TEST REPORT

Application No.:	FYCR2206000211CR
Applicant:	Quectel Wireless Solutions Co., Ltd.
Address of Applicant:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Manufacturer:	Quectel Wireless Solutions Co., Ltd.
Address of Manufacturer:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Equipment Under Test (EUT):	
EUT Name:	5G Sub-6 GHz M.2 Module
Model No.:	Quectel
Trade mark:	RM520N-GL
FCC ID:	XMR2022RM520NGL
Standards:	47 CFR Part 96E
Date of Receipt:	2022-05-15
Date of Test:	2022-05-22 to 2022-07-22
Date of Issue:	2022-07-24
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Kidd Yang
EMC Laboratory Manager

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		*2022-07-24*		*Original*

Authorized for issue by:				
		Tree Zhan **Tree Zhan/Project Engineer**		
		Winkey Wang **Winkey Wang/Reviewer**		

1 Test Summary

Test Item	FCC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §96.41	EIRP≤ 47dBm/10MHz PSD≤ 37dBm/MHz (B48 & N48)	PASS
Peak-Average Ratio	§96.41	≤13dB	PASS
Modulation Characteristics	§2.1047	Digital modulation	PASS
Bandwidth	§96.41	OBW: No limit EBW: No limit	PASS
Band Edge Compliance	§2.1051, §96.41	0-10 MHz: -13 dBm; 10-operating band edge MHz: -25 dBm; other: -40 dBm	PASS
Spurious emissions at antenna terminals	§2.1051, §96.41	≤ -40dBm (B48 & N48)	PASS
Field strength of spurious radiation	§2.1051, §96.41	≤ -40dBm (B48 & N48)	PASS
Frequency stability	§2.1055,	Fundamental emission stays within authorized frequency block	PASS

2 Contents

3 General Information

3.1 Details of E.U.T.

Power supply:	DC3.7V
LTE:	
Frequency Range:	3550MHz to 370MHz
Modulation Type:	UL: QPSK, 16QAM, 64QAM, 256QAM
LTE Operation Frequency Band:	48
Sample Type:	Mobile production
Antenna Type:	Monopole
Antenna Gain:	-6.1dBi
5G NR:	
Frequency Range:	3550MHz to 370MHz
Modulation Type:	UL: Pi/2-BPSK, DFT-QPSK, 16QAM, 64QAM, 256QAM, CP-QPSK, 16QAM, 64QAM, 256QAM
5G NR Operation Frequency Band:	48
Sample Type:	Mobile production
Antenna Type:	Monopole
Antenna Gain:	-6.1dBi

CA:

UL CA_48C;

ENDC:

DC_48A_n25A;DC_48A_n71A;DC_48A_n5A

DC_48A_n66A;DC_2A_n48A;DC_5A_n48A

DC_13A_n48A;DC_66A_n48A;DC_48A_n12A;

NR UL CA:n48A-n66A;n2A-n48A;n5A-n48A;n48A-n70A

n48A-n71A;n25A-n48A;

ENDC& NRCA Only test RSE, report only show worst mode

3.2 Description of Support Units

The EUT has been tested as an independent unit.

3.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conducted Emission at mains port using AMN	2.4dB (9kHz to 150kHz)
		2.2dB (150kHz to 30MHz)
2	Radio Frequency	8.4×10^{-8}
3	Timeout	2s
4	Occupied Bandwidth	3%
5	RF power density	2.9dB
6	RF Radiated power	4.2dB (Below 1GHz)
		4.1dB (Above 1GHz)
7	Radiated Spurious emission test	4.2dB (Below 30MHz)
		4.6dB (30MHz-1GHz)
		4.8dB (1GHz-18GHz)
		5.5dB (Above 18GHz)
8	Temperature test	1°C
9	Humidity test	3%
10	Supply voltages	1.5%
11	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.4 Test Location

All tests were performed at:
Compliance Certification Services（Kunshan）Inc. Shenzhen branch.
Fuyong lab. Xinlong TechnoPark,Fengtang Road, Fuyong Subdistrict, Bao'an, Shenzhen, China
Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

Compliance Certification Services (Kunshan) Inc.

Shenzhen Branch

3.5 Deviation from Standards

None

3.6 Abnormalities from Standard Conditions

None

4 Equipment List

RF conducted test					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date**	**Cal. Due date**
Programmable DC Source	Chroma	62024P-80-60	SEM011-09	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Measurement Software	TST	TST PASS V2.0	N/A	N/A	N/A
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2022/03/29	2023/03/28
Radio Communication Test Station	Anritsu	MT8000A	SEM010-03	2022/03/25	2023/03/24
Power Sensor	KEYSIGHT	U2021XA	SEM009-15	2021/07/13	2022/07/12
				2022/07/12	2023/07/11

RE in Chamber					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date**	**Cal. Due date**
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	SEM003-33	2021/9/25	2024/9/24
MXE EMI receiver	Agilent	N9038A	SEM004-05	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Pre-amplifier	HP	8447D	SEM005-02	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Spectrum Analyzer	Rohde & Schwarz	101288	SEM004-08	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Low Noise Amplifier	CLAVIIO	BDLNA-0118-352810	SEM005-05	2021/07/13	2022/07/12
				2022/07/12	2023/07/11

Substitution Antenna	Schwarzbeck	VULB9168	SEM003-18	2019/08/08	2022/08/07
Signal Generator(9kHz-40GHz)	N5173B	MY53270267	Agilent	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Pre-amplifier	HP	8447D	SEM005-02	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2021/7/11	2024/7/10
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	SEM003-32	2021/9/26	2024/9/25
Double-ridged waveguide horn	ETS-LINDGREN	3117	SEM003-34	2021/9/25	2024/9/24
Spectrum Analyzer	Rohde & Schwarz	101288	SEM004-08	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Low Noise Amplifier	CLAVIIO	BDLNA-0118-352810	SEM005-05	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Pre-amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Pre-amplifier	Rohde & Schwarz	CH14-H052	SEM005-17	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Substitution Antenna	ETS-Lindgren	3142C	SEM003-01	2020/06/26	2023/06/25
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2022/03/29	2023/03/28
Radio Communication Test Station	Anritsu	MT8000A	SEM010-03	2022/03/25	2023/03/24

General used equipment					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Mingle	TH607	SEM002-22	2021/07/13	2022/07/12
				2022/07/12	2023/07/11
Humidity/ Temperature	Mingle	TH607	SEM002-23	2021/07/13	2022/07/12

Indicator				2022/07/12	2023/07/11
Barometer	DUMAI	DYM3	SEM002-24	2021/07/13	2022/07/12
				2022/07/12	2023/07/11

5 Radio Spectrum Matter Test Results

5.1 Effective (Isotropic) Radiated Power Output Data

Test Requirement: §2.1046, §96.41

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: EIRP≤ 47dBm/10MHz, PSD≤ 37dBm/MHz (B48 & N48)

5.1.1 E.U.T. Operation

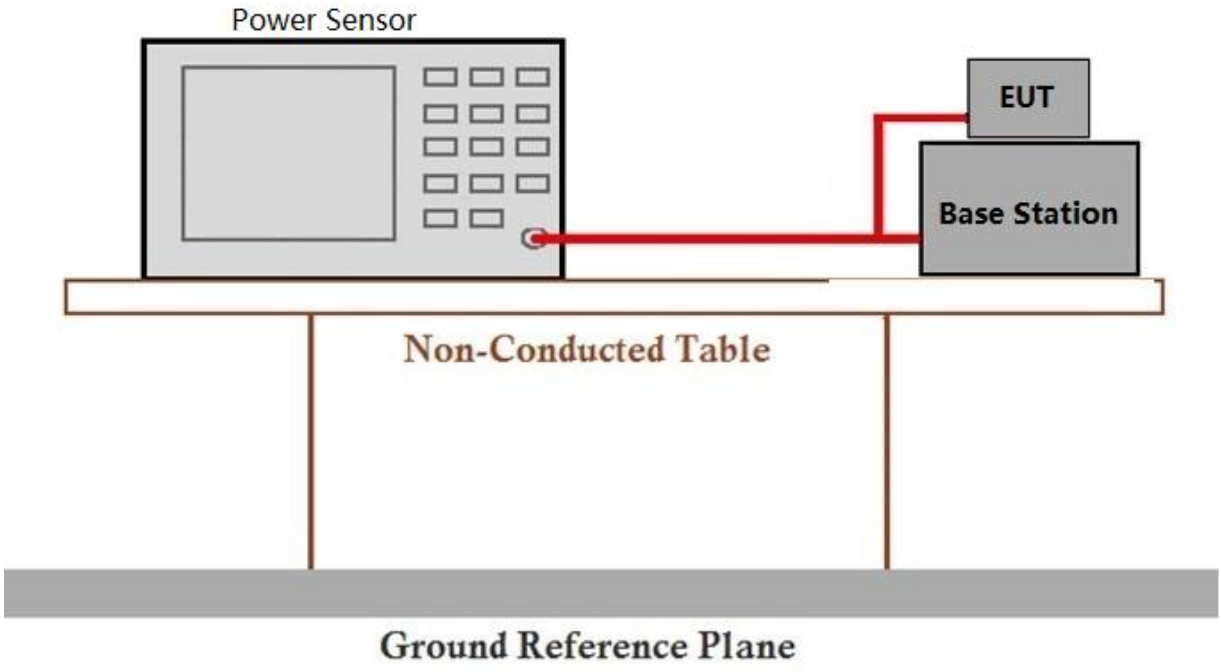
Operating Environment:

Temperature: 23.7 °C Humidity: 56.9 % RH Atmospheric Pressure: 1010 mbar

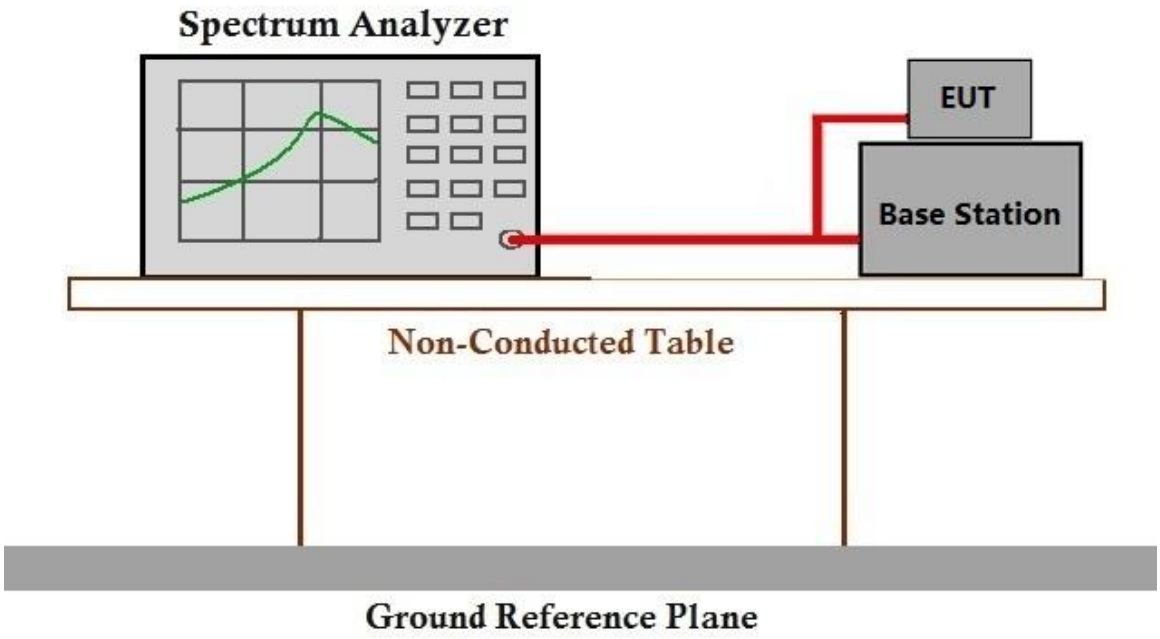
Test mode: 00: Tx mode: Keep the EUT in transmitting mode in LTE mode

01: Tx mode: Keep the EUT in transmitting mode in 5G NR mode

5.1.2 Test Setup Diagram



Test setup for Power measurement



Test setup for PSD measurement

5.1.3 Measurement Data

Please refer to Appendix A-Output power

5.2 Peak-Average Ratio

Test Requirement: §96.41

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: ≤13dB

5.2.1 E.U.T. Operation

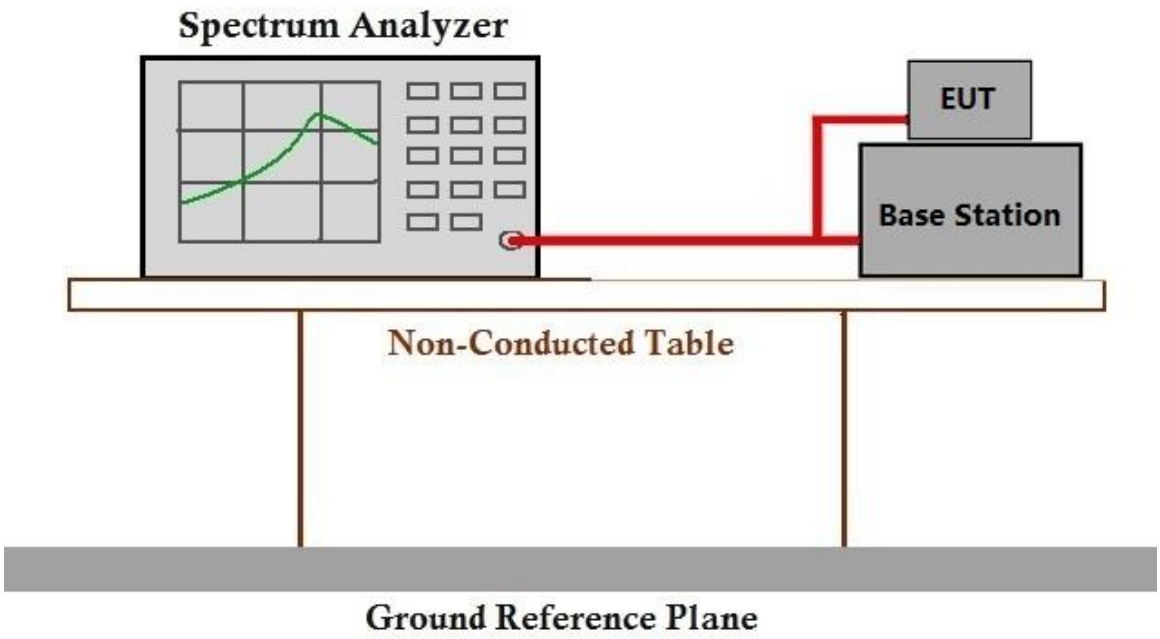
Operating Environment:

Temperature: 23.7 °C Humidity: 56.9 % RH Atmospheric Pressure: 1010 mbar

Test mode: 00: Tx mode: Keep the EUT in transmitting mode in LTE mode

01: Tx mode: Keep the EUT in transmitting mode in 5G NR mode

5.2.2 Test Setup Diagram



5.2.3 Measurement Data

Please refer to Appendix B- Peak-Average Ratio

5.3 Bandwidth

Test Requirement: §2.1049(h)

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: OBW: No limit

EBW: No limit

5.3.1 E.U.T. Operation

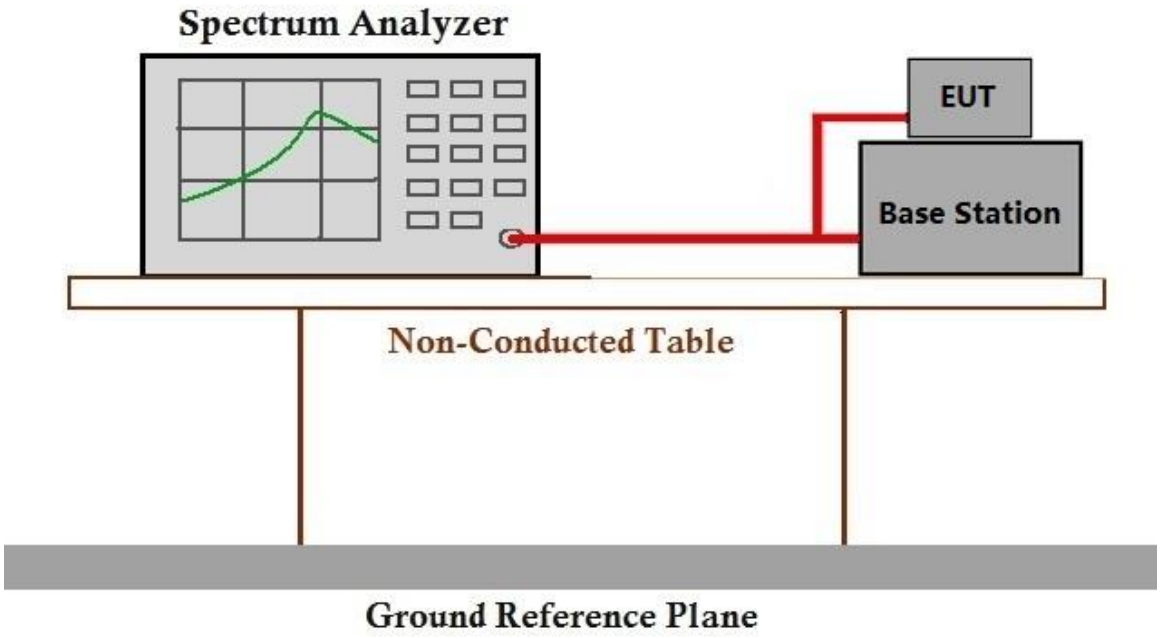
Operating Environment:

Temperature: 23.7 °C Humidity: 56.9 % RH Atmospheric Pressure: 1010 mbar

Test mode: 00: Tx mode: Keep the EUT in transmitting mode in LTE mode

01: Tx mode: Keep the EUT in transmitting mode in 5G NR mode

5.3.2 Test Setup Diagram



5.3.3 Measurement Data

Please refer to Appendix C- Bandwidth

5.4 Band Edge Compliance

Test Requirement: §2.1051, §96.41

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed −13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed −25 dBm/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

5.4.1 E.U.T. Operation

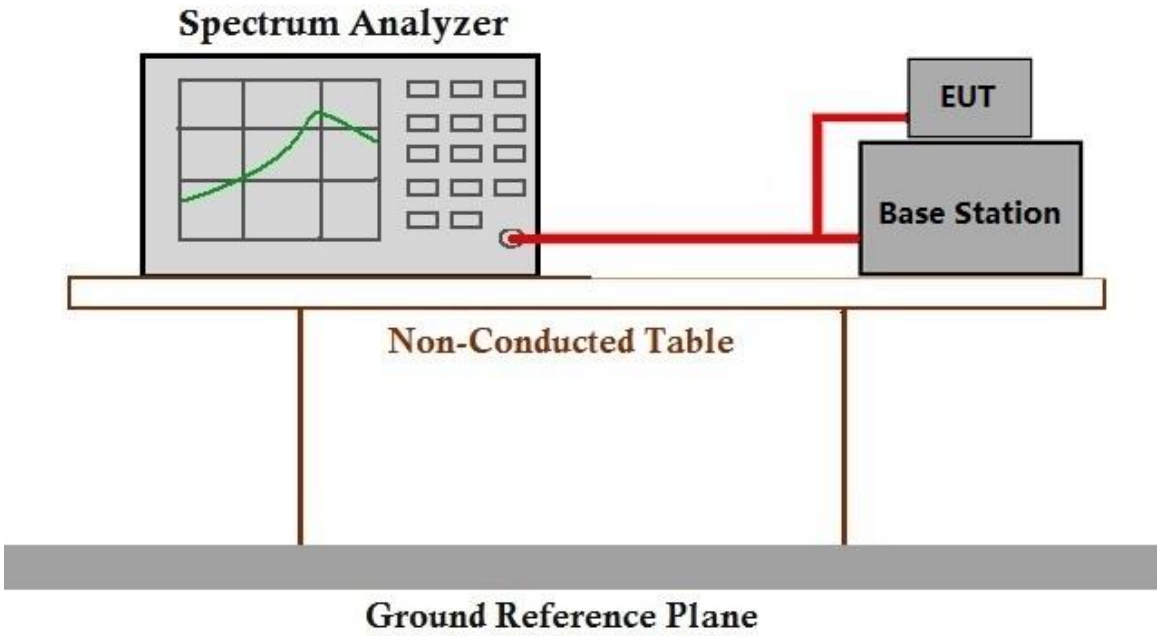
Operating Environment:

Temperature: 23.7 °C Humidity: 56.9 % RH Atmospheric Pressure: 1010 mbar

Test mode: 00: Tx mode: Keep the EUT in transmitting mode in LTE mode

01: Tx mode: Keep the EUT in transmitting mode in 5G NR mode

5.4.2 Test Setup Diagram



5.4.3 Measurement Data

Please refer to Appendix D-Spurious emissions at antenna terminals

5.5 Spurious emissions at antenna terminals

Test Requirement: §2.1051, §96.41

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed −13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed −25 dBm/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

5.5.1 E.U.T. Operation

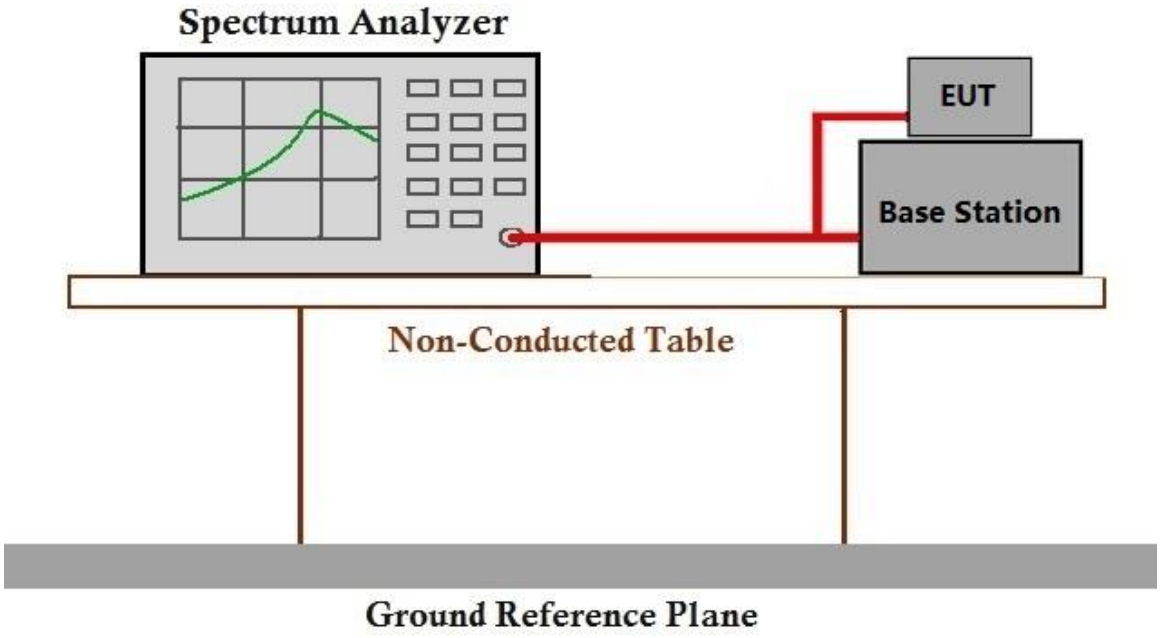
Operating Environment:

Temperature: 23.7 °C Humidity: 56.9 % RH Atmospheric Pressure: 1010 mbar

Test mode: 00: Tx mode: Keep the EUT in transmitting mode in LTE mode

01: Tx mode: Keep the EUT in transmitting mode in 5G NR mode

5.5.2 Test Setup Diagram



5.5.3 Measurement Data

Please refer to Appendix D- Spurious emissions at antenna terminals

5.6 Field strength of spurious radiation

Test Requirement: §2.1051, §96.41

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed −13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed −25 dBm/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

5.6.1 E.U.T. Operation

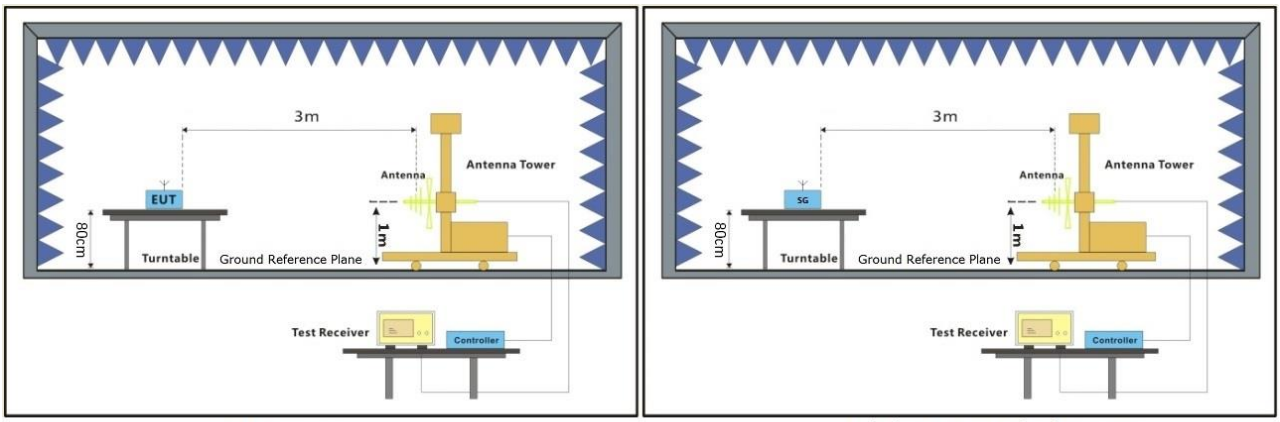
Operating Environment:

Temperature: 23.2 °C Humidity: 56.3 % RH Atmospheric Pressure: 1010 mbar

Test mode: 00: Tx mode: Keep the EUT in transmitting mode in LTE mode

01: Tx mode: Keep the EUT in transmitting mode in 5G NR mode

5.6.2 Test Setup Diagram



EUT

Substiute Antenna+Signal Generator

5.6.3 Measurement Procedure and Data

Test Procedure:

(1)On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
(2)The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
(3)The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
(4)The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
(5)The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
(6)The transmitter shall than be rotated through 360°in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
(7)The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
(8)The maximum signal level detected by the measuring receiver shall be noted.
(9)The measurement shall be repeated with the test antenna set to horizontal polarization.
(10) Replace the antenna with a proper Antenna (substitution antenna).
(11)The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
(12)The substitution antenna shall be connected to a calibrated signal generator.
(13)If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
(14)The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
(15)The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
(16)The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
(17)The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

LTE Band 48

TDD LTE Band 48, Modulation: QPSK, Bandwidth: 5MHz, 1 RB

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7100.5	-51.93	-40	-11.93	-55.47	8.19	11.73	Horizontal	Pass
10650.75	-47.54	-40	-7.54	-49.96	11.06	13.48	Horizontal	Pass
14201	-46.25	-40	-6.25	-49.26	11.48	14.49	Horizontal	Pass
7100.5	-51.02	-40	-11.02	-54.56	8.19	11.73	Vertical	Pass
10650.75	-48.95	-40	-8.95	-51.37	11.06	13.48	Vertical	Pass
14201	-46.49	-40	-6.49	-49.5	11.48	14.49	Vertical	Pass

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7245.5	-50.51	-40	-10.51	-54.05	8.19	11.73	Horizontal	Pass
10868.25	-47.92	-40	-7.92	-50.34	11.06	13.48	Horizontal	Pass
14491	-43.92	-40	-3.92	-46.93	11.48	14.49	Horizontal	Pass
7245.5	-52.42	-40	-12.42	-55.96	8.19	11.73	Vertical	Pass
10868.25	-47.02	-40	-7.02	-49.44	11.06	13.48	Vertical	Pass
14491	-45.22	-40	-5.22	-48.23	11.48	14.49	Vertical	Pass

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7390.5	-51.88	-40	-11.88	-55.42	8.19	11.73	Horizontal	Pass
11085.75	-46.4	-40	-6.4	-48.69	11.36	13.65	Horizontal	Pass
14781	-44.13	-40	-4.13	-47.03	11.4	14.3	Horizontal	Pass
7390.5	-51.8	-40	-11.8	-55.34	8.19	11.73	Vertical	Pass
11085.75	-46.98	-40	-6.98	-49.27	11.36	13.65	Vertical	Pass
14781	-43.58	-40	-3.58	-46.48	11.4	14.3	Vertical	Pass

TDD LTE Band 48, Modulation: QPSK, Bandwidth: 10MHz, 1 RB

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7101	-52.47	-40	-12.47	-56.01	8.19	11.73	Horizontal	Pass
10651.5	-47.79	-40	-7.79	-50.21	11.06	13.48	Horizontal	Pass
14202	-46.29	-40	-6.29	-49.3	11.48	14.49	Horizontal	Pass
7101	-52.21	-40	-12.21	-55.75	8.19	11.73	Vertical	Pass
10651.5	-48.28	-40	-8.28	-50.7	11.06	13.48	Vertical	Pass
14202	-46.08	-40	-6.08	-49.09	11.48	14.49	Vertical	Pass
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7241	-52.17	-40	-12.17	-55.71	8.19	11.73	Horizontal	Pass
10861.5	-47.27	-40	-7.27	-49.69	11.06	13.48	Horizontal	Pass
14482	-44.03	-40	-4.03	-47.04	11.48	14.49	Horizontal	Pass
7241	-52.99	-40	-12.99	-56.53	8.19	11.73	Vertical	Pass
10861.5	-47.31	-40	-7.31	-49.73	11.06	13.48	Vertical	Pass
14482	-45.04	-40	-5.04	-48.05	11.48	14.49	Vertical	Pass
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7381	-51.47	-40	-11.47	-55.01	8.19	11.73	Horizontal	Pass
11071.5	-47.42	-40	-7.42	-49.71	11.36	13.65	Horizontal	Pass
14762	-43.68	-40	-3.68	-46.58	11.4	14.3	Horizontal	Pass
7381	-51.59	-40	-11.59	-55.13	8.19	11.73	Vertical	Pass
11071.5	-46.98	-40	-6.98	-49.27	11.36	13.65	Vertical	Pass
14762	-43.94	-40	-3.94	-46.84	11.4	14.3	Vertical	Pass

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TDD LTE Band 48, Modulation: QPSK, Bandwidth: 15MHz, 1 RB

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7101.5	-51.97	-40	-11.97	-55.51	8.19	11.73	Horizontal	Pass
10652.25	-48.81	-40	-8.81	-51.23	11.06	13.48	Horizontal	Pass
14203	-45.53	-40	-5.53	-48.54	11.48	14.49	Horizontal	Pass
7101.5	-52.35	-40	-12.35	-55.89	8.19	11.73	Vertical	Pass
10652.25	-48.9	-40	-8.9	-51.32	11.06	13.48	Vertical	Pass
14203	-46.03	-40	-6.03	-49.04	11.48	14.49	Vertical	Pass

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7236.5	-52.7	-40	-12.7	-56.24	8.19	11.73	Horizontal	Pass
10854.75	-48.05	-40	-8.05	-50.47	11.06	13.48	Horizontal	Pass
14473	-44.37	-40	-4.37	-47.38	11.48	14.49	Horizontal	Pass
7236.5	-52.25	-40	-12.25	-55.79	8.19	11.73	Vertical	Pass
10854.75	-47.57	-40	-7.57	-49.99	11.06	13.48	Vertical	Pass
14473	-44.22	-40	-4.22	-47.23	11.48	14.49	Vertical	Pass

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7371.5	-51.43	-40	-11.43	-54.97	8.19	11.73	Horizontal	Pass
11057.25	-47.12	-40	-7.12	-49.41	11.36	13.65	Horizontal	Pass
14743	-43.11	-40	-3.11	-46.01	11.4	14.3	Horizontal	Pass
7371.5	-51.97	-40	-11.97	-55.51	8.19	11.73	Vertical	Pass
11057.25	-47.27	-40	-7.27	-49.56	11.36	13.65	Vertical	Pass
14743	-44.01	-40	-4.01	-46.91	11.4	14.3	Vertical	Pass

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中国·深圳·宝安区福永街道凤塘大道鑫龙科技园福永实验室 邮编: 518103 t (86–755) 88663988 f (86–755) 26710594 sgs.china@sgs.com

TDD LTE Band 48, Modulation: QPSK, Bandwidth: 20MHz, 1 RB

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7102	-51.67	-40	-11.67	-55.21	8.19	11.73	Horizontal	Pass
10653	-49.25	-40	-9.25	-51.67	11.06	13.48	Horizontal	Pass
14204	-45.47	-40	-5.47	-48.48	11.48	14.49	Horizontal	Pass
7102	-51.56	-40	-11.56	-55.1	8.19	11.73	Vertical	Pass
10653	-48.09	-40	-8.09	-50.51	11.06	13.48	Vertical	Pass
14204	-46.24	-40	-6.24	-49.25	11.48	14.49	Vertical	Pass

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7232	-52.29	-40	-12.29	-55.83	8.19	11.73	Horizontal	Pass
10848	-48.27	-40	-8.27	-50.69	11.06	13.48	Horizontal	Pass
14464	-44.02	-40	-4.02	-47.03	11.48	14.49	Horizontal	Pass
7232	-51.97	-40	-11.97	-55.51	8.19	11.73	Vertical	Pass
10848	-47.38	-40	-7.38	-49.8	11.06	13.48	Vertical	Pass
14464	-45.13	-40	-5.13	-48.14	11.48	14.49	Vertical	Pass

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7362	-51.58	-40	-11.58	-55.12	8.19	11.73	Horizontal	Pass
11043	-47.7	-40	-7.7	-49.99	11.36	13.65	Horizontal	Pass
14724	-44.31	-40	-4.31	-47.21	11.4	14.3	Horizontal	Pass
7362	-51.2	-40	-11.2	-54.74	8.19	11.73	Vertical	Pass
11043	-47.1	-40	-7.1	-49.39	11.36	13.65	Vertical	Pass
14724	-43.99	-40	-3.99	-46.89	11.4	14.3	Vertical	Pass

Note: All modes have been tested and we found QPSK test mode has the worst test result. Only record the worst test result.

5G NR N48, Modulation: QPSK, Bandwidth: 10MHz

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7101	-53.06	-40	-13.06	-56.6	8.19	11.73	Horizontal	Pass
10651.5	-48.48	-40	-8.48	-50.9	11.06	13.48	Horizontal	Pass
14202	-46.89	-40	-6.89	-49.9	11.48	14.49	Horizontal	Pass
7101	-52.59	-40	-12.59	-56.13	8.19	11.73	Vertical	Pass
10651.5	-48.8	-40	-8.8	-51.22	11.06	13.48	Vertical	Pass
14202	-46.59	-40	-6.59	-49.6	11.48	14.49	Vertical	Pass
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7241	-52.71	-40	-12.71	-56.25	8.19	11.73	Horizontal	Pass
10861.5	-47.45	-40	-7.45	-49.87	11.06	13.48	Horizontal	Pass
14482	-44.59	-40	-4.59	-47.6	11.48	14.49	Horizontal	Pass
7241	-52.69	-40	-12.69	-56.23	8.19	11.73	Vertical	Pass
10861.5	-47.6	-40	-7.6	-50.02	11.06	13.48	Vertical	Pass
14482	-44.88	-40	-4.88	-47.89	11.48	14.49	Vertical	Pass
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7381	-51.99	-40	-11.99	-55.53	8.19	11.73	Horizontal	Pass
11071.5	-47.7	-40	-7.7	-49.99	11.36	13.65	Horizontal	Pass
14762	-44.08	-40	-4.08	-46.98	11.4	14.3	Horizontal	Pass
7381	-51.89	-40	-11.89	-55.43	8.19	11.73	Vertical	Pass
11071.5	-47.48	-40	-7.48	-49.77	11.36	13.65	Vertical	Pass
14762	-44.06	-40	-4.06	-46.96	11.4	14.3	Vertical	Pass

5G NR N48, Modulation: QPSK, Bandwidth: 20MHz

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7102	-51.84	-40	-11.84	-55.38	8.19	11.73	Horizontal	Pass
10653	-49.82	-40	-9.82	-52.24	11.06	13.48	Horizontal	Pass
14204	-45.85	-40	-5.85	-48.86	11.48	14.49	Horizontal	Pass
7102	-51.78	-40	-11.78	-55.32	8.19	11.73	Vertical	Pass
10653	-48.31	-40	-8.31	-50.73	11.06	13.48	Vertical	Pass
14204	-46.36	-40	-6.36	-49.37	11.48	14.49	Vertical	Pass
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7232	-52.64	-40	-12.64	-56.18	8.19	11.73	Horizontal	Pass
10848	-48.44	-40	-8.44	-50.86	11.06	13.48	Horizontal	Pass
14464	-44.33	-40	-4.33	-47.34	11.48	14.49	Horizontal	Pass
7232	-52.57	-40	-12.57	-56.11	8.19	11.73	Vertical	Pass
10848	-48.3	-40	-8.3	-50.72	11.06	13.48	Vertical	Pass
14464	-45.33	-40	-5.33	-48.34	11.48	14.49	Vertical	Pass
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7362	-52.01	-40	-12.01	-55.55	8.19	11.73	Horizontal	Pass
11043	-47.93	-40	-7.93	-50.22	11.36	13.65	Horizontal	Pass
14724	-44.43	-40	-4.43	-47.33	11.4	14.3	Horizontal	Pass
7362	-51.56	-40	-11.56	-55.1	8.19	11.73	Vertical	Pass
11043	-47.27	-40	-7.27	-49.56	11.36	13.65	Vertical	Pass
14724	-44.16	-40	-4.16	-47.06	11.4	14.3	Vertical	Pass

5G NR N48, Modulation: QPSK, Bandwidth: 40MHz

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7103	-51.93	-40	-11.93	-55.47	8.19	11.73	Horizontal	Pass
10654.5	-49.78	-40	-9.78	-52.2	11.06	13.48	Horizontal	Pass
14206	-45.96	-40	-5.96	-48.97	11.48	14.49	Horizontal	Pass
7103	-52.28	-40	-12.28	-55.82	8.19	11.73	Vertical	Pass
10654.5	-49.46	-40	-9.46	-51.88	11.06	13.48	Vertical	Pass
14206	-45.78	-40	-5.78	-48.79	11.48	14.49	Vertical	Pass
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7214	-52.53	-40	-12.53	-56.07	8.19	11.73	Horizontal	Pass
10821	-48.62	-40	-8.62	-51.04	11.06	13.48	Horizontal	Pass
14428	-44.54	-40	-4.54	-47.55	11.48	14.49	Horizontal	Pass
7214	-52.43	-40	-12.43	-55.97	8.19	11.73	Vertical	Pass
10821	-47.86	-40	-7.86	-50.28	11.06	13.48	Vertical	Pass
14428	-44.5	-40	-4.5	-47.51	11.48	14.49	Vertical	Pass
Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7324	-51.56	-40	-11.56	-55.1	8.19	11.73	Horizontal	Pass
10986	-47.69	-40	-7.69	-50.11	11.06	13.48	Horizontal	Pass
14648	-43.33	-40	-3.33	-46.23	11.4	14.3	Horizontal	Pass
7324	-52.38	-40	-12.38	-55.92	8.19	11.73	Vertical	Pass
10986	-47.39	-40	-7.39	-49.81	11.06	13.48	Vertical	Pass
14648	-44.39	-40	-4.39	-47.29	11.4	14.3	Vertical	Pass

Note: All modes have been tested and we found QPSK test mode has the worst test result. Only record the worst test result.

5G NR n48A-n66A, Modulation: QPSK, Bandwidth: 15MHz

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7371.5	-51.71	-40	-11.71	-54.97	8.19	11.73	Horizontal	Pass
11057.25	-47.20	-40	-7.20	-49.41	11.36	13.65	Horizontal	Pass
14743	-43.31	-40	-3.31	-46.01	11.4	14.3	Horizontal	Pass
7371.5	-51.94	-40	-11.94	-55.51	8.19	11.73	Vertical	Pass
11057.25	-47.69	-40	-7.69	-49.56	11.36	13.65	Vertical	Pass
14743	-44.35	-40	-4.35	-46.91	11.4	14.3	Vertical	Pass

5G NR n48A-n70A, Modulation: QPSK, Bandwidth: 15MHz

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7371.5	-51.37	-40	-11.37	-54.97	8.19	11.73	Horizontal	Pass
11057.25	-47.48	-40	-7.48	-49.41	11.36	13.65	Horizontal	Pass
14743	-43.56	-40	-3.56	-46.01	11.4	14.3	Horizontal	Pass
7371.5	-52.08	-40	-12.08	-55.51	8.19	11.73	Vertical	Pass
11057.25	-47.63	-40	-7.63	-49.56	11.36	13.65	Vertical	Pass
14743	-44.27	-40	-4.27	-46.91	11.4	14.3	Vertical	Pass

5G NR n48A-n71A, Modulation: QPSK, Bandwidth: 15MHz

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7371.5	-51.61	-40	-11.61	-54.97	8.19	11.73	Horizontal	Pass
11057.25	-47.40	-40	-7.40	-49.41	11.36	13.65	Horizontal	Pass
14743	-43.99	-40	-3.99	-46.01	11.4	14.3	Horizontal	Pass
7371.5	-52.44	-40	-12.44	-55.51	8.19	11.73	Vertical	Pass
11057.25	-47.39	-40	-7.39	-49.56	11.36	13.65	Vertical	Pass
14743	-44.28	-40	-4.28	-46.91	11.4	14.3	Vertical	Pass

5G NR n48A-n66A, Modulation: QPSK, Bandwidth: 40MHz

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7324	-51.56	-40	-11.56	-55.1	8.19	11.73	Horizontal	Pass
10986	-48.08	-40	-8.08	-50.11	11.06	13.48	Horizontal	Pass
14648	-43.52	-40	-3.52	-46.23	11.4	14.3	Horizontal	Pass
7324	-52.42	-40	-12.42	-55.92	8.19	11.73	Vertical	Pass
10986	-47.81	-40	-7.81	-49.81	11.06	13.48	Vertical	Pass
14648	-44.39	-40	-4.39	-47.29	11.4	14.3	Vertical	Pass

5G NR n48A-n70A, Modulation: QPSK, Bandwidth: 40MHz

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7324	-52.01	-40	-12.01	-55.1	8.19	11.73	Horizontal	Pass
10986	-47.87	-40	-7.87	-50.11	11.06	13.48	Horizontal	Pass
14648	-43.76	-40	-3.76	-46.23	11.4	14.3	Horizontal	Pass
7324	-52.34	-40	-12.34	-55.92	8.19	11.73	Vertical	Pass
10986	-47.41	-40	-7.41	-49.81	11.06	13.48	Vertical	Pass
14648	-44.39	-40	-4.39	-47.29	11.4	14.3	Vertical	Pass

5G NR n48A-n71A, Modulation: QPSK, Bandwidth: 40MHz

Frequency (MHz)	EIRP(dBm)	Limit(dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7324	-51.76	-40	-11.76	-55.1	8.19	11.73	Horizontal	Pass
10986	-47.87	-40	-7.87	-50.11	11.06	13.48	Horizontal	Pass
14648	-43.41	-40	-3.41	-46.23	11.4	14.3	Horizontal	Pass
7324	-52.43	-40	-12.43	-55.92	8.19	11.73	Vertical	Pass
10986	-47.81	-40	-7.81	-49.81	11.06	13.48	Vertical	Pass
14648	-44.81	-40	-4.81	-47.29	11.4	14.3	Vertical	Pass

5.7 Frequency stability

Test Requirement: §2.1055

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: Fundamental emission stays within authorized frequency block

5.7.1 E.U.T. Operation

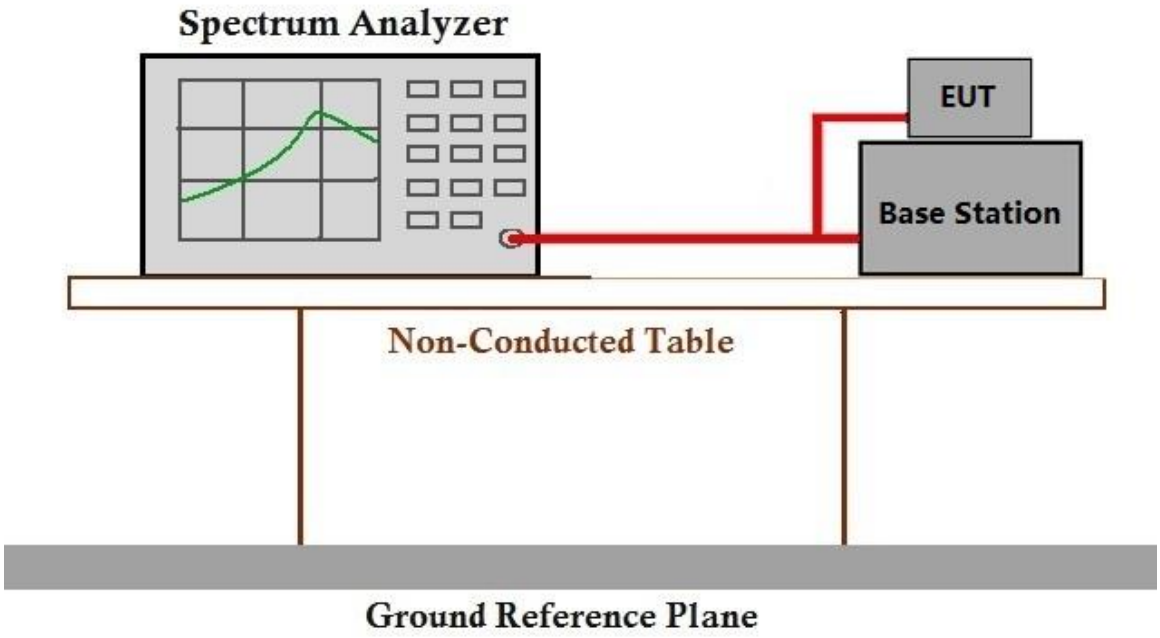
Operating Environment:

Temperature: 23.7 °C Humidity: 56.9 % RH Atmospheric Pressure: 1010 mbar

Test mode: 00: Tx mode: Keep the EUT in transmitting mode in LTE mode

01: Tx mode: Keep the EUT in transmitting mode in 5G NR mode

5.7.2 Test Setup Diagram



5.7.3 Measurement Data

Please refer to Appendix F- Frequency stability

5.8 Modulation Characteristics

Test Requirement: §2.1047

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: Digital modulation

5.8.1 E.U.T. Operation

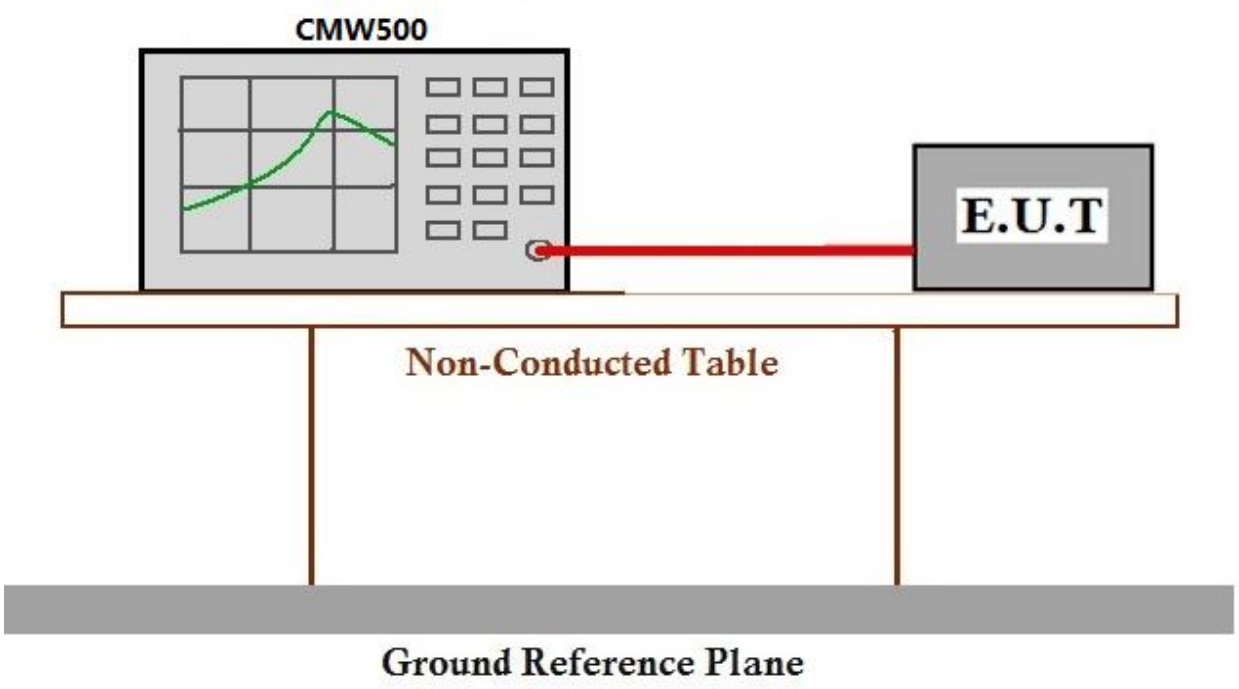
Operating Environment:

Temperature: 23.7 °C Humidity: 56.9 % RH Atmospheric Pressure: 1010 mbar

Test mode: 00: Tx mode: Keep the EUT in transmitting mode in LTE mode

01: Tx mode: Keep the EUT in transmitting mode in 5G NR mode

5.8.2 Test Setup Diagram



5.8.3 Measurement Data

Please refer to Appendix G-Modulation Characteristics

6 Photographs

6.1 Setup photo

Please refer to setup photos.

6.2 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for details.

-End of Report-