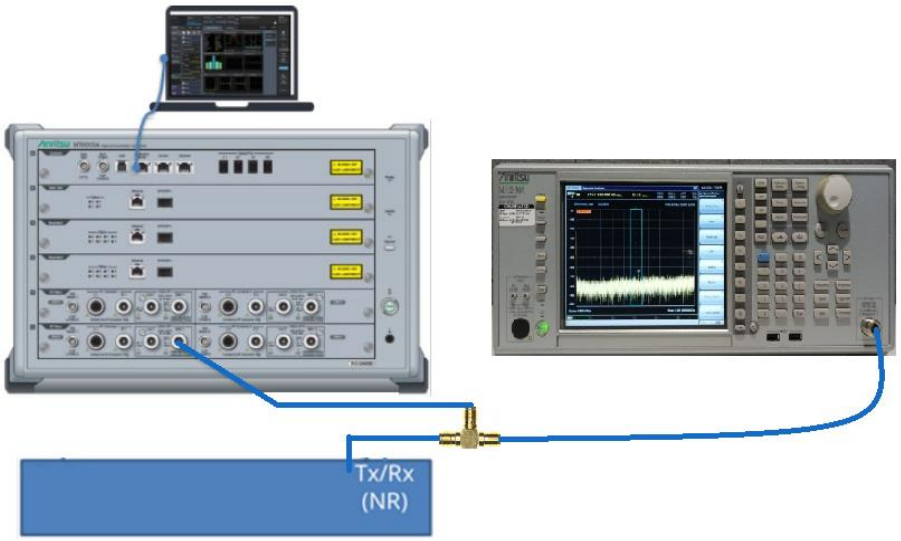
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

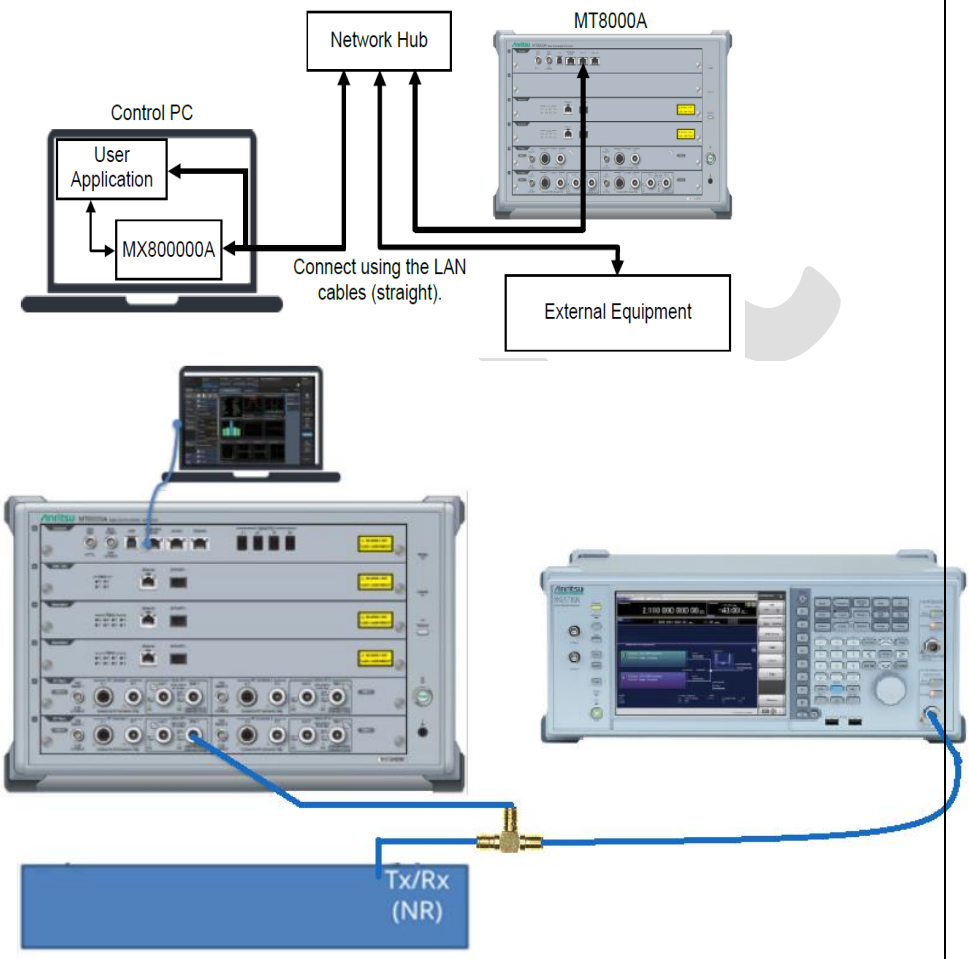
Test No. as per GR	1.5.13 (vii)
Test Name	Test for Adjacent channel selectivity for UL-MIMO
Standards Reference	3GPP TS 38.521-1 Clause 7.5D
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Selectivity to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (viii)
Test Name	Test for General spurious emissions for UL MIMO
Standards Reference	3GPP TS 38.521-1 Clause 6.5D.3.1

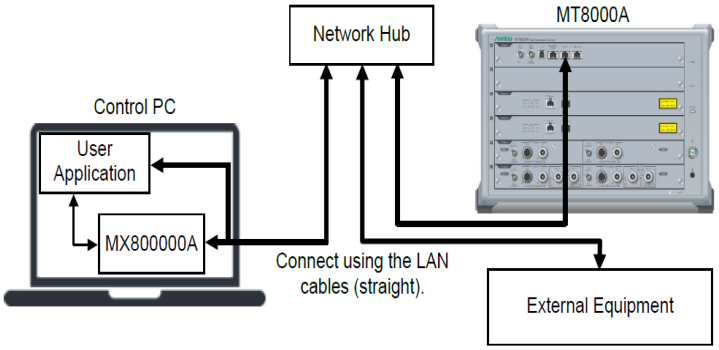
Test Instruments Required	5G Communications Tester (signaling) ; Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Emissions to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the splitter to connect one of the ports to the spectrum analyzer. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (ix)
Test Name	Test for General spurious Emissions-Transmitter
Standards Reference	3GPP TS 38.521-1 Clause 6.5.3.1
Test Instruments Required	Anritsu, Signal Generator, Signal Analyser
Test Setup	

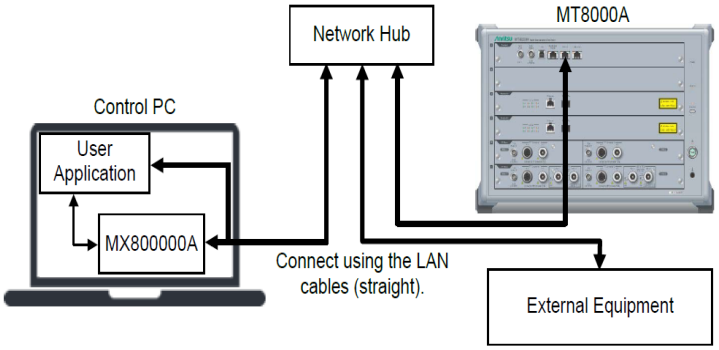
	
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Base station simulator, Signal Analyzer & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed softwares. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

Test No. as per GR	1.5.13 (x)
Test Name	Test for Inband Blocking
Standards Reference	3GPP TS 38.521-1 Clause 7.6.2
Test Instruments Required	Anritsu, Signal Generator, Signal Analyser
Test Setup	
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester, Vector Signal Generator & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed software. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA)Select the 5G Cellular band as per the requirement 6. Connect the EUT as per the above diagram 7. Install the 5G SIM in the EUT and Switch ON the EUT

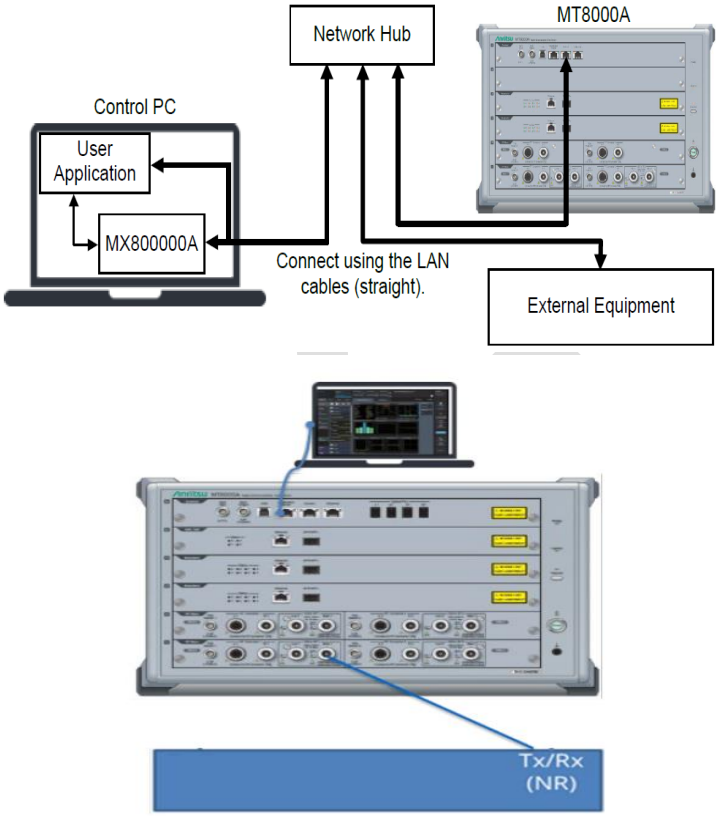
	8. The tester will try to communicate with EUT 9. EUT will connect with Tester. 10. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 11. Select the Cellular tester from the ATS tool 12. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 13. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 14. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 15. Save the configuration in the remote laptop. 16. Open the ATS tool user interface from the remote laptop. 17. Select the configuration file & path loss using the Add plan option. 18. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 19. After the measurement completed, the system will automatically generate the test report.
Expected Results	

Test No. as per GR	1.5.13 (xi)
Test Name	Test for In-band Blocking for CA-2DL CA
Standards Reference	3GPP TS 38.521-1 Clause 7.6A.2.1
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Blocking to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in CA mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in Carrier Aggregation mode. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same

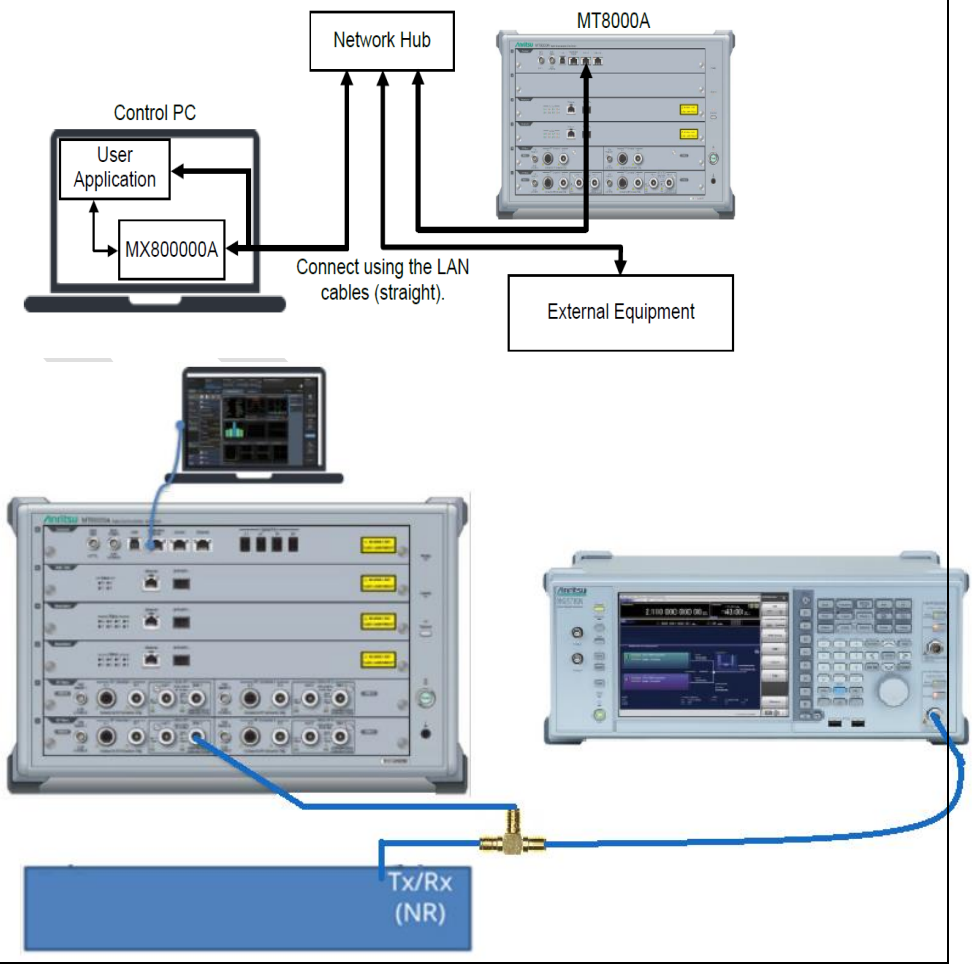
	port. Allow the EUT to connect with the tester. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (xii)
Test Name	Test for Inband blocking for UL-MIMO
Standards Reference	3GPP TS 38.521-1 Clause 7.6D.2
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Blocking to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (xiii)
Test Name	Test for Minimum output power
Standards Reference	3GPP TS 38.521-2 Clause 6.3.1

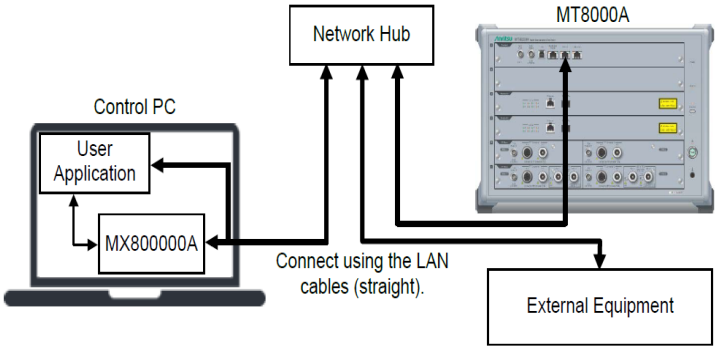
Test Instruments Required	Anritsu, Signal Analyser
Test Setup	
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed softwares. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool.

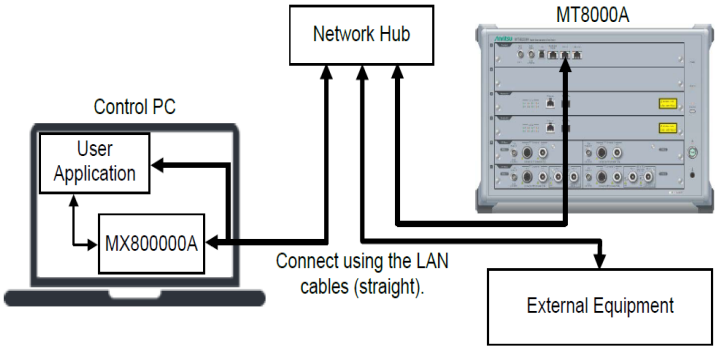
	15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

Test No. as per GR	1.5.13 (xiv)
Test Name	Test for Narrow band blocking
Standards Reference	3GPP TS 38.521-1 Clause 7.6.4
Test Instruments Required	Anritsu, Signal Generator, Signal Analyser
Test Setup	

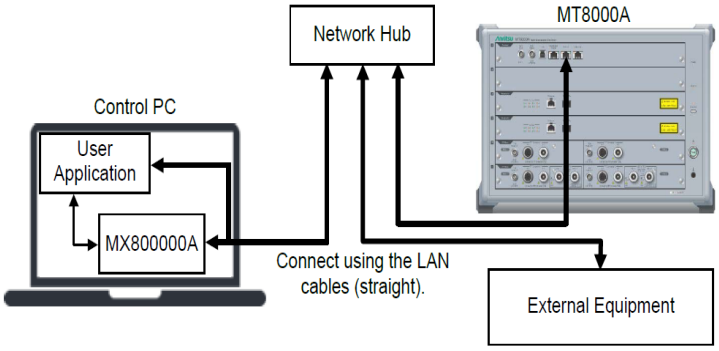
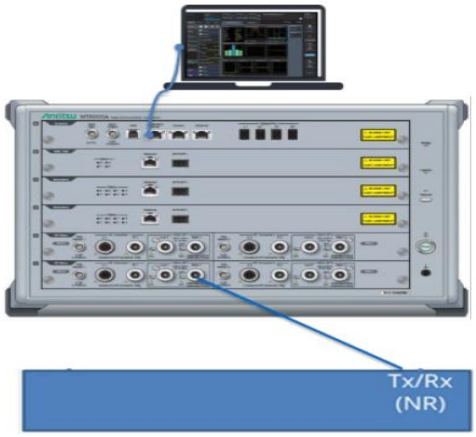
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester, Vector Signal Generator & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed softwares. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. The tester will try to communicate with EUT 8. EUT will connect with Tester. 9. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 10. Select the Cellular tester from the ATS tool 11. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 12. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 13. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 14. Save the configuration in the remote laptop. 15. Open the ATS tool user interface from the remote laptop. 16. Select the configuration file & path loss using the Add plan option. 17. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 18. After the measurement completed, the system will automatically generate the test report.
Expected Results	

Test No. as per GR	1.5.13 (xv)
Test Name	Test for Narrow band blocking for CA-2DL CA
Standards Reference	3GPP TS 38.521-1 Clause 7.6A.4.1
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories

Test Setup	
Test Limits	Blocking to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in CA mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in CA mode. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

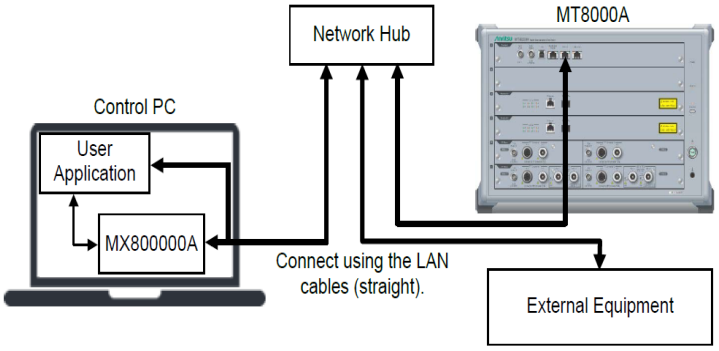
Test No. as per GR	1.5.13 (xvi)
Test Name	Test for Narrow band blocking for UL-MIMO
Standards Reference	3GPP TS 38.521-1 Clause 7.6D.4
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Selectivity to be within limits (as preset in tester)

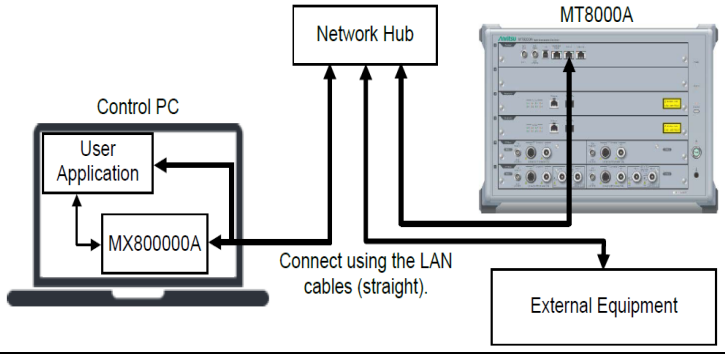
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

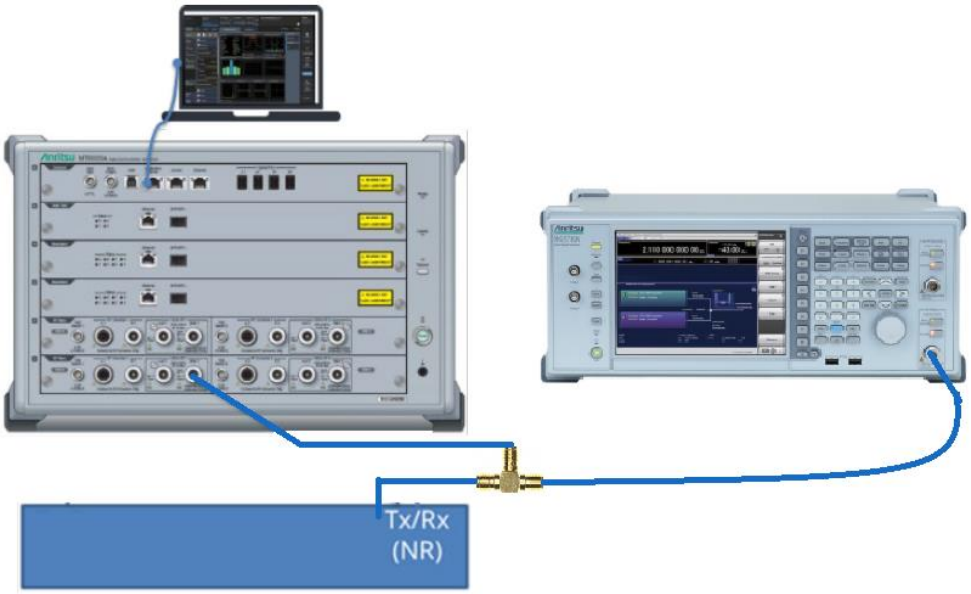
Test No. as per GR	1.5.13 (xvii)
Test Name	Test for NR ACLR
Standards Reference	3GPP TS 38.521-1 Clause 6.5.2.4.1
Test Instruments Required	Anritsu, Signal Analyser
Test Setup	 
Test Limits	

Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed softwares. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

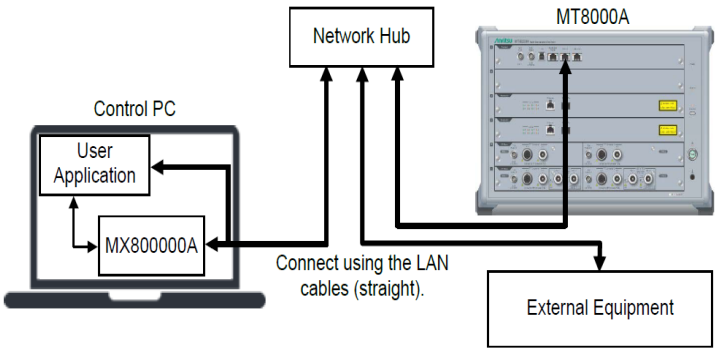
Test No. as per GR	1.5.13 (xviii)
Test Name	Test for NR ACLR for UL MIMO
Standards Reference	3GPP TS 38.521-1 Clause 6.5D.2.4.1
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories

Test Setup	
Test Limits	Blocking to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in CA mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in CA mode. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

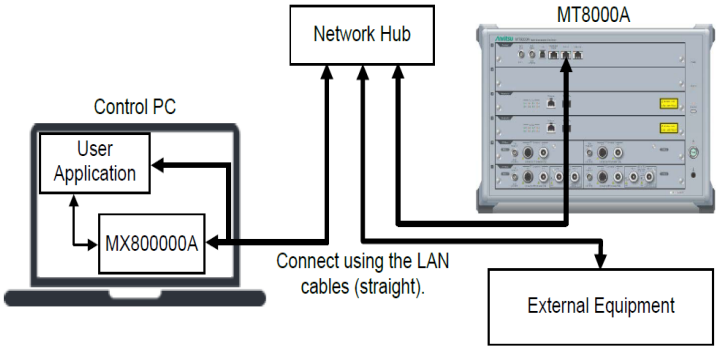
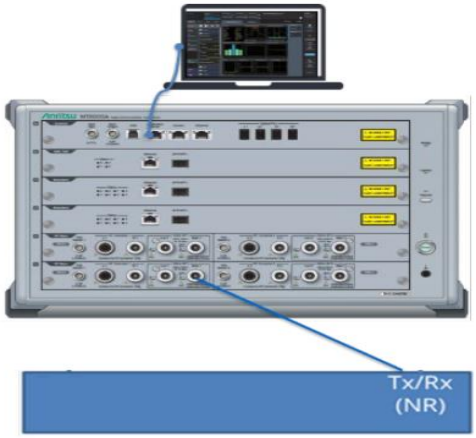
Test No. as per GR	1.5.13 (xix)
Test Name	Test for Out-of-band blocking
Standards Reference	3GPP TS 38.521-1 Clause 7.6.3
Test Instruments Required	Anritsu, Signal Generator, Signal Analyser
Test Setup	

	
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester, Vector Signal Generator & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed softwares. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.

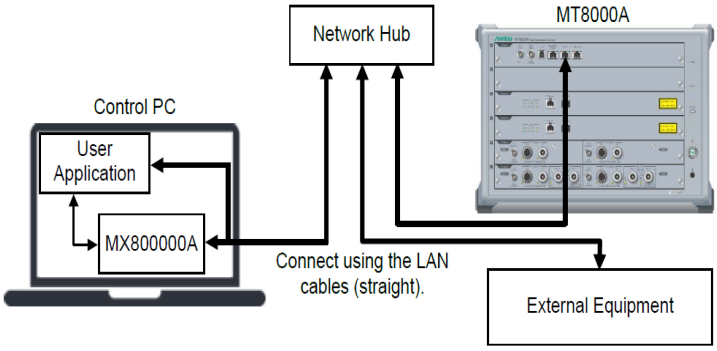
Expected Results	

Test No. as per GR	1.5.13 (xx)
Test Name	Test for Out-of-band blocking for UL-MIMO
Standards Reference	3GPP TS 38.521-1 Clause 7.6D.3
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Blocking to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

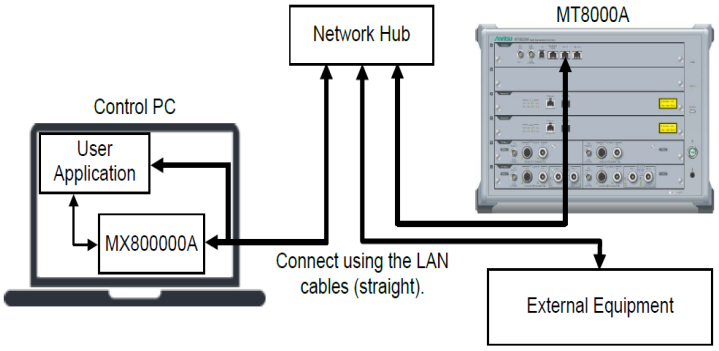
Test No. as per GR	1.5.13 (xxi)
Test Name	Test for Reference sensitivity power level
Standards Reference	3GPP TS 38.521-1 Clause 7.3.2
Test Instruments Required	Anritsu, Signal Analyser

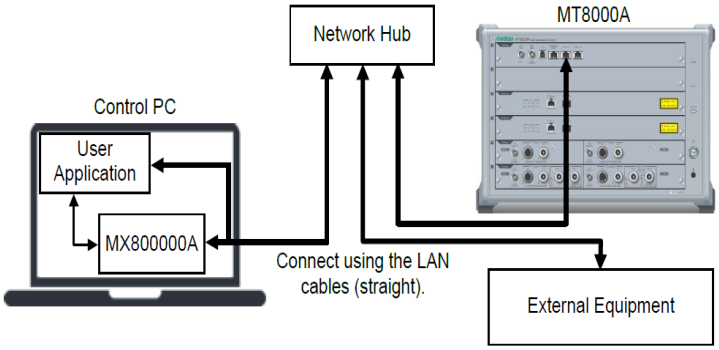
Test Setup	 
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed softwares. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop.

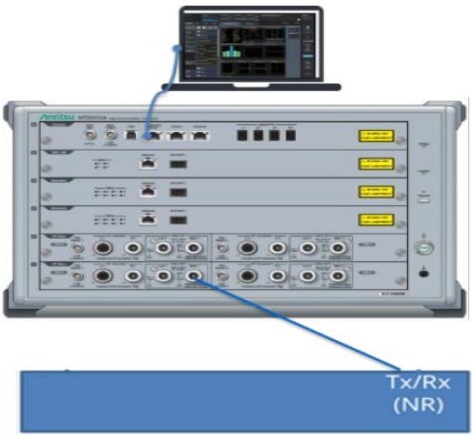
	18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

Test No. as per GR	1.5.13 (xxii)
Test Name	Test for Reference sensitivity power level for 2DL CA without exception
Standards Reference	3GPP TS 38.521 1 Clause 7.3A.1
Test Instruments Required	5G Communications Tester (signaling) ; Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Sensitivity to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in CA mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in CA mode. Ensure that EUT is connected in CA mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

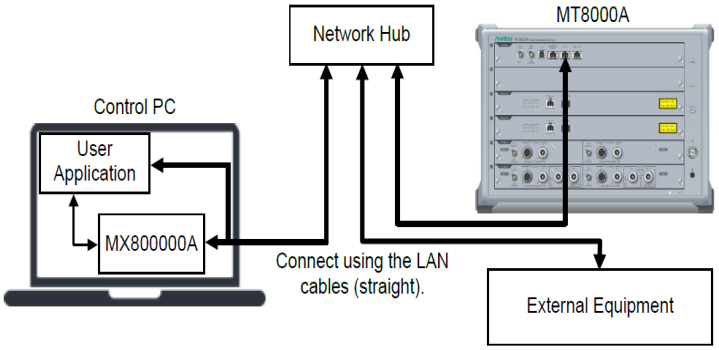
Test No. as per GR	1.5.13 (xxiii)
Test Name	Test for Reference sensitivity power level for UL- MIMO
Standards Reference	3GPP TS 38.521-1 Clause 7.3D.2
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories

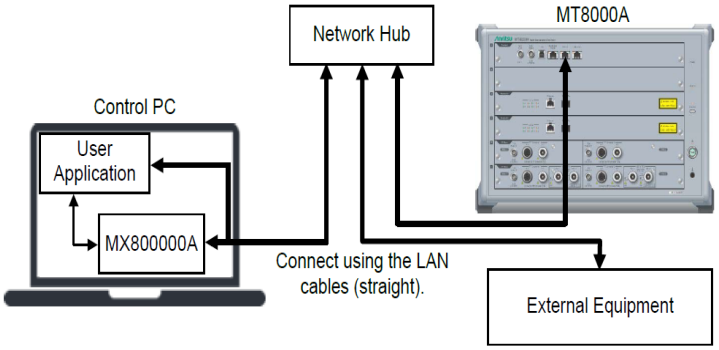
Test Setup	
Test Limits	Sensitivity to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results

Test No. as per GR	1.5.13 (xxiv)
Test Name	Test for Spectrum Emission Mask-5G NR FR1
Standards Reference	3GPP TS 38.521-1 Clause 6.5.2.2
Test Instruments Required	Anritsu, Signal Analyser
Test Setup	

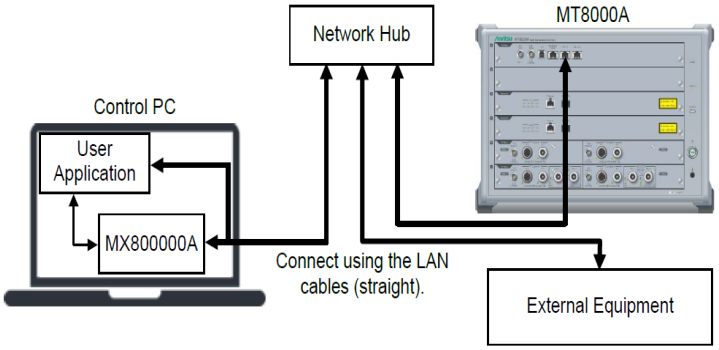
	
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed software. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

Test No. as per GR	1.5.13 (xxv)

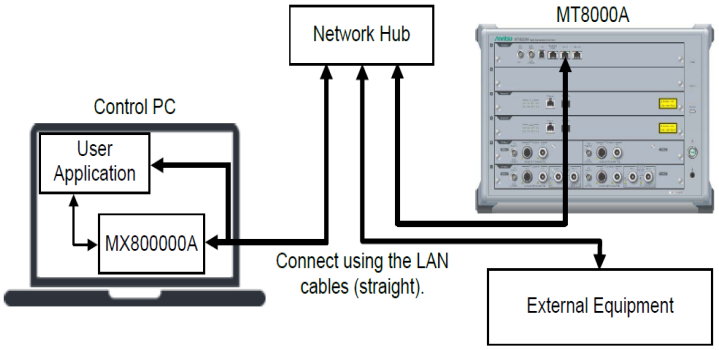
Test Name	Test for Spectrum emission Mask for UL MIMO
Standards Reference	3GPP TS 38.521-1 Clause 6.5D.2.2
Test Instruments Required	5G Communications Tester (signaling) ; Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Selectivity to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

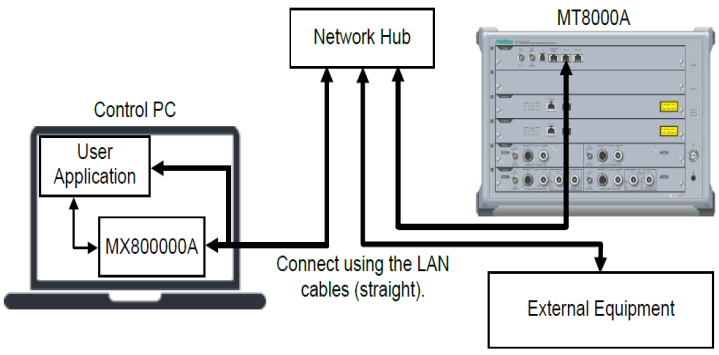
Test No. as per GR	1.5.13 (xxvi)
Test Name	Test for Spurious emission for 2DL CA
Standards Reference	3GPP TS 38.521-1 Clause 7.9A.1
Test Instruments Required	5G Communications Tester (signaling) ; Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	

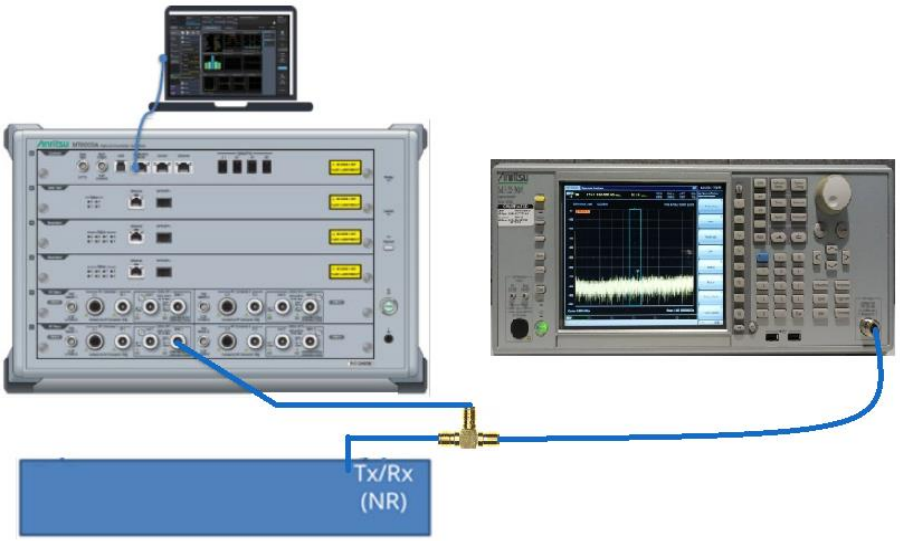
Test Limits	Emissions to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the splitter to connect one of the ports to the spectrum analyzer. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

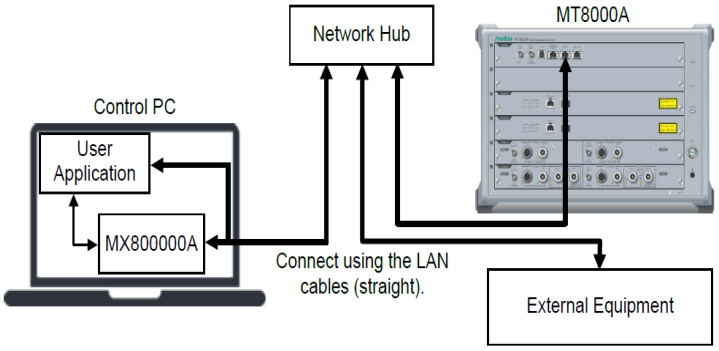
Test No. as per GR	1.5.13 (xxvii)
Test Name	Test for Spurious emission for UE co-existence
Standards Reference	3GPP TS 38.521-1 Clause 6.5.3.2
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 4G/3G/2G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Emissions to be within limits (as preset in tester)
Test Procedure	EUT to be connected to 5G Communications Tester port enabled for desired 5G FR1 band. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results

Test No. as per GR	1.5.13 (xxviii)
Test Name	Test for Spurious emission for UE co-existence for UL MIMO
Standards Reference	3GPP TS 38.521-1 Clause 6.5D.3.2

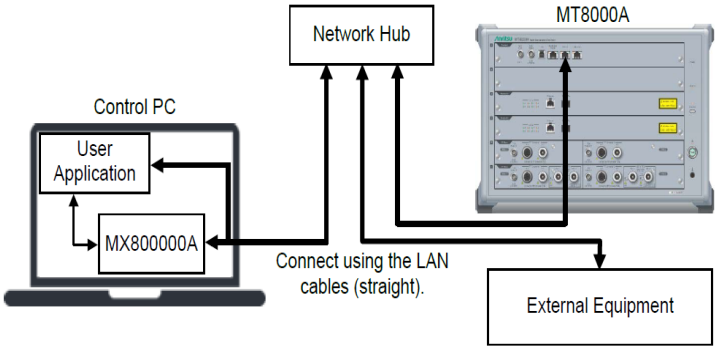
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 4G/3G/2G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Emissions to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the splitter to connect one of the ports to the spectrum analyzer. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

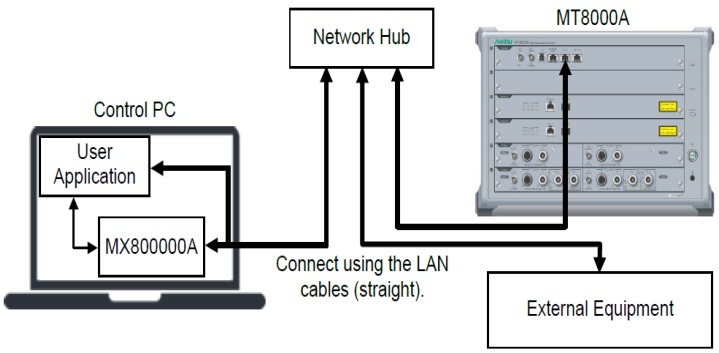
Test No. as per GR	1.5.13 (xxix)
Test Name	Test for Spurious emissions-5G NR FR1
Standards Reference	3GPP TS 38.521-1 Clause 7.9
Test Instruments Required	Anritsu, Signal Generator, Signal Analyser
Test Setup	

	
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester, Signal Analyzer & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed softwares. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

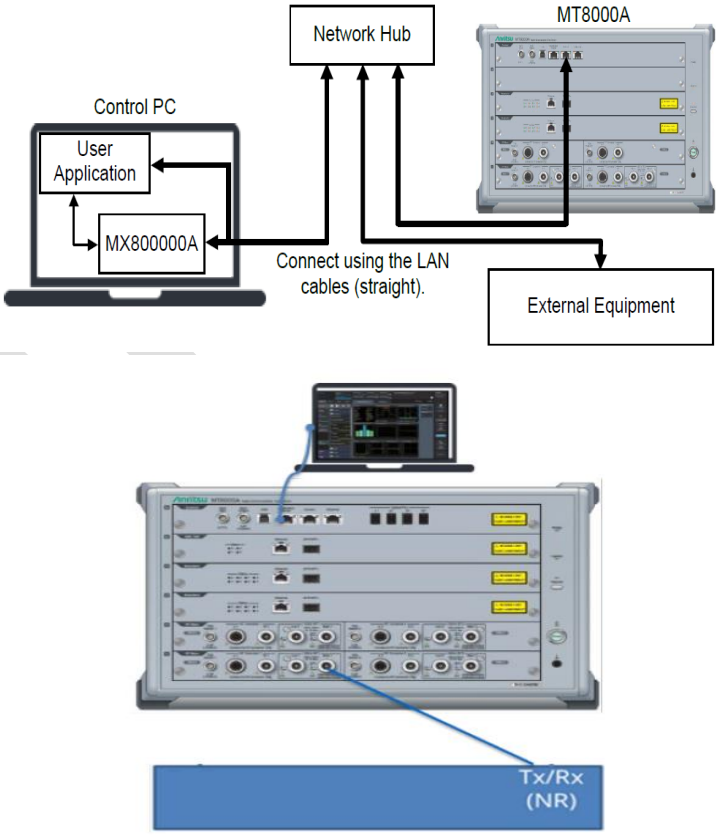
Test No. as per GR	1.5.13 (xxx)
Test Name	Test for Spurious response
Standards Reference	3GPP TS 38.521-1 Clause 7.7
Test Instruments Required	5G Communications Tester (signaling) ;Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Emissions to be within limits (as preset in tester)
Test Procedure	EUT antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band. Use the splitter to connect one of the ports to the spectrum analyzer. Allow the EUT to connect with the tester. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (xxxi)
Test Name	Test for Spurious response for 2DL CA
Standards Reference	3GPP TS 38.521-1 Clause 7.7A.1
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories

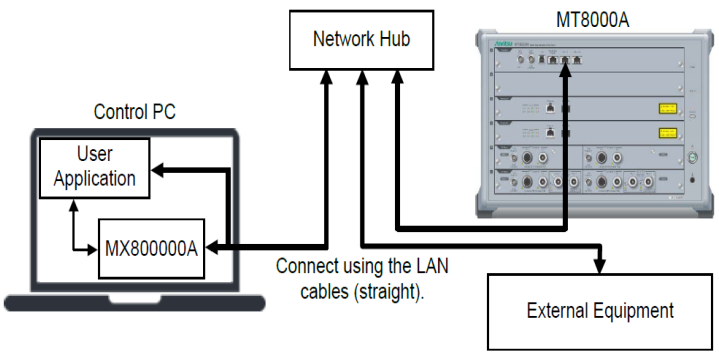
Test Setup	
Test Limits	Blocking to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in CA mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in CA mode. Use the splitter to connect one of the ports to the spectrum analyzer. Allow the EUT to connect with the tester. Ensure that EUT is connected in CA mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (xxxii)
Test Name	Test for Spurious response for UL-MIMO
Standards Reference	3GPP TS 38.521-1 Clause 7.7D
Test Instruments Required	5G Communications Tester (signaling) ; Spectrum Analyzer (pre-loaded with appropriate 5G masks), Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Emissions to be within limits (as preset in tester)

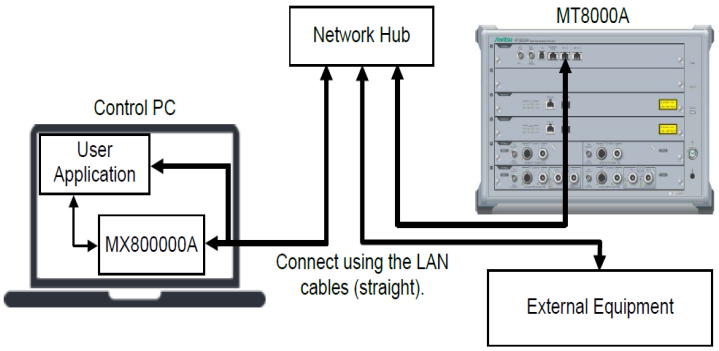
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use RF circulator to connect the Vector Signal Generator to the same port. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (xxxiii)
Test Name	Test for UE Maximum Output Power
Standards Reference	3GPP TS 38.521-1 Clause 6.2.1
Test Instruments Required	Anritsu, Signal Analyser
Test Setup	
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher.

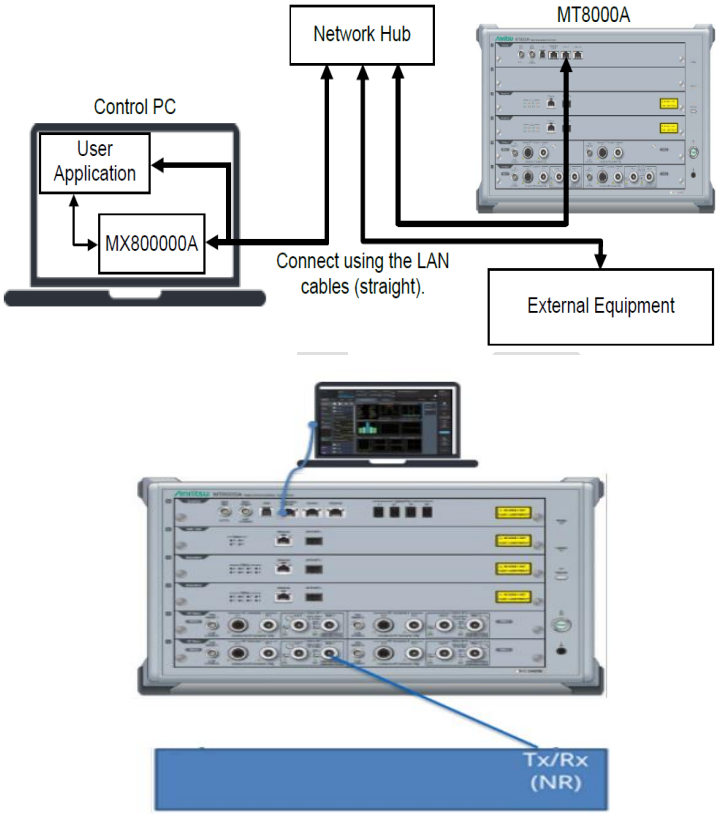
	4. Remote Laptop will communicate with Tester & we will get various installed softwares. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool. 15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

Test No. as per GR	1.5.13 (xxxiv)
Test Name	Test for UE maximum output power for UL-MIMO
Standards Reference	3GPP TS 38.521-1 Clause 6.2D.1
Test Instruments Required	5G Communications Tester (signaling) ; Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	

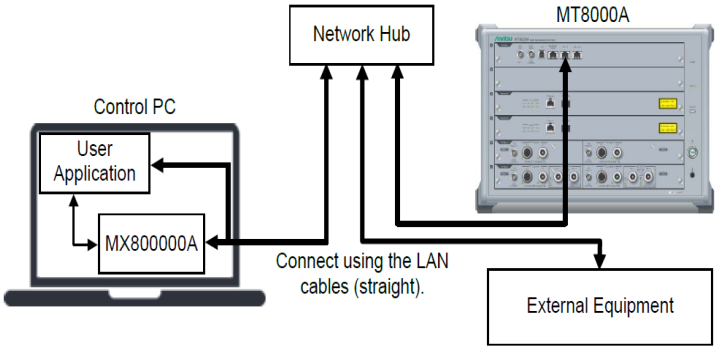
Test Limits	Power to be within limits (as preset in tester)
Test Procedure	EUT antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band. Allow the EUT to connect with the tester. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (xxxv)
Test Name	Test for UE maximum output power reduction for UL- MIMO
Standards Reference	3GPP TS 38.521-1 Clause 6.2D.2
Test Instruments Required	5G Communications Tester (signaling) ; Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Power reduction to be within limits (as preset in tester)
Test Procedure	EUT antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band. Allow the EUT to connect with the tester. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

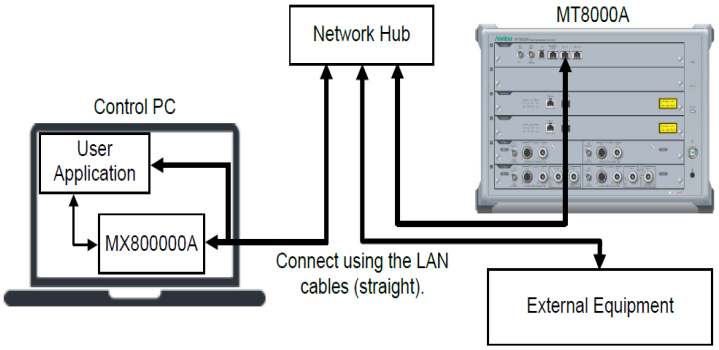
Test No. as per GR	1.5.13 (xxxvi)
Test Name	Test for UTRA ACLR
Standards Reference	3GPP TS 38.521-1 Clause 6.5.2.4.2

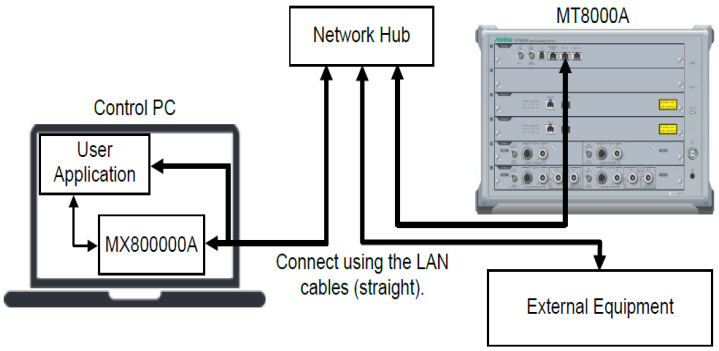
Test Instruments Required	Anritsu, Signal Analyser
Test Setup	
Test Limits	
Test Procedure	1. Connect the tester as per the above diagram 2. Switch On the Anritsu 5G Cellular tester & hold till system booting. 3. Switch on the Cellular Tester Remote Laptop & open the 5G Cellular Tester MT8000A application launcher. 4. Remote Laptop will communicate with Tester & we will get various installed software. 5. Select the desired software platform as per the cellular technology. (5G FR1 SA or NSA) 6. Select the 5G Cellular band as per the requirement. 7. Connect the EUT as per the above diagram 8. Install the 5G SIM in the EUT and Switch ON the EUT 9. The tester will try to communicate with EUT 10. EUT will connect with Tester. 11. After successfully connected with the tester & EUT, open the ATS Plan Edit tool from the remote laptop. 12. Select the Cellular tester from the ATS tool 13. After Selecting the ATS tool, select the 5G Cellular technology & select the cellular Band. 14. Select the Additional spectrum emission Mask-Transmitter test case from the ATS tool.

	15. Select the other configurations as per the requirements. E.g. path loss, Bandwidth etc. 16. Save the configuration in the remote laptop. 17. Open the ATS tool user interface from the remote laptop. 18. Select the configuration file & path loss using the Add plan option. 19. Run the test case, the system / Tester will automatically execute the configuration & start the test for measuring the parameters. 20. After the measurement completed, the system will automatically generate the test report.
Expected Results	

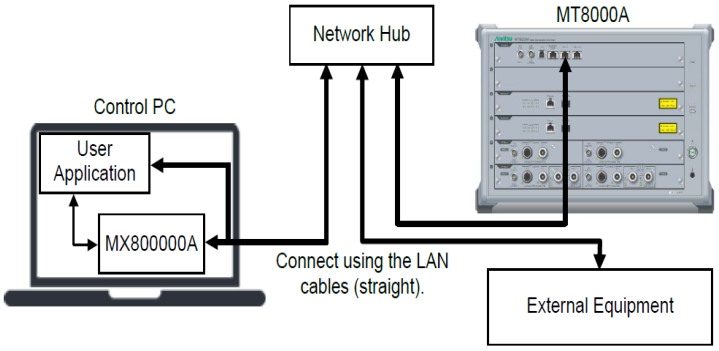
Test No. as per GR	1.5.13 (xxxvii)
Test Name	Test for UTRA ACLR for UL MIMO
Standards Reference	3GPP TS 38.521-1 Clause 6.5D.2.4.2
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Adjacent Channel Leakage Ratio to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the RF circulator to connect one of the ports to the Vector Signal Generator. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results

Test No. as per GR	1.5.13 (xxxviii)
Test Name	Test for Wide band Intermodulation
Standards Reference	3GPP TS 38.521-1 Clause 7.8.2

Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Intermodulation distortion to be within limits (as preset in tester)
Test Procedure	EUT to be connected to 5G Communications Tester port enabled for desired 5G FR1 band. Use the RF circulator to connect one of the ports to the Vector Signal Generator. Allow the EUT to connect with the tester. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (xxxix)
Test Name	Test for Wide band Intermodulation for CA-2DL CA
Standards Reference	3GPP TS 38.521-1 Clause 7.8A.2.1
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Adjacent Channel Leakage Ratio to be within limits (as preset in tester)

Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in CA mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in CA mode. Use the RF circulator to connect one of the ports to the Vector Signal Generator. Allow the EUT to connect with the tester. Ensure that EUT is connected in CA mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

Test No. as per GR	1.5.13 (xl)
Test Name	Test for Wide band Intermodulation for UL-MIMO
Standards Reference	3GPP TS 38.521-1 Clause 7.8D.2
Test Instruments Required	5G Communications Tester (signaling) ; Vector signal generator (capable of generating 5G signals) , Control Software, Signal splitter / combiner , RF circulator, all required accessories
Test Setup	
Test Limits	Intermodulation distortion to be within limits (as preset in tester)
Test Procedure	EUT (with atleast 2 antenna ports) to be enabled to operate in MIMO mode each antenna port to be connected to 5G Communications Tester port enabled for desired 5G FR1 band in MIMO mode. Use the RF circulator to connect one of the ports to the Vector Signal Generator. Allow the EUT to connect with the tester. Ensure that EUT is connected in MIMO mode. Ensure that attenuation factors due to passive components is compensated in the tester. Select the test to perform from the menu and save the test results
Expected Results	

1.5.14 Interface 14: 5G NR- FR1 and FR2 interworking with other Radios

Test No. as per GR	1.5.14 (i)
Test Name	Test for Additional Spectrum emissions mask for inter-band EN-DC within FR1
Standards	3GPP TS 38.521-3 Clause 6.5B.2.3.2

Reference	
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (ii)
Test Name	Test for Additional Spurious emissions for inter-band EN-DC within FR1
Standards Reference	3GPP TS 38.521 3 Clause 6.5B.4.3
Test Instruments Required	Signal Generator, Signal Analyser
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (iii)
Test Name	Test for Adjacent channel leakage ratio for Inter-band EN-DC including FR2 2CCs
Standards Reference	3GPP TS 38.521-3 Clause 6.5B.2.4.3

Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (iv)
Test Name	Test for Adjacent channel leakage ratio for inter-band EN-DC within FR1
Standards Reference	3GPP TS 38.521 3 Clause 6.5B.2.3.3
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (v)
Test Name	Test for Adjacent channel selectivity for inter-band EN-DC within FR1 2CCs
Standards Reference	3GPP TS 38.521-3 3GPP TS 38.521-3 Clause 7.5B.3

Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (vi)
Test Name	Test for Adjacent channel selectivity for intra-band contiguous EN-DC 2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.5B.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (vii)
Test Name	Test for General spurious emissions for inter-band EN-DC within FR1
Standards Reference	3GPP TS 38.521-3 Clause 6.5B.3.3.1

Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (viii)
Test Name	Test for General spurious emissions for intra-band contiguous EN-DC
Standards Reference	3GPP TS 38.521 3 Clause 6.5B.3.1.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (ix)
Test Name	Test for Inband blocking for inter-band EN-DC within FR1-2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.6B.2.3

Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (x)
Test Name	Test for Inband blocking for intra-band contiguous EN-DC in FR1-2CCs
Standards Reference	3GPP TS 38.521 3 Clause 7.6B.2.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xi)
Test Name	Test for Minimum output power for EN-DC Inter-band including FR2
Standards Reference	3GPP TS 38.521-3 Clause 6.3B.1.4
Test Instruments Required	

Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xii)
Test Name	Test for Minimum Output Power for intra-band contiguous EN-DC
Standards Reference	3GPP TS 38.521-3 Clause 6.3B.1.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xiii)
Test Name	Test for Minimum output power for intra-band EN-DC within FR1
Standards Reference	3GPP TS 38.521-3 Clause 6.3B.1.3
Test Instruments Required	

Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xiv)
Test Name	Test for Narrow band blocking for inter band EN DC within FR1 2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.6B.4.3
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xv)
Test Name	Test for Narrow band blocking for intra band contiguous EN DC in FR1 2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.6B.4.1
Test Instruments Required	
Test Setup	

Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xvi)
Test Name	Test for Out-of-band blocking for inter-band EN-DC within FR1-2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.6B.3.3
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xvii)
Test Name	Test for Out-of-band blocking for intra-band contiguous EN-DC in FR1-2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.6B.3.1
Test Instruments Required	
Test Setup	

Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xviii)
Test Name	Test for Reference sensitivity for EN-DC within FR1 3CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.3B.2.3_1.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xix)
Test Name	Test for Reference sensitivity for inter-band EN-DC including FR2
Standards Reference	3GPP TS 38.521-3 Clause 7.3B.2.4
Test Instruments Required	
Test Setup	

Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xx)
Test Name	Test for Reference sensitivity for inter-band EN-DC within FR1 2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.3B.2.3
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxi)
Test Name	Test for Reference sensitivity for intra-band contiguous EN-DC 2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.3B.2.1
Test Instruments Required	
Test Setup	

Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxii)
Test Name	Test for Spectrum emissions mask for inter-band EN- DC including FR2 (2 CCs)
Standards Reference	3GPP TS 38.521-3 Clause 6.5B.2.4.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxiii)
Test Name	Test for Spectrum emissions mask for inter- band EN-DC within FR1
Standards Reference	3GPP TS 38.521-3 Clause 6.5B.2.3.1
Test Instruments Required	
Test Setup	
Test Limits	

Test No. as per GR	1.5.14 (xxiv)
Test Name	Test for Spurious emission band UE co-existence for intra-band contiguous EN-DC
Standards Reference	3GPP TS 38.521-3 Clause 6.5B.3.1.2
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxv)
Test Name	Test for Spurious emissions band UE co-existence for inter-band within FR1
Standards Reference	3GPP TS 38.521-3 Clause 6.5B.3.3.2
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxvi)
Test Name	Test for Spurious Emissions for EN DC within FR1 3CCs

Standards Reference	3GPP TS 38.521-3 Clause 7.9B.3 1.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxvii)
Test Name	Test for Spurious Emissions for inter band EN DC within FR1 2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.9B.3
Test Instruments Required	
Test Setup	
Test Limits	

Test No. as per GR	1.5.14 (xxviii)
Test Name	Test for Spurious emissions for intra band contiguous EN DC in FR1 2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.9B.1
Test Instruments Required	
Test Setup	

Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxix)
Test Name	Test for Spurious Response for inter band EN DC within FR1 2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.7B.3
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxx)
Test Name	Test for Spurious Response for intra band contiguous EN DC in FR1 2CCs
Standards Reference	3GPP TS 38.521-3 Clause 7.7B.1
Test Instruments Required	
Test Setup	
Test Limits	

Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxxi)
Test Name	Test for UE Maximum Output Power for Inter-Band EN-DC including FR2- EIRP and TR
Standards Reference	3GPP TS 38.521-3 Clause 6.2B.1.4.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxxii)
Test Name	Test for UE Maximum Output Power for Inter-Band EN-DC including FR2 - Spherical Coverage
Standards Reference	3GPP TS 38.521-3 Clause 6.2B.1.4.2
Test Instruments Required	
Test Setup	
Test Limits	

Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxxiii)
Test Name	Test for UE Maximum Output Power for Inter-Band EN-DC within FR1
Standards Reference	3GPP TS 38.521-3 Clause 6.2B.1.3
Test Instruments Required	
Test Setup	
Test Limits	

Test No. as per GR	1.5.14 (xxxiv)
Test Name	Test for UE Maximum Output Power for Intra-Band Contiguous EN-DC
Standards Reference	3GPP TS 38.521 3 Clause 6.2B.1.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxxv)
Test Name	Test for Wideband Intermodulation for inter band EN DC in FR1 2CCs

Standards Reference	3GPP TS 38.521-3 Clause 7.8B.2.3
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.14 (xxxvi)
Test Name	Test for Wideband Intermodulation for intra band contiguous EN DC in FR1
Standards Reference	3GPP TS 38.521-3 Clause 7.8B.2.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

1.5.15 Interface 15: 5G NR (FR2)

Test No. as per GR	1.5.15 (i)
Test Name	Test for Adjacent channel leakage ratio
Standards Reference	3GPP TS 38.521-2 Clause 6.5.2.3

Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.15 (ii)
Test Name	Test for Minimum Output power -Transmitter
Standards Reference	3GPP TS 38.521-1 Clause 6.3.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.15 (iii)
Test Name	Test for Reference sensitivity power level
Standards Reference	3GPP TS 38.521-1 Clause 7.3.2
Test Instruments Required	

Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.15 (iv)
Test Name	Test for Spectrum Emission Mask-5G NR FR2
Standards Reference	3GPP TS 38.521-2 Clause 6.5.2.1
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.15 (v)
Test Name	Test for UE maximum output power-EIRP and TRP
Standards Reference	3GPP TS 38.521-2 Clause 6.2.1.1
Test Instruments Required	
Test Setup	

Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.15 (vi)
Test Name	Test for UE maximum output power reduction
Standards Reference	3GPP TS 38.521-2 Clause 6.2.2
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

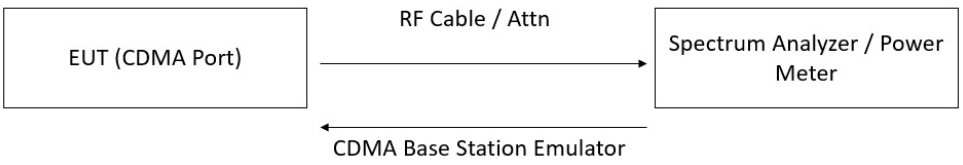
Test No. as per GR	1.5.15 (vii)
Test Name	Test for UE maximum output power -Spherical coverage
Standards Reference	3GPP TS 38.521-2 Clause 6.2.1.2
Test Instruments Required	
Test Setup	
Test Limits	

Test Procedure	
Expected Results	

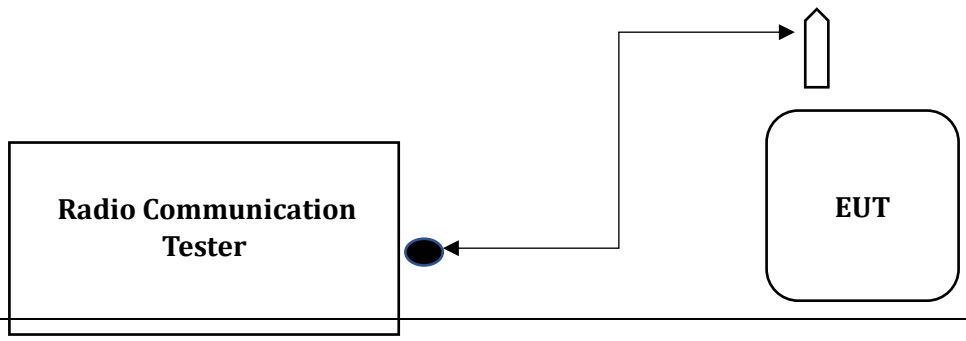
Test No. as per GR	1.5.15 (viii)
Test Name	Test for UE maximum output power with additional requirements
Standards Reference	3GPP TS 38.521-2 Clause 6.2.3
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

1.5.16 Interface 16: CDMA

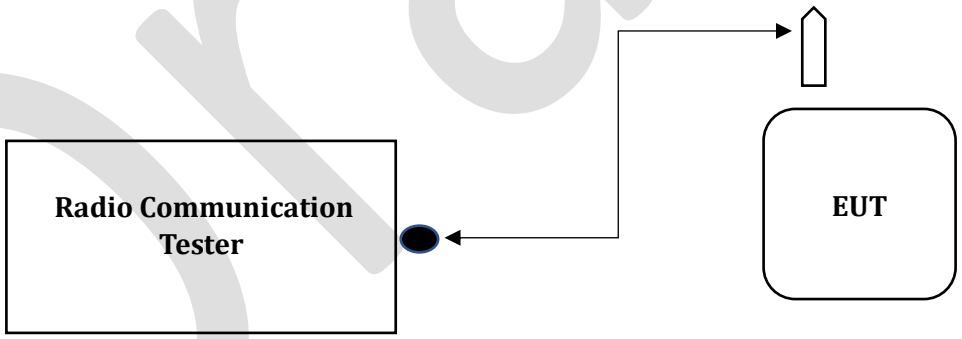
Test No. as per GR	1.5.16
Test Name	i. Test for CDMA Int Parameters ii. Test for Operating Frequency for CDMA Int
Standards Reference	i. Test for CDMA Int Parameters: 1xS0011 or EN 301 908-04 CDMA ii. Test for Operating Frequency for CDMA Int: As per NFAP
Test Instruments Required	i. CDMA Radio Communication Tester/ Call Box ii. Spectrum Analyzer iii. RF Power Meter iv. RF Signal Generator (CDMA capable) v. RF Cables and Attenuators vi. Frequency Counter (optional) vii. Control PC with test software

Test Setup	
Test Limits	
Test Procedure	1. Configure the EUT for CDMA operation as per supported band and mode. 2. Connect the EUT RF port to the test equipment using calibrated RF cables and attenuators. 3. Establish a CDMA link between the EUT and the base station emulator. 4. Measure CDMA interface parameters (output power, spectrum, modulation, receiver performance) as per the applicable standard. 5. Measure transmit and receive operating frequencies. 6. Record all measured values. 7. Repeat the test for all supported CDMA bands and configurations.
Expected Results	i. All CDMA interface parameters shall comply with TIA-1xS0011 or EN 301 908-04 limits. ii. Operating frequencies shall be within NFAP-allocated bands with acceptable tolerance. iii. The EUT shall be declared PASS if all measured values meet the specified requirements.

1.5.17 Interface 17: GSM or GPRS or EDGE

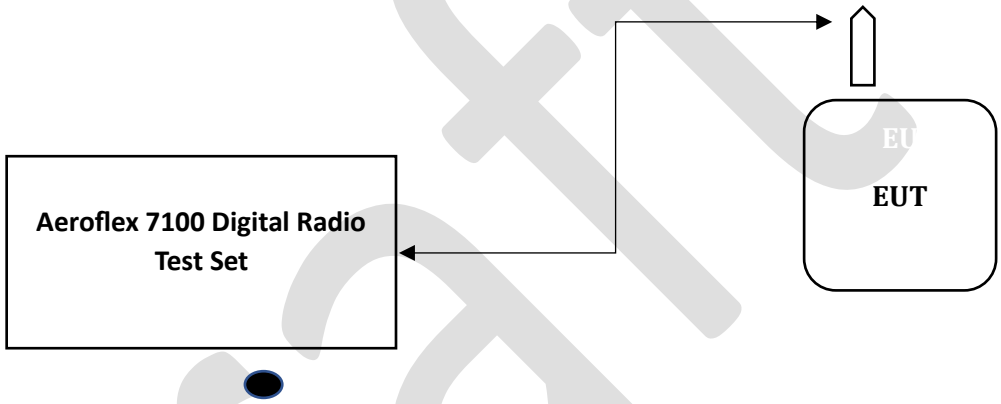
Test No. as per GR	1.5.17 (i)
Test Name	Test for Int Parameters for GSM or GPRS or EDGE
Standards Reference	3GPP TS 51 010-1 or EN 301 511. Annex F of Standard No. TEC 33010:2025
Test Instruments Required	Radio Communication tester
Test Setup	

Test Limits	
Test Procedure	1. Connect the EUT's network antenna directly to the Radio Communication tester. 2. Select the RAT (Radio Access technology) as GSM. 3. Switch on the EUT and wait for the successful connection. Start the call and take readings.
Expected Results	

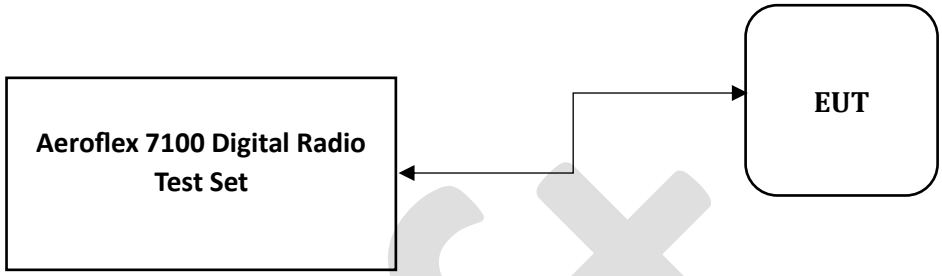
Test No. as per GR	1.5.17 (ii)
Test Name	Test for Operating Frequency for GSM or GPRS or EDGE Int
Standards Reference	NFAP. Annex-E of Standard No. TEC 33010:2025
Test Instruments Required	Radio Communication Tester
Test Setup	
Test Limits	Latest NFAP issued by WPC
Test Procedure	1. Verify that the EUT supports the current operating bands in India. 2. Put the Equipment under Test (EUT) Switch Off mode. 3. Configure the tester for any one of uplink /downlink frequency and duplexing technology (FDD/TDD) supported in India. 4. Switch on the EUT and wait for successful connection to establish. Make a call. 5. Check that the EUT is connected to the tester and that the call goes through. Repeat for all bands supported in India.

Expected Results	

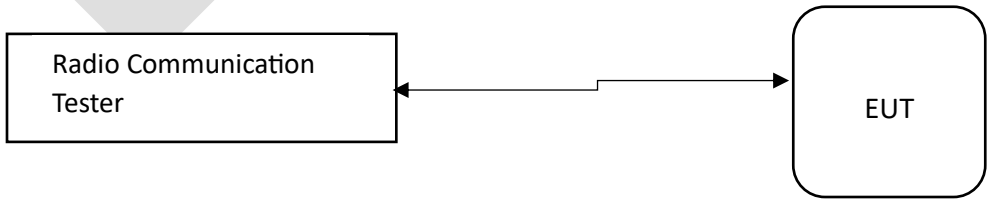
1.5.18 Interface 18: LTE or LTE-A

Test No. as per GR	1.5.18 (i)
Test Name	Test for Int Parameters for LTE or LTE-A
Standards Reference	3GPP TS 36.521-1 or EN 301 908-13. Annex-G of Standard No. TEC 33010:2025
Test Instruments Required	Digital Radio test set
Test Setup	
Test Limits	
Test Procedure	1. Connect the EUT's network antenna to the Digital Radio Test Set. 2. Select the RAT (Radio Access technology) as LTE. 3. Switch on the EUT and wait for the successful connection. Select the parameter in the Test Execution window and run the test. Take down the readings.
Expected Results	

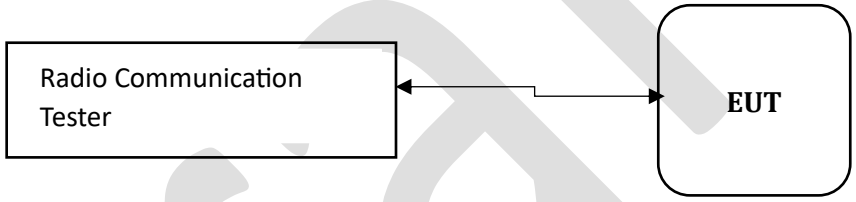
Test No. as per GR	1.5.18 (ii)
Test Name	Test for Operating Frequency for LTE or LTE-A Int

Standards Reference	NFAP. Annex-E of Standard No. TEC 33010:2025
Test Instruments Required	Digital Radio test set
Test Setup	
Test Limits	Latest NFAP issued by WPC
Test Procedure	1. Verify that the EUT supports the current operating bands in India. 2. Put the Equipment Under Test (EUT) Switch Off mode. 3. Configure the LTE tester for any one of up/down frequency and duplexing technology (FDD/TDD) supported in India. 4. Switch on the EUT and initiate a call. 5. Check that the EUT is connected to the tester and that the call goes through. Repeat for all bands supported in India.
Expected Results	

1.5.19 Interface 19: WCDMA or HSPA

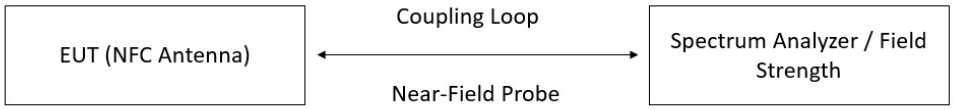
Test No. as per GR	1.5.19 (i)
Test Name	Test for Operating Frequency for WCDMA or HSPA Int
Standards Reference	NFAP, Annex-E of Standard No. TEC 33010:2025
Test Instruments Required	Radio Communication Tester
Test Setup	
Test Limits	Latest NFAP issued by WPC

Test Procedure	1. Verify that the EUT supports the current operating bands in India. 2. Put the Equipment Under Test (EUT) Switch Off mode. 3. Configure the tester for any one of uplink /downlink frequency and duplexing technology (FDD/TDD) supported in India. 4. Switch on the EUT and wait for successful connection to establish. Make a call. 5. Check that the EUT is connected to the tester and that the call goes through. Repeat for all bands supported in India.
Expected Results	

Test No. as per GR	1.5.19 (ii)
Test Name	Test for WCDMA or HSPA Int Parameters
Standards Reference	3GPP TS 34.121-1 or EN 301 908-2
Test Instruments Required	Radio Communication Tester
Test Setup	
Test Limits	
Test Procedure	1. Connect the EUT's network antenna directly to the Radio Communication Tester 2. Select the RAT (Radio Access technology) as WCDMA. 3. Switch on the EUT and wait for the successful connection. Press "Start call" and take the readings.
Expected Results	

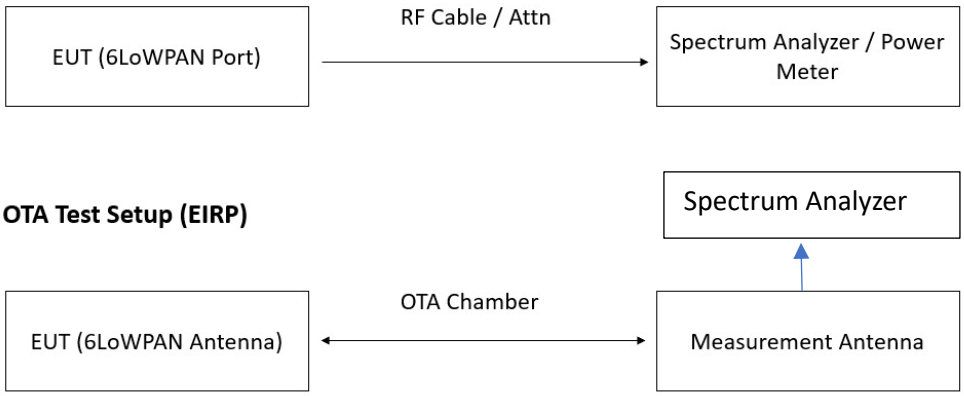
1.5.20 Interface 20: NFC

Test No. as per GR	1.5.20
Test Name	i. Test for Basic RF Requirements for NFC – Int ii. Frequency of Operation for NFC Int
Standards Reference	i. Basic RF Requirements for NFC Int: As per ETSI EN 300 330 V2.1.1 ii. Frequency of Operation for NFC Int: As per Latest NFAP.
Test Instruments Required	i. Spectrum Analyzer ii. RF Signal Generator (13.56 MHz, NFC compatible) iii. Power Meter / Field Strength Meter iv. Near-Field Probe / Loop Antenna v. RF Test Receiver (optional)

	vi. Test Jig / Coupling Loop (as per EN 300 330) vii. Control PC with test software
Test Setup	
Test Limits	
Test Procedure	1. Configure the EUT for NFC transmit and receive operation. 2. Position the NFC antenna of the EUT with respect to the coupling loop / near-field probe as specified in EN 300 330. 3. Measure carrier frequency and field strength at the specified distance. 4. Measure occupied bandwidth and spurious emissions. 5. Verify operating frequency against NFAP allocation. 6. Record all measured values. 7. Repeat the test for all supported NFC modes.
Expected Results	i. All basic RF parameters shall comply with ETSI EN 300 330 V2.1.1 limits. ii. Operating frequency shall conform to the latest NFAP allocation. iii. The EUT shall be considered PASS if all requirements are met.

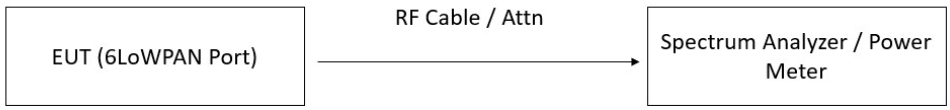
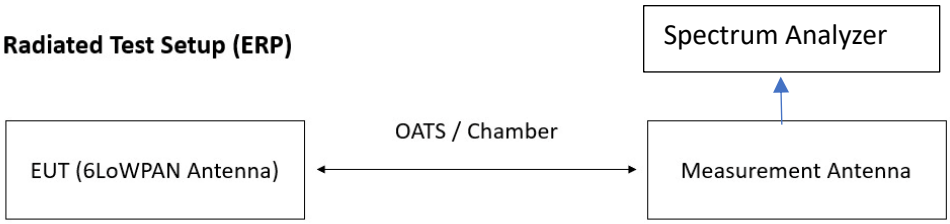
1.5.21 Interface 21: 6LoWPAN (2.4 GHz)

Test No. as per GR	1.5.21
Test Name	i. Test for Basic RF Requirements for 6LowPAN Interface ii. Test for EIRP for 6LowPAN Interface iii. Test for Frequency of operation for 6LowPAN Interface iv. Test for Maximum Transmitted Power for 6LowPAN Int
Standards Reference	i. Basic RF Requirements for 6LowPAN Interface: As per ETSI EN 300 328 V2.2.2 ii. EIRP for 6LowPAN Interface: As per WPC GSR 45(E) iii. Frequency of operation for 6LowPAN Interface: As per Latest NFAP iv. Maximum Transmitted Power for 6LowPAN Int: As per WPC GSR 45(E).
Test Instruments Required	i. Spectrum Analyzer (2.4 GHz capable) ii. RF Power Meter with Sensor iii. Signal Generator (2.4 GHz) iv. RF Test Receiver (optional) v. Anechoic Chamber / OTA Test Setup (for EIRP) vi. RF Cables, Attenuators, Antennas vii. Control PC with test software

Test Setup	**Conducted Tests (RF Parameters, Frequency, Tx Power)**  **OTA Test Setup (EIRP)**
Test Limits	i. For EIRP for 6LowPAN Interface ≤ 4W (36 dBm) As per WPC GSR 45(E) ii. For Frequency of operation for 6LowPAN Interface: 2.4 GHz to 2.4835 GHz (As per WPC GSR 45(E)) iii. For Maximum Transmitted Power for 6LowPAN Int ≤ 1 W (30dBm) As per WPC GSR 45(E)
Test Procedure	1. Configure the EUT for 6LoWPAN operation in the 2.4 GHz band. 2. For conducted tests, connect the EUT RF port to the measurement equipment using calibrated RF cables. 3. Measure RF parameters (output power, bandwidth, spectral emissions) as per ETSI EN 300 328. 4. Measure operating frequency and verify compliance with NFAP allocation. 5. For EIRP, place the EUT in an anechoic chamber and perform OTA measurement. 6. Record maximum transmitted power and EIRP values. 7. Repeat tests for all supported channels and modes.
Expected Results	i. All basic RF parameters shall comply with ETSI EN 300 328 V2.2.2. ii. Operating frequency shall be within the NFAP-allocated 2.4 GHz band. iii. Maximum transmitted power and EIRP shall comply with WPC GSR 45(E) limits. iv. The EUT shall be declared PASS if all measured values meet the specified requirements.

1.5.22 Interface 22: 6LoWPAN (865 to 868 MHz)

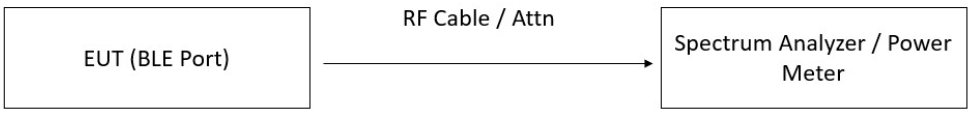
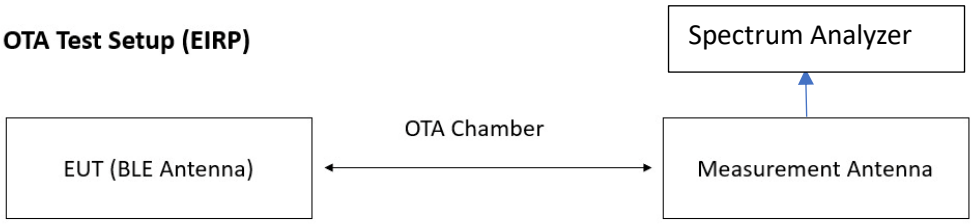
Test No. as per GR	1.5.22 (i) to 1.5.22 (v)
Test Name	i. Test for Basic RF Requirements for 6LoWPAN Interface (865 to 868 MHz) ii. Test for ERP for 6LoWPAN Interface (865–868 MHz) iii. Test for Frequency of Operation for 6LoWPAN (865–868 MHz) iv. Test for Maximum Transmitted Power for 6LoWPAN (865–868 MHz) v. Test for Duty Cycle for 6LoWPAN (865–868 MHz)
Standards	i. Basic RF Requirements for 6LoWPAN (865–868 MHz) –ETSI EN 300 220-2 V3.2.1

Reference	, As per Annex-K (K.4 to K.18) of Standard No. TEC 33010:2025 ii. ERP for 6LoWPAN Interface (865–868 MHz) – As per WPC GSR 853(E), Annex-K (K.2) of Standard No. TEC 33010:2025 iii. Frequency of Operation for 6LoWPAN (865–868 MHz) – As per latest NFAP, Annex-K (K.1) of Standard No. TEC 33010:2025 iv. Maximum Transmitted Power for 6LoWPAN (865–868 MHz) – As per WPC GSR 853(E), Annex-K (K.3) of Standard No. TEC 33010:2025 v. Duty Cycle for 6LoWPAN (865–868 MHz) – As per WPC GSR 853(E), Annex – K (K.7) of Standard No. TEC 33010:2025
Test Instruments Required	i. Spectrum Analyzer (sub-GHz capable) ii. RF Power Meter iii. Signal Generator (sub-GHz) iv. RF Test Receiver (optional) v. Anechoic Chamber / Open Area Test Site (for ERP) vi. Measurement Antenna (calibrated, sub-GHz) vii. RF Cables, Attenuators viii. Timing Analyzer / Spectrum Analyzer with duty-cycle measurement ix. Control PC with test software
Test Setup	**Conducted Tests (RF Parameters, Frequency, Duty Cycle)**  **Radiated Test Setup (ERP)** 
Test Limits	i. For ERP for 6LoWPAN Interface (865 to 868 MHz): As per WPC GSR 853 (E) ii. For Frequency of Operation for 6LoWPAN Interface (865 to 868 MHz): 865 MHz to 868 MHz (As per WPC GSR 853 (E) iii. For Maximum Transmitted Power for 6LoWPAN Interface (865 to 868 MHz): Devices falling under “Non Specific Short Range Devices” i.e. Table 1 of WPC GSR 853 (E): 25 mW Devices falling under “Tracking, Tracing and Data Acquisition Devices” i.e. Table 2 of WPC GSR 853 (E): 500 mW iv. Duty Cycle for 6LoWPAN interface 865-868 MHz: Devices falling under “Non Specific Short Range Devices” i.e. Table 1 of WPC GSR 853 (E): 1%. Devices falling under “Tracking, Tracing and Data Acquisition Devices” i.e. Table 2 of WPC GSR 853 (E): ≤ 10% (for network access points) otherwise ≤ 2.5%

Test Procedure	1. Configure the EUT for 6LoWPAN operation in the 865–868 MHz band. 2. For conducted tests, connect the EUT RF port to the measurement equipment using calibrated RF cables. 3. Measure RF parameters (output power, bandwidth, spurious emissions) as per ETSI EN 300 220-2. 4. Verify operating frequency against NFAP allocation. 5. Measure duty cycle over the specified observation period. 6. For ERP measurement, place the EUT in an OATS or anechoic chamber and perform radiated measurements. 7. Record maximum transmitted power, ERP, and duty cycle values. 8. Repeat tests for all supported channels and operating modes.
Expected Results	i. All basic RF parameters shall comply with ETSI EN 300 220-2 V3.2.1. ii. Operating frequency shall be within the NFAP-allocated 865–868 MHz band. iii. Maximum transmitted power, ERP, and duty cycle shall comply with WPC GSR 853(E) limits. iv. The EUT shall be declared PASS if all measured values meet the specified requirements.

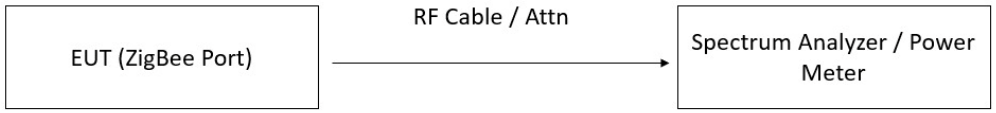
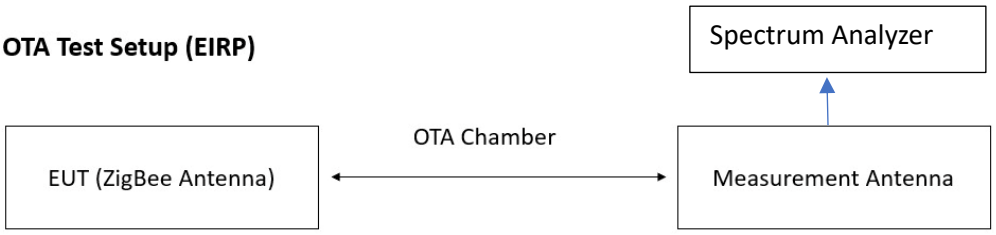
1.5.23 Interface 23: BLE

Test No. as per GR	1.5.23
Test Name	i. Test for Basic RF Requirements for BLE Interface ii. Test for EIRP for BLE Interface iii. Test for Frequency of Operation for BLE Interface iv. Test for Maximum Transmitted Power for BLE Interface
Standards Reference	i. Basic RF Requirements for BLE Interface – As per ETSI EN 300 328 V2.2.2 ii. EIRP for BLE Interface – As per WPC GSR 45(E) iii. Frequency of Operation for BLE Interface – As per latest NFAP iv. Maximum Transmitted Power for BLE Interface – As per WPC GSR 45(E)
Test Instruments Required	i. Spectrum Analyzer (2.4 GHz capable) ii. RF Power Meter with Sensor iii. Signal Generator (2.4 GHz, BLE compatible) iv. RF Test Receiver (optional) v. Anechoic Chamber / OTA Test Setup (for EIRP) vi. RF Cables, Attenuators, Antennas vii. Control PC with test software

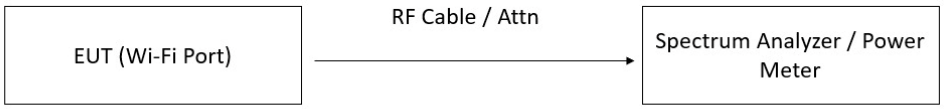
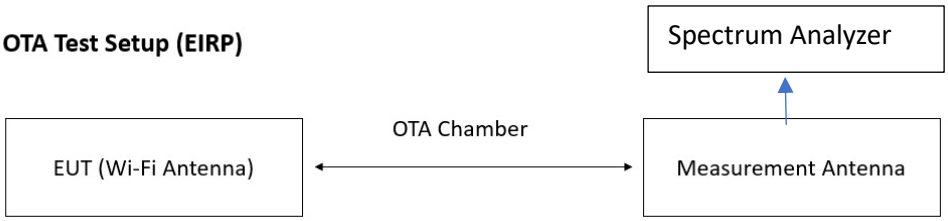
Test Setup	**Conducted Tests (RF Parameters, Frequency, Tx Power)**  **OTA Test Setup (EIRP)** 
Test Limits	i. For Basic RF Requirements for BLE Interface :As per WPC GSR 45(E) ii. For EIRP for BLE Interface ≤ 4W (36 dBm) As per WPC GSR 45(E) iii. For Frequency of Operation for BLE Interface: 2.4 GHz to 2.4835 GHz (As per WPC GSR 45(E)) iv. For Maximum Transmitted Power for BLE Int ≤ 1 W (30dBm) As per WPC GSR 45(E)
Test Procedure	1. Configure the EUT for BLE operation in the 2.4 GHz band. 2. For conducted tests, connect the EUT RF port to the measurement equipment using calibrated RF cables. 3. Measure RF parameters (output power, occupied bandwidth, spectral emissions) as per ETSI EN 300 328. 4. Verify operating frequency against NFAP allocation. 5. For EIRP measurement, place the EUT in an anechoic chamber and perform OTA measurement. 6. Record maximum transmitted power and EIRP values. 7. Repeat tests for all supported BLE channels and modes.
Expected Results	i. All basic RF parameters shall comply with ETSI EN 300 328 V2.2.2. ii. Operating frequency shall be within the NFAP-allocated 2.4 GHz band. iii. Maximum transmitted power and EIRP shall comply with WPC GSR 45(E) limits. iv. The EUT shall be declared PASS if all measured values meet the specified requirements.

1.5.24 Interface 24: ZigBee

Test No. as per GR	1.5.24
Test Name	i. Test for Basic RF Requirements for ZigBee Interface ii. Test for EIRP for ZigBee Interface iii. Test for Frequency of Operation for ZigBee Interface iv. Test for Maximum Transmitted Power for ZigBee Interface

Standards Reference	i. Basic RF Requirements for ZigBee Interface – As per ETSI EN 300 328 V2.2.2 ii. EIRP for ZigBee Interface – As per WPC GSR 45(E) iii. Frequency of Operation for ZigBee Interface – As per latest NFAP iv. Maximum Transmitted Power for ZigBee Interface – As per WPC GSR 45(E)
Test Instruments Required	i. Spectrum Analyzer (2.4 GHz capable) ii. RF Power Meter with Sensor iii. Signal Generator (2.4 GHz, ZigBee compatible) iv. RF Test Receiver (optional) v. Anechoic Chamber / OTA Test Setup (for EIRP) vi. RF Cables, Attenuators, Antennas vii. Control PC with test software
Test Setup	**Conducted Tests (RF Parameters, Frequency, Tx Power)**  **OTA Test Setup (EIRP)** 
Test Limits	i. For EIRP for ZigBee Interface ≤ 4W (36 dBm) As per WPC GSR 45(E) ii. For Frequency of Operation for ZigBee Interface: 2.4 GHz to 2.4835 GHz (As per WPC GSR 45(E)) iii. For Maximum Transmitted Power for ZigBee Int ≤ 1 W (30dBm) As per WPC GSR 45(E)
Test Procedure	1. Configure the EUT for ZigBee operation in the 2.4 GHz band. 2. For conducted tests, connect the EUT RF port to the measurement equipment using calibrated RF cables. 3. Measure RF parameters (output power, occupied bandwidth, spectral emissions) as per ETSI EN 300 328. 4. Verify operating frequency against NFAP allocation. 5. For EIRP measurement, place the EUT in an anechoic chamber and perform OTA measurement. 6. Record maximum transmitted power and EIRP values. 7. Repeat tests for all supported ZigBee channels and modes.
Expected Results	i. All basic RF parameters shall comply with ETSI EN 300 328 V2.2.2. ii. Operating frequency shall be within the NFAP-allocated 2.4 GHz band. iii. Maximum transmitted power and EIRP shall comply with WPC GSR 45(E) limits. iv. The EUT shall be declared PASS if all measured values meet the specified requirements.

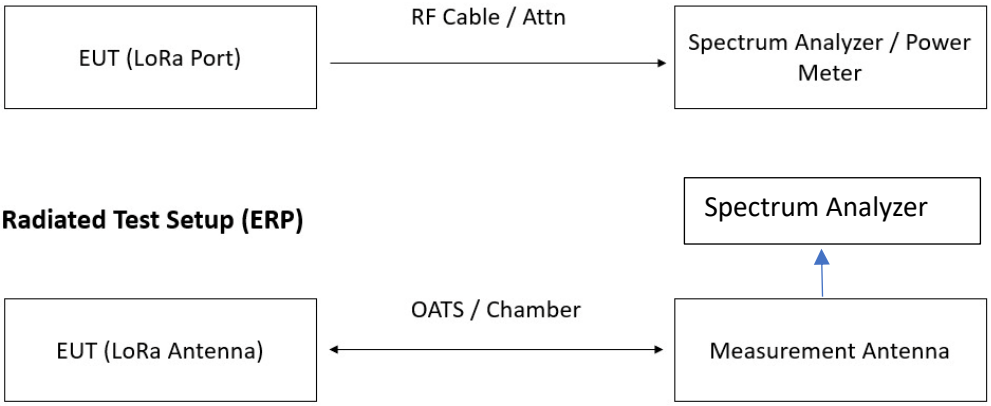
1.5.25 Interface 25: WiFi

Test No. as per GR	1.5.25
Test Name	i. Test for 2.4 GHz WiFi Radio Conformance ii. Test for 5 GHz Wi-Fi Radio Conformance iii. Test for EIRP for Wi-Fi Interface iv. Test for Frequency for Wi-Fi Equipment
Standards Reference	i. 2.4 GHz Wi-Fi Radio Conformance – As per ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249 ii. 5 GHz Wi-Fi Radio Conformance – As per ETSI EN 301 893 and/or ETSI EN 302 502 or FCC CFR 47 Part 15.407 / 15.249 iii. EIRP for Wi-Fi Interface – As per latest NFAP and GSRs issued by DoT WPC iv. Frequency for Wi-Fi Equipment – As per DoT WPC GSR No. 45(E), 1048(E)
Test Instruments Required	i. Spectrum Analyzer (2.4 GHz & 5 GHz capable) ii. RF Power Meter with Sensors iii. Wi-Fi Test Set / Signal Generator (802.11 a/b/g/n/ac/ax as applicable) iv. RF Test Receiver (optional) v. Anechoic Chamber / OTA Test Setup (for EIRP) vi. RF Cables, Attenuators, Antennas vii. Control PC with test software
Test Setup	**Conducted Tests Setup (Radio Conformance, Frequency, Tx Power)**  **OTA Test Setup (EIRP)** 
Test Limits	i. For EIRP for WiFi Interface < 4 W (36dBm) Maximum output power of transmitter ≤ 1 W (30 dBm) in spread of 10 MHz or higher. (As per GSR 45(E). ii. For Frequency for WiFi equipments: 2.4 GHZ Band: 2.4-2.4835 GHz as per WPC GSR 45(E) 5 GHz Band: 5.150-5.250 GHz, 5.250-5.350 GHz, 5.470-5.725 GHz, 5.725-5.875 GHz as per WPC GSR 1048(E)

Test Procedure	1. Configure the EUT for Wi-Fi operation in 2.4 GHz and/or 5 GHz band. 2. For conducted tests, connect the EUT RF port to measurement equipment using calibrated RF cables. 3. Measure RF parameters (output power, occupied bandwidth, spurious emissions) as per applicable ETSI/FCC standard. 4. Verify operating frequency against WPC GSR and NFAP allocation. 5. For EIRP measurement, place the EUT in an anechoic chamber and perform OTA measurement. 6. Record maximum transmitted power and EIRP values. 7. Repeat tests for all supported channels, bandwidths, and modes.
Expected Results	i. All RF parameters shall comply with the applicable ETSI / FCC standards. ii. Operating frequencies shall conform to DoT WPC GSR and NFAP allocations. iii. Maximum transmitted power and EIRP shall remain within prescribed limits. iv. The EUT shall be declared PASS if all requirements are met.

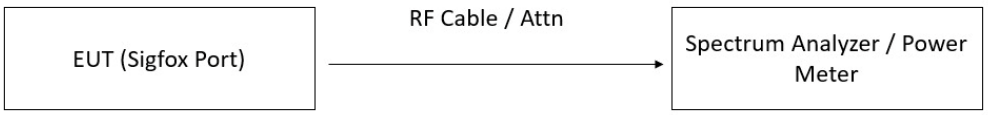
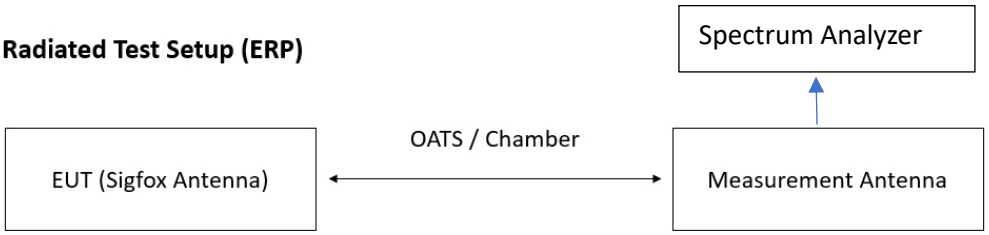
1.5.26 Interface 26: LPWAN – LoRa

Test No. as per GR	1.5.26
Test Name	i. Test for Basic RF Requirements for LPWAN-LoRA ii. Test for ERP for LoRa Interface iii. Test for Frequency of Operation for LoRa Interface iv. Test for Maximum Transmit Power for LoRa Interface
Standards Reference	i. Basic RF Requirements for LPWAN–LoRa – As per ETSI EN 300 220-2 V3.2.1 ii. ERP for LoRa Interface – As per WPC GSR 853(E) iii. Frequency of Operation for LoRa Interface – As per latest NFAP iv. Maximum Transmit Power for LoRa Interface – As per WPC GSR 853(E)
Test Instruments Required	i. Spectrum Analyzer (sub-GHz capable) ii. RF Power Meter iii. Signal Generator (sub-GHz, LoRa compatible – optional) iv. RF Test Receiver (optional) v. Anechoic Chamber / Open Area Test Site (for ERP) vi. Measurement Antenna (calibrated, sub-GHz) vii. RF Cables, Attenuators viii. Control PC with test software

Test Setup	**Conducted Tests (RF Parameters, Frequency, Tx Power)**  **Radiated Test Setup (ERP)**
Test Limits	i. For ERP LoRa: As per WPC GSR 853 (E) ii. For Frequency of Operation for LoRa Int: 865 MHz to 868 MHz (As per WPC GSR 853 (E) iii. Maximum Transmit Power LoRa: Devices falling under "Non Specific Short Range Devices" i.e. Table 1 of WPC GSR 853 (E): 25 mW Devices falling under "Tracking, Tracing and Data Acquisition Devices" i.e. Table 2 of WPC GSR 853 (E): 500 mW
Test Procedure	1. Configure the EUT for LoRa operation in the applicable sub-GHz band. 2. For conducted tests, connect the EUT RF port to the measurement equipment using calibrated RF cables. 3. Measure RF parameters (output power, occupied bandwidth, spurious emissions) as per ETSI EN 300 220-2. 4. Verify operating frequency against NFAP allocation. 5. For ERP measurement, place the EUT in an OATS or anechoic chamber and perform radiated measurement. 6. Record maximum transmit power and ERP values. 7. Repeat tests for all supported channels, data rates, and spreading factors.
Expected Results	i. All basic RF parameters shall comply with ETSI EN 300 220-2 V3.2.1. ii. Operating frequency shall conform to NFAP allocation. iii. Maximum transmit power and ERP shall comply with WPC GSR 853(E) limits. iv. The EUT shall be declared PASS if all measured values meet the specified requirements.

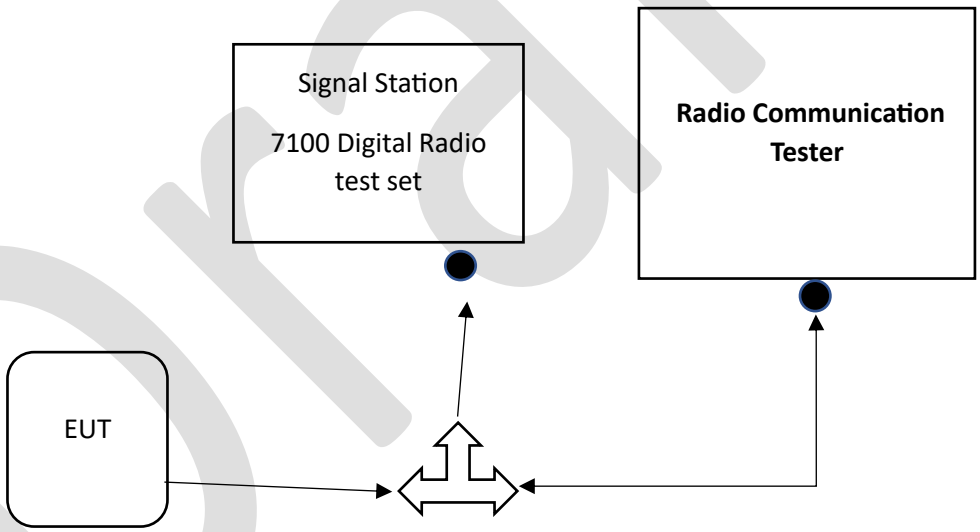
1.5.27 Interface 27: LPWAN – SigFox

Test No. as per GR	1.5.27
Test Name	i. Test for Basic RF Requirements for LPWAN – SigFox ii. Test for ERP for Sigfox Interface

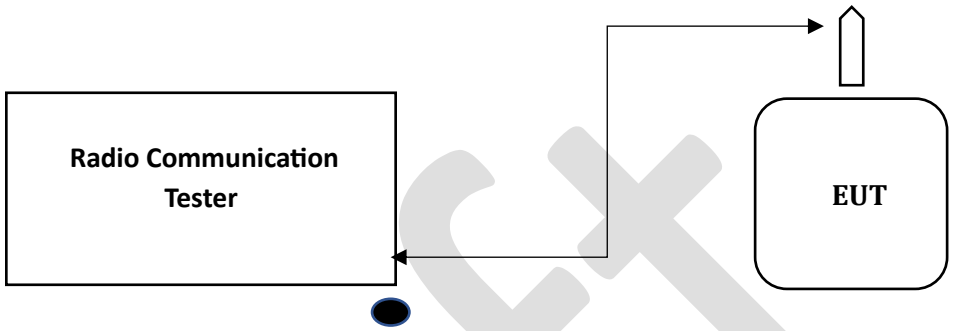
	iii. Test for Frequency of Operation for Sigfox Interface iv. Test for Maximum Transmit Power for Sigfox Interface
Standards Reference	i. Basic RF Requirements for LPWAN–Sigfox – As per ETSI EN 300 220-2 V3.2.1 ii. ERP for Sigfox Interface – As per WPC GSR 853(E) iii. Frequency of Operation for Sigfox Interface – As per latest NFAP iv. Maximum Transmit Power for Sigfox Interface – As per WPC GSR 853(E)
Test Instruments Required	i. Spectrum Analyzer (sub-GHz capable) ii. RF Power Meter iii. RF Signal Generator (sub-GHz, optional) iv. RF Test Receiver (optional) v. Anechoic Chamber / Open Area Test Site (for ERP) vi. Calibrated Measurement Antenna (sub-GHz) vii. RF Cables, Attenuators viii. Control PC with test software
Test Setup	**Conducted Tests (RF Parameters, Frequency, Tx Power)**  **Radiated Test Setup (ERP)** 
Test Limits	i. For ERP SigFox: As per WPC GSR 853 (E) ii. For Frequency of Operation for SigFox Int: 865 MHz to 868 MHz (As per WPC GSR 853 (E) iii. For Maximum Transmit Power SigFox: Devices falling under “Non Specific Short Range Devices” i.e. Table 1 of WPC GSR 853 (E): 25 mW Devices falling under “Tracking, Tracing and Data Acquisition Devices” i.e. Table 2 of WPC GSR 853 (E): 500 mW
Test Procedure	1. Configure the EUT for Sigfox operation in the applicable sub-GHz band. 2. For conducted tests, connect the EUT RF port to the measurement equipment using calibrated RF cables. 3. Measure RF parameters (output power, occupied bandwidth, spurious emissions) as per ETSI EN 300 220-2. 4. Verify operating frequency against NFAP allocation. 5. For ERP measurement, place the EUT in an OATS or anechoic chamber and perform radiated measurement. 6. Record maximum transmit power and ERP values. 7. Repeat tests for all supported Sigfox channels and operating modes.

Expected Results	i. All basic RF parameters shall comply with ETSI EN 300 220-2 V3.2.1. ii. Operating frequency shall conform to NFAP allocation. iii. Maximum transmit power and ERP shall comply with WPC GSR 853(E) limits. iv. The EUT shall be declared PASS if all measured values meet the specified requirements.

1.5.28 Interface 28: NB-IoT

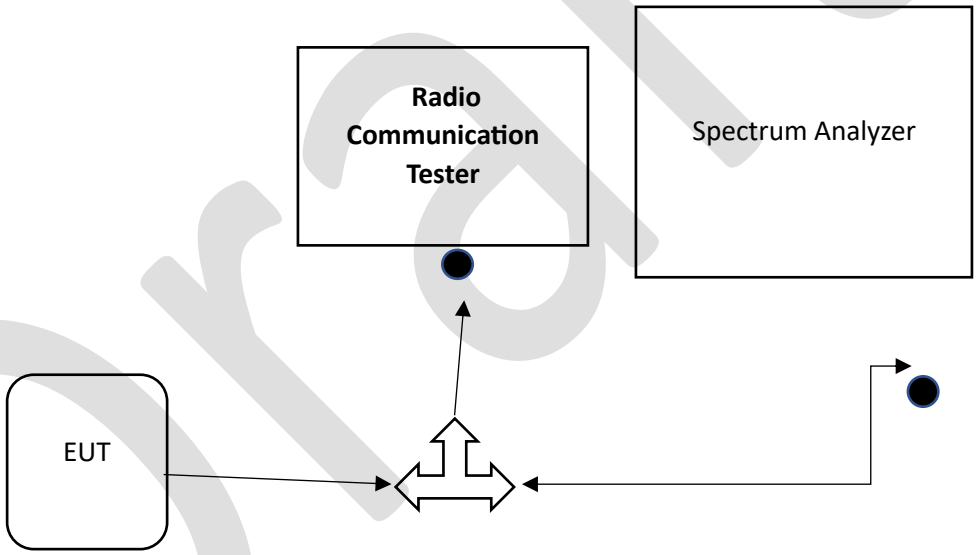
Test No. as per GR	1.5.28 (i)
Test Name	Test for Frequency Error -NB-IoT
Standards Reference	3GPP TS 36.521-1 Clause 6.5.1F
Test Instruments Required	**Radio Communication Tester**, Digital Radio test,
Test Setup	
Test Limits	
Test Procedure	Connect the EUT signal generator Select the test parameter on the tester and run the test.
Expected Results	

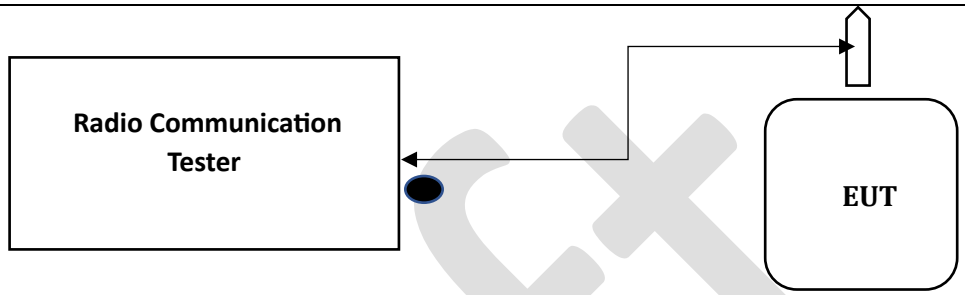
Test No. as per GR	1.5.28 (ii)

Test Name	Test for Maximum output power-NB-IoT
Standards Reference	3GPP TS 36.521-1 Clause 6.2.2F
Test Instruments Required	**Radio Communication Tester**
Test Setup	
Test Limits	
Test Procedure	4. Connect the EUT's network antenna is directly connected to the 5. Select the RAT (Radio Access technology) as NB-IOT. 6. Switch on the EUT and wait for the successful connection. Select the parameter in the Test Execution window and run the test. Take down the readings.
Expected Results	

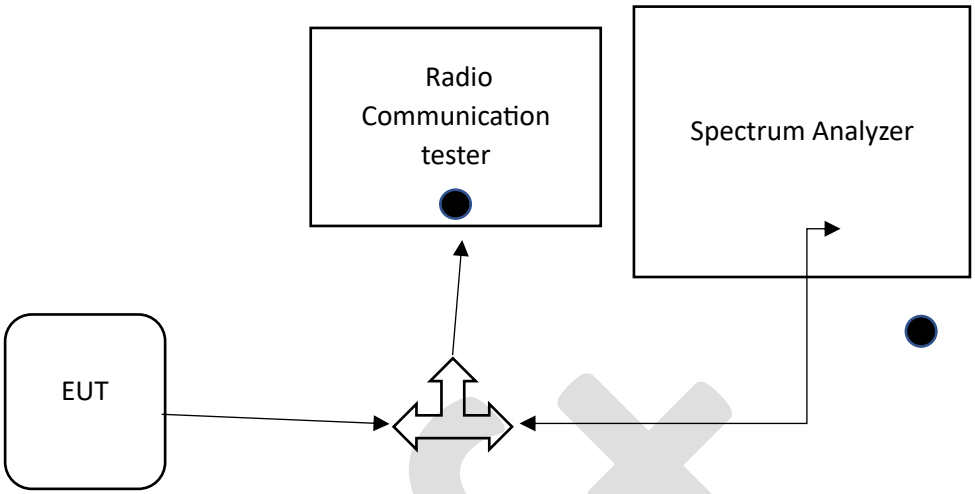
Test No. as per GR	1.5.28 (iii)
Test Name	Test for Operating Frequency-NB-IoT-Device Equp. shall be capable of operating in at least one of the frequency bands as per the latest NFAP National Freq. Allocation plan
Standards Reference	National Frequency Allocation Plan - 2018 Frequency Allocation Table (IND 16)
Test Instruments Required	
Test Setup	
Test Limits	

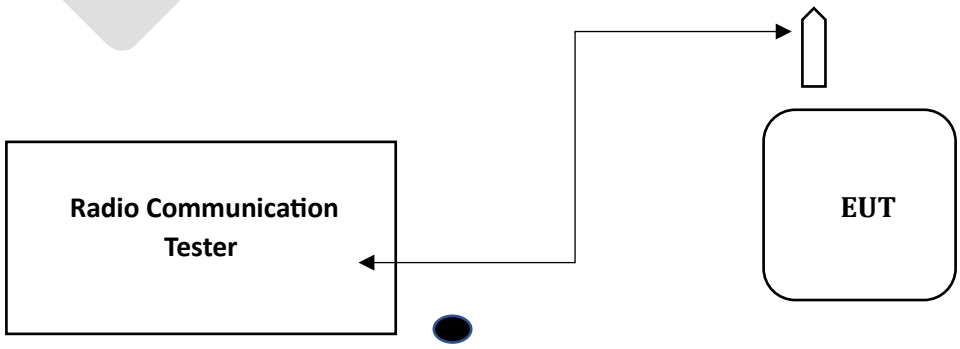
Test Procedure	
Expected Results	

Test No. as per GR	1.5.28 (iv)
Test Name	Test for Power Control Absolute Power Tolerance- NB-IoT
Standards Reference	3GPP TS 36.521-1 Clause 6.3.5F.1
Test Instruments Required	**Radio Communication Tester**, Spectrum Analyzer
Test Setup	
Test Limits	
Test Procedure	Connect the EUT signal generator Select the test parameter on the tester and run the test.
Expected Results	

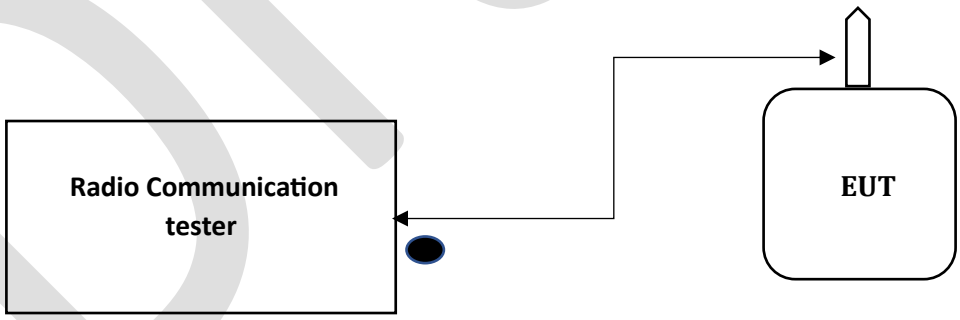
Test No. as per GR	1.5.28 (v)
Test Name	Test for Receiver Adjacent Channel Selectivity (ACS) -NB-IoT
Standards Reference	3GPP TS 36.521-1 Clause 7.5F
Test Instruments Required	**Radio Communication Tester**
Test Setup	
Test Limits	
Test Procedure	1. Connect the EUT's network antenna to the Radio Communication Tester. 2. Select the RAT (Radio Access technology) as NB-IOT. 3. Switch on the EUT and wait for the successful connection. Select the parameter in the Test Execution window and run the test. Take down the readings.
Expected Results	

Test No. as per GR	1.5.28 (vi)
Test Name	Test for Receiver In-band blocking-NB-IoT
Standards Reference	3GPP TS 36.521-1 Clause 7.6.1F
Test Instruments Required	Radio Communication Tester, Spectrum Analyzer

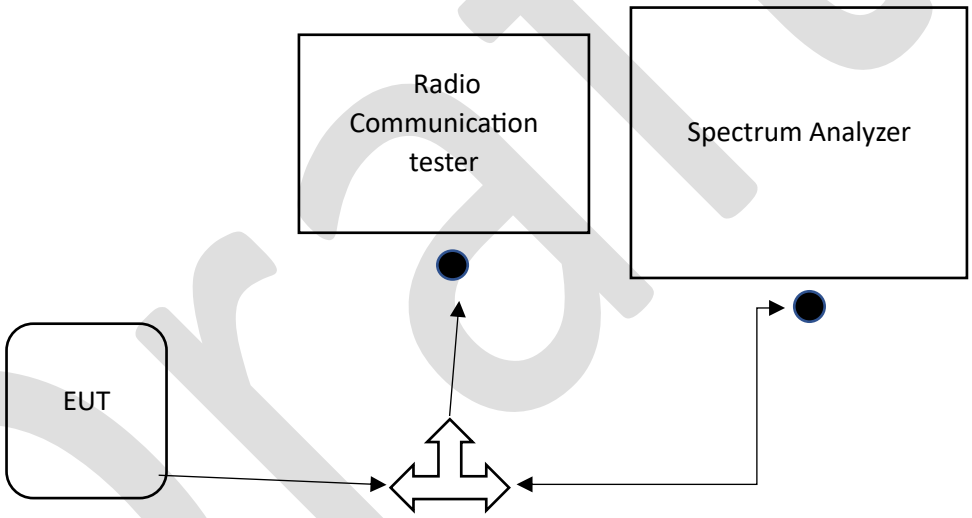
Test Setup	
Test Limits	
Test Procedure	Connect the EUT and external signal generator to the tester Select the interferer signal characteristics as per the standard and generate the signal from Anritsu. Select the test parameter on the tester and run the test.
Expected Results	

Test No. as per GR	1.5.28 (vii)
Test Name	Test for Receiver Reference Sensitivity level-NB-IoT
Standards Reference	3GPP TS 36.521-1 Clause 7.3F
Test Instruments Required	**Radio Communication Tester**
Test Setup	

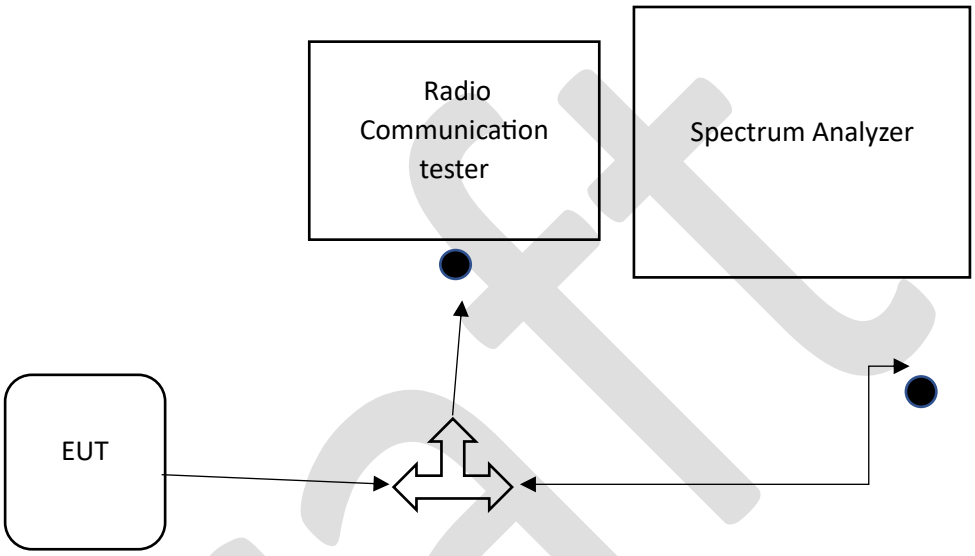
Test Limits	
Test Procedure	1. Connect the EUT's network antenna to the Radio Communication tester. 2. Select the RAT (Radio Access technology) as NB-IOT. 3. Switch on the EUT and wait for the successful connection. Select the parameter in the Test Execution window and run the test.Take down the readings.
Expected Results	

Test No. as per GR	1.5.28 (viii)
Test Name	Test for Receiver spurious emission-NB-IoT
Standards Reference	3GPP TS 36.521-1 Clause 7.9F
Test Instruments Required	Radio Communication tester, Spectrum Analyzer
Test Setup	Refer the same test setup as used for "Test for Spurious emissions-NB-IoT" 
Test Limits	
Test Procedure	Connect the EUT's network antenna to the spectrum analyzer. Select the frequency range and observe the spurious emission in that range.

Expected Results	

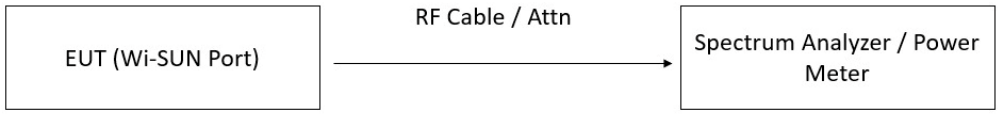
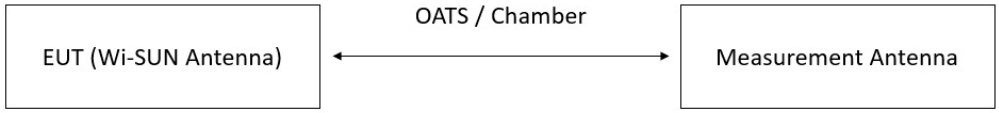
Test No. as per GR	1.5.28 (ix)
Test Name	Test for Spectrum emissions mask-NB-IoT
Standards Reference	3GPP TS 36.521-1 Clause 6.6.2.1F
Test Instruments Required	Radio Communication Tester, Spectrum Analyzer
Test Setup	
Test Limits	
Test Procedure	1. Connect the EUT's network antenna is directly connected to the 2. Select the RAT (Radio Access technology) as NB-IOT. 3. Switch on the EUT and wait for the successful connection. Select the parameter in the Test Execution window and run the test. Take down the readings.
Expected Results	

Test No. as per GR	1.5.28 (x)

Test Name	Test for Spurious emissions-NB-IoT
Standards Reference	3GPP TS 36.521-1 Clause 6.6.3F.1-6.6.3F.2
Test Instruments Required	Radio Communication tester, Spectrum Analyzer
Test Setup	
Test Limits	
Test Procedure	1. Select the operating band and channel bandwidth in the Signal station the 2. Switch on the EUT and make successful connection with SS. 3. Select the frequency range in the spectrum analyzer. Check the spurious emissions in the required frequency range.
Expected Results	

1.5.29 Interface 29: Wireless Smart Utility Network (Wi- SUN) Field Area Network (FAN)

Test No. as per GR	1.5.29 (i)
Test Name	i. Test for Basic RF Requirements for Wi-SUN ii. Test for ERP for Wi-SUN Interface iii. Test for Frequency of Operation for Wi-SUN Interface iv. Test for Maximum Transmit Power for Wi-SUN Interface
Standards Reference	i. Basic RF Requirements for Wi-SUN – As per ETSI EN 300 220-2 ii. ERP for Wi-SUN Interface – As per WPC GSR 853(E) iii. Frequency of Operation for Wi-SUN Interface – As per latest NFAP

	iv. Maximum Transmit Power for Wi-SUN Interface – As per WPC GSR 853(E)
Test Instruments Required	i. Spectrum Analyzer (sub-GHz capable) ii. RF Power Meter iii. RF Signal Generator (sub-GHz, optional) iv. RF Test Receiver (optional) v. Anechoic Chamber / Open Area Test Site (for ERP) vi. Calibrated Measurement Antenna (sub-GHz) vii. RF Cables, Attenuators viii. Control PC with test software
Test Setup	**Conducted Test Setup (RF Parameters, Frequency, Tx Power)**  **Radiated Test Setup (ERP)** 
Test Limits	i. For ERP Wi-SUN: As per WPC GSR 853 (E) ii. For Frequency of Operation for Wi-SUN Int: 865 MHz to 868 MHz (As per WPC GSR 853 (E) iii. For Maximum Transmit Power Wi-SUN: Devices falling under “Non Specific Short Range Devices” i.e. Table 1 of WPC GSR 853 (E): 25 mW Devices falling under “Tracking, Tracing and Data Acquisition Devices” i.e. Table 2 of WPC GSR 853 (E): 500 mW
Test Procedure	1. Configure the EUT for Wi-SUN FAN operation in the applicable sub-GHz band. 2. For conducted tests, connect the EUT RF port to the measurement equipment using calibrated RF cables. 3. Measure RF parameters (output power, occupied bandwidth, spurious emissions) as per ETSI EN 300 220-2. 4. Verify operating frequency against NFAP allocation. 5. For ERP measurement, place the EUT in an OATS or anechoic chamber and perform radiated measurement. 6. Record maximum transmit power and ERP values. 7. Repeat tests for all supported Wi-SUN channels and operating modes.
Expected Results	i. All basic RF parameters shall comply with ETSI EN 300 220-2. ii. Operating frequency shall conform to NFAP allocation. iii. Maximum transmit power and ERP shall comply with WPC GSR 853(E) limits. iv. The EUT shall be declared PASS if all measured values meet the specified requirements.

1.5.30 Interface 30: Geolocation Navigation Interface for IoT

Test No. as per GR	1.5.30 (i)
Test Name	Test for GNSS for IoT
Standards Reference	
Test Instruments Required	
Test Setup	
Test Limits	
Test Procedure	
Expected Results	

Test No. as per GR	1.5.30 (ii)
Test Name	Test for NavIC for IoT/ Support for geolocation through GPS/NaVIC
Standards Reference	
Test Instruments Required	
Test Setup	Powered on EUT (Equipment Under Test)
Test Limits	
Test Procedure	i. Power on the EUT. ii. If the EUT is SIM enabled, then deactivate the SIM. iii. Go to Settings through appropriate menu in the device to enable GPS/NaVIC functionality. iv. Expected Result Locate the settings to turn Location “ON”.

Expected Results	Verify that the device is able to display location using satellite based GPS/NaVIC, when SIM (if present) is deactivated.

1.6 Quality Requirements

Test No. as per GR	1.6.1
Test Name	The manufacturer shall have a valid ISO 9001:2015 or any other equivalent ISO certificate.
Test Type/No.	Declaration from the applicant /manufacturer is to be taken.

Test No. as per GR	1.6.2
Test Name	The equipment shall meet the environmental requirements as per 'Category B-2' (in case of Indoor equipment) and 'Category D' (in case of Outdoor equipment) of QM-333 (latest version) Standard for Environmental Testing of Telecommunication Equipment.
Test Type/No.	Report from TEC Designated test lab to be submitted. CGN system shall be complaint to QM 333 class B category requirements. All modules in CGN shall compliance to QM333 class B category.

Test No. as per GR	1.6.3
Test Name	The MTBF (Mean Time between Failure) and MTTR (Mean Time To Repair) predicted shall be provided and the manufacturer shall furnish observed values.
Test Type/No.	Details about MTBF to be provided by applicant/manufacturer. Declaration from the applicant /manufacturer may also be taken.

1.7 EMI/EMC Requirements

Test No. as per GR	1.7.1 to 1.7.8
Test Name	The equipment shall conform to TEC EMI/EMC Standard No. TEC 11016:2016 1.7.1 Conducted and radiated emission (applicable to telecom equipment) 1.7.2 Immunity to Electrostatic discharge 1.7.3 Immunity to radiated RF 1.7.4 Immunity to fast transients (burst) 1.7.5 Immunity to surges 1.7.6 Immunity to conducted disturbance induced by Radio frequency fields 1.7.7 Immunity to voltage dips & short interruptions (AC Power Ports) 1.7.8 Immunity to voltage dips & short interruptions (DC power ports)
Test Type/No.	Report from Accredited test lab to be submitted. All Modules of CGN system shall comply to EMI/EMC Requirements.

1.8 SAFETY REQUIREMENTS

Test No. as per GR	1.8

Test Name	The equipment shall conform to: • IS 13252 part 1: 2010 (Amd 2013 & Amd 2015) "Information Technology Equipment – Safety – Part 1: General Requirements" or equivalent. • IEC Standard –IEC 60950- 1:2005+A1:2009+A2:2013 "Information Technology Equipment – Safety- Part 1: General Requirements. Additional Requirement: • For Outdoor Nodes- • IEC 60950-22 OR • IEC 62368-1:2018 or latest version Additional Requirement: • For Outdoor Nodes- IEC 60950-22, if the Indoor testing has been done as per IEC 62368-1 Edition 2. OR • For Outdoor Nodes- Annexure Y of IEC 62368-1 Edition 3
Test Type/No.	Report from Accredited test lab to be submitted.

1.9 Security Requirements

Security requirements as per the Indian Telecommunication Security Assurance Requirement (ITSAR) of IoT Gateway, as and when notified.

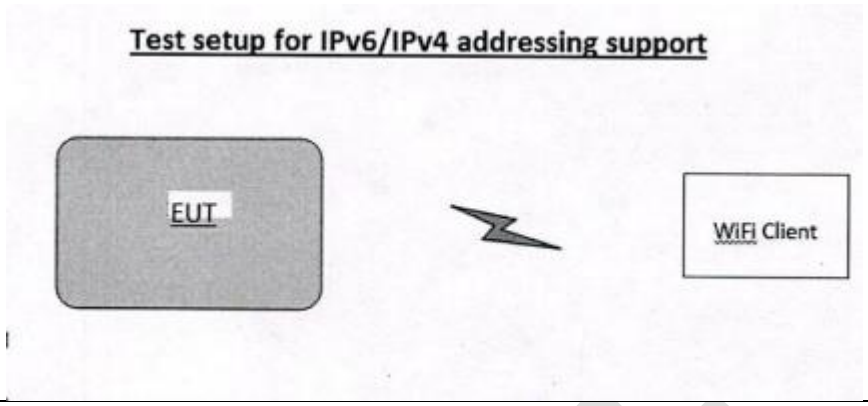
1.10 Other Requirements

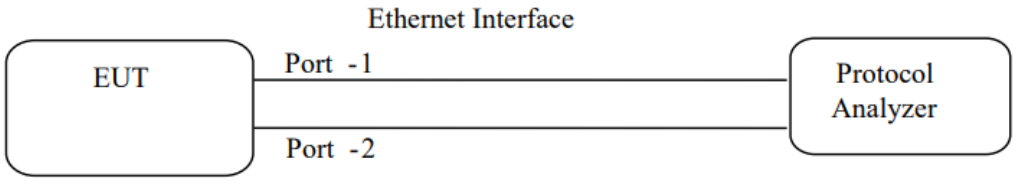
1.10.3 IoT Dev - Non-0 IMEI or MEID or Unique MAC

Test No. as per GR	1.10.3
Test Name	IoT Dev - Non-0 IMEI or MEID or Unique MAC
Reference Standard	As per GSMA official document IMEI Allocation & Approval Process (for IMEI / MEID)
Test Procedure	Device manufacturer shall mention the suitable procedure for testing IMEI/ MEID/ MAC address/ any other unique ID by connecting device to smart phone/ tablet/ PC and without using any specialized test equipment.

1.10.4 Dual IP Parameters

Test No. as per GR	1.10.4, 1.10.5 and 1.10.6
Test Name	Dual IP Parameters, IPv4 Parameters and IPv6 Parameters
Standards Reference	RFC 4213 RFC 791 RFC 2460/8200
Test Instruments Required	1. Equipment under test 2. Laptop with open source tools like Insider etc. OR Licensed tools like LANforge etc. 3. Managed Ethernet switch. 4. Connecting cables.

Test Setup	
Test Limits	NA
Test Procedure	1. Configure EUT with IPv4 and IPv6 addresses 2. Configure a licensed equipment/laptop to have IPv4 and IPv6 3. Ping both IPv4 and IPv6 address between the EUT and the equipment/laptop 4. Verify that the ping is successful for both IPv4 and IPv6
Expected Results	Ping operation should be successful between the EUT and the client.

Test No. as per GR	1.10.4, 1.10.5 and 1.10.6
Test Name	Test for Various Protocols
Standards Reference	
Test Instruments Required	1. IP Protocol Analyser
Test Setup	
Test Limits	
Test Procedure	1. Connect the test setup as shown in figure 2. The EUT shall be configured through the CLI [Command Line Interface] or SNMP interface for the various tests like IPv4, IPv6, TCP, Static Routing, Dynamic Routing, BGP, PPP etc. 3. Various test parameters shall be measured using this setup 4. The test results may be recorded.
Expected Results	Enclose the Test Results

	Note: 1. The test procedure for those RFC's which are forming part of the "compendium of test setup and test procedures for testing of RFC's of IETF" shall be performed as per the same. This test setup (at test no 16) is generic in nature and shall apply in case of RFC's which are not covered in the above referred compendium. 2. TEC New Delhi NGN Lab has this test facility. 3. Where ever conformance tests are not available, functional tests shall be carried out. Moreover, wherever the specification requirement is to meet a specific functionality of the RFC, the clause of the RFC refereeing to the function shall be tested as per the functional test procedure. The functional test model available in the "compendium of test setup and test procedures for testing of RFC's of IETF" can be followed for those RFC's which are not covered in the compendium and where functional tests are carried out. 4. The protocol analyser shall be able to send various test packets to the EUT, check the response packet and check the conformance/functionality. Software tools like wireshark has got only the capability to analyse the received packets and do not have the capability to send test packets and measure the response. Hence the tools like wireshark cannot be used for this test. 5. In case the product is offered (with the same product version) is 'IPv6 Readylogo Certified', then the tests against RFC 4862, RFC 4443, RFC 4291, RFC 2460, RFC 4861, RFC 1981 and RFC 5095 (where ever referred in the Test Schedule) which are covered as part of the 'IPv6 Readylogo certification' shall not be carried out. I.e. in this case, the product version of the 'IPv6 Readylogo certificate' and the offered product shall be the same. Later versions than the certified versions will not come under the purview of this condition.

I. SUMMARY OF TEST RESULTS:

TEC Standard No.: TEC 33010:2025

TEC Test Guide No.: TEC 33011:2026

Equipment name & Model No.: _____

Clause No.	Compliance (Complied/Not Complied/ Submitted/Not Submitted/Not Applicable)	Remarks / Test Report Annexure No.

Date:

Place:

Signature & Name of TEC testing Officer /

*** Signature of Applicant / Authorized Signatory**

**** Section I. as given above is also to be submitted by the Applicant/ Authorized signatory as part of in-house test results along with Form-A. The Authorized signatory shall be the same as the one for Form 'A'.***