TEST REPORT

Application No.:	KSCR2211002180AT
FCC ID:	XMR2022EG060KNA
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:	LTE-A Cat 6 LGA Module
Model No.:	EG060K-NA
Trade Mark:	Quectel
Standard(s) :	47 CFR Part 2 47 CFR Part 96 subpart E
Date of Receipt:	2022-10-08
Date of Test:	2022-10-09 to 2022-11-12
Date of Issue:	2022-11-15
Test Result:	**Pass**

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

Eric Lin
Laboratory Manager

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Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2022-11-14	/

Authorized for issue by:				
		Damon zhou Damon_Zhou/Project Engineer		
		Eric Lin Eric Lin /Reviewer		

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2 Test Summary

Test Item	FCC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Output Power Data	§2.1046 §96.41(b)	EIRP≤ 23dBm/10MHz	PASS
Peak-Average Ratio	§96.41(g)	≤13dB	PASS
Modulation Characteristics	§2.1047	Digital modulation	PASS
Bandwidth	§2.1049(h)	OBW: No limit EBW: No limit	PASS
Band Edge Compliance	§96.41(e)	Refer to clause 6.4	PASS
Spurious emissions at antenna terminals	§96.41(e)	Refer to clause 6.5	PASS
Field strength of spurious radiation	§2.1051 §96.41(e)	Refer to clause 6.6	PASS
Frequency stability	§2.1055	≤ ±2.5ppm.	PASS

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3 Contents

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4 General Information

4.1 Details of E.U.T.

Power supply: DC 3.8V
Hardware Version: R1.0
Software Version: EG060KNAAAR01A02M2G
Operation Frequency Band: Band 48
Modulation Type: QPSK, 16QAM
LTE Power Class: Level 3
Antenna Type: External Antenna
Antenna Gain: -1.36dBi(Provide by Manufacturer)

4.2 Test Frequency

Test mode:	Nominal Bandwidth (MHz)	RF Channel		
		Low (L)	Middle (M)	High (H)
		MHz	MHz	MHz
LTE FDD Band 48	5	3552.5	3625.0	3697.5
	10	3555.0	3625.0	3695.0
	15	3557.5	3625.0	3692.5
	20	3560.0	3625.0	3690.0

4.3 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1015Pa	
Temperature:	TL	-35°C
	TN	+20°C
	TH	+75°C
Voltage:	VL	3.3 V
	VN	3.8 V
	VH	4.3 V

NOTE: VL= lower extreme test voltage
VN= nominal voltage
VH= upper extreme test voltage
TL= lower extreme test temperature
TN= normal temperature
TH= upper extreme test temperature

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4.4 Description of Support Units

Item No.	Mode No.	Description	Manufacturer
Adapter	P12F050200	Input :AC 100-240V, 50/60Hz, 0.3A Output :DC 5V2A	Something High Innovation (B.V.I.) Co., Ltd

4.5 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	± 5.4 x 10^{-8}
2	Duty cycle	± 0.3%
3	Occupied Bandwidth	± 3%
4	RF conducted power	± 0.8dB
5	RF power density	± 0.4dB
6	Conducted Spurious emissions	± 2.7dB
7	Radiated Spurious emission test	± 3.1dB (Below 1GHz)
		± 4.4dB (Above 1GHz)
8	Temperature test	± 1°C
9	Humidity test	± 3%
10	Supply voltages	± 1.5%
11	Time	± 3%

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4.6 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

1.SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).

2.SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

4.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• ISED

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

• VCCI

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.8 Deviation from Standards

None

4.9 Abnormalities from Standard Conditions

None

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5 Equipment List

NO	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
RF Conducted Test						
1	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	08/22/2022	08/21/2023
2	Spectrum Analyzer	R&S	FSV40	KUS1806E003	08/22/2022	08/21/2023
3	Spectrum Analyzer	Keysight	N9030B	KSEM021-1	01/22/2022	01/21/2023
4	Signal Generator	R&S	SMW200A	KSEM020-1	08/22/2022	08/21/2023
5	Signal Generator	Agilent	N5182A	KUS2001M001-1	08/22/2022	08/21/2023
6	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	08/22/2022	08/21/2023
7	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	08/22/2022	08/21/2023
8	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	08/22/2022	08/21/2023
9	Switcher	CCSRF	FY562	KUS2001M001-3	08/22/2022	08/21/2023
10	AC Power Source	EXTECH	6605	KS301178	N.C.R	N.C.R
11	DC Power Supply	Aglient	E3632A	KS301180	N.C.R	N.C.R
12	Conducted Test Cable	Thermax	RF01-RF04	CZ301111-CZ301120	01/16/2022	01/15/2023
13	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KS301190	04/01/2021	03/31/2023
14	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	04/01/2021	03/31/2023
15	Software	BST	TST-PASS	/	N/A	N/A
RF Radiated Test						
1	Spectrum Analyzer	R&S	FSV40	KUS1806E003	08/22/2022	08/21/2023
2	Universal Radio Communication Tester	R&S	CMW500	KSEM009-1	04/01/2022	03/31/2023
3	Signal Generator	Agilent	E8257C	KS301066	08/22/2022	08/21/2023
4	Loop Antenna	COM-POWER	AL-130R	KUS1806E001	04/13/2021	04/12/2023
5	Bilog Antenna	TESEQ	CBL 6112D	KUS1806E005	06/29/2021	06/28/2023
6	Bilog Antenna	SCHWARZBECK	VULB9160	CZ301016	04/13/2021	04/12/2024
7	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	KS301079	04/02/2022	04/01/2024
8	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	KS301186	02/22/2021	02/21/2023
9	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	CZ301058	03/22/2022	03/21/2023
10	Amplifier(30MHz~18GHz)	PANSHAN TECHNOLOGY	LNA:1~18G	KSEM010-1	01/22/2022	01/21/2023
11	Amplifier(18~40GHz)	COM-POWER	PAM-840A	KUS1710E001	01/22/2022	01/21/2023
12	RE Test Cable	REBES MICROWAVE	/	CZ301097	11/14/2021	11/13/2022
13	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	08/22/2022	08/21/2023
14	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	08/22/2022	08/21/2023
15	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	01/04/2022	31/03/2023
16	Software	Faratronic	EZ_EMC-v 3A1	/	N/A	N/A

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6 Radio Spectrum Matter Test Results

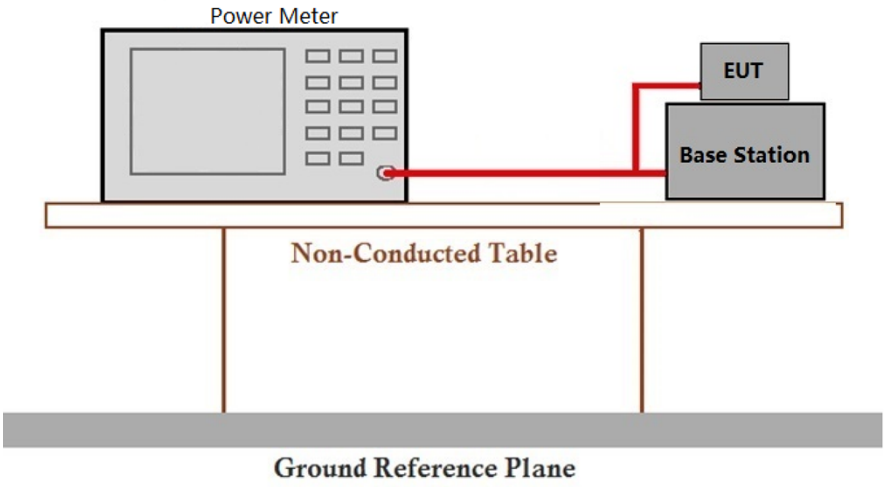
6.1 Effective (Isotropic) Radiated Output Power Data

Test Requirement: §2.1046; §96.41(b)
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: EIRP≤ 23dBm/10MHz

6.1.1 E.U.T. Operation

Operating Environment:
Temperature: 21.5 °C Humidity: 53.5 % RH Atmospheric Pressure: 1020 mbar
Test mode Tx mode, Keep the EUT in transmitting mode.

6.1.2 Test Setup Diagram



6.1.3 Measurement Data

Please refer to Appendix A for KSCR221100218001

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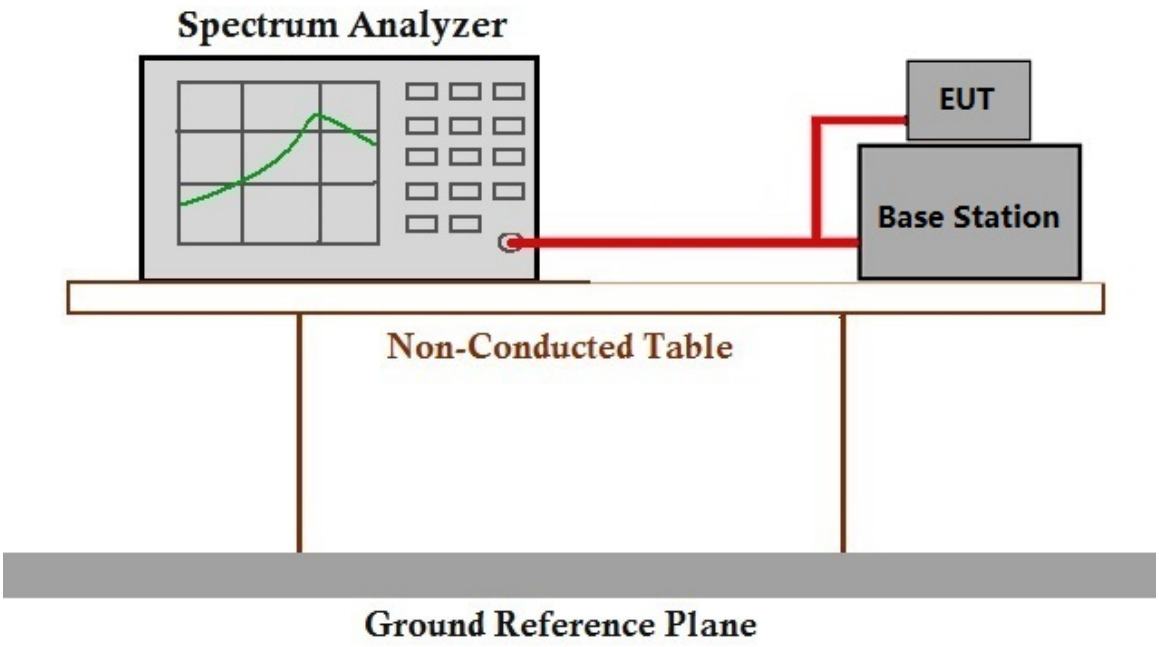
6.2 Peak-Average Ratio

Test Requirement: §96.41(g)
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: ≤13dB

6.2.1 E.U.T. Operation

Operating Environment:
Temperature: 21.5 °C Humidity: 53.5 % RH Atmospheric Pressure: 1020 mbar
Test mode Tx mode, Keep the EUT in transmitting mode.

6.2.2 Test Setup Diagram



6.2.3 Measurement Data

Please refer to Appendix A for KSCR221100218001

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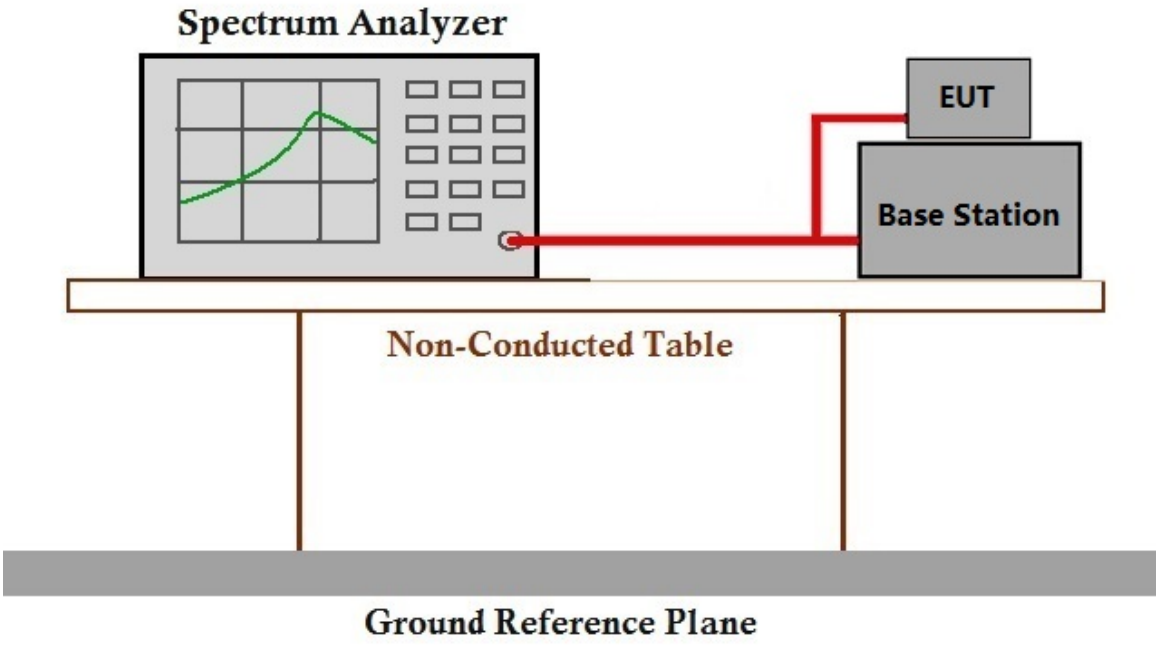
6.3 Bandwidth

Test Requirement: §2.1049(h)
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: OBW: No limit
EBW: No limit

6.3.1 E.U.T. Operation

Operating Environment:
Temperature: 21.5 °C Humidity: 53.5 % RH Atmospheric Pressure: 1020 mbar
Test mode Tx mode, Keep the EUT in transmitting mode.

6.3.2 Test Setup Diagram



6.3.3 Measurement Data

Please refer to Appendix A for KSCR221100218001

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6.4 Band Edge Compliance

Test Requirement: §2.1051, §96.41(e)

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

Limit: Emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz)

At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dBm/MHz

Emissions below 3530MHz or above 3720 MHz shall not exceed -40dBm/MHz

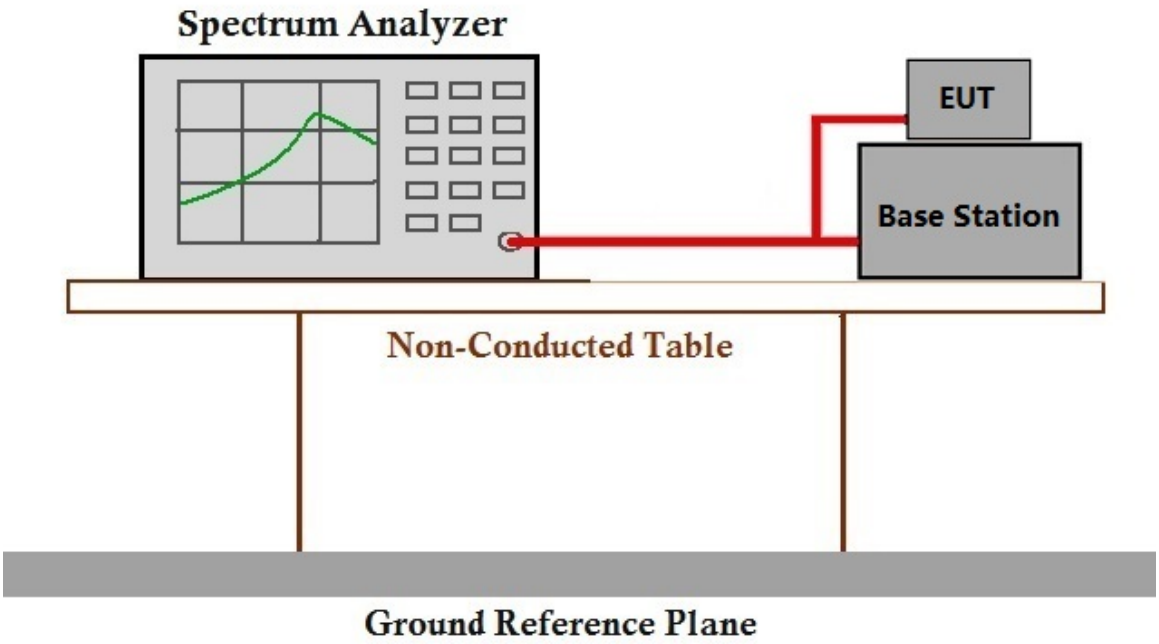
6.4.1 E.U.T. Operation

Operating Environment:

Temperature: 21.5 °C Humidity: 53.5 % RH Atmospheric Pressure: 1020 mbar

Test mode Tx mode, Keep the EUT in transmitting mode.

6.4.2 Test Setup Diagram



6.4.3 Measurement Data

Please refer to Appendix A for KSCR221100218001

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6.5 Spurious emissions at antenna terminals

Test Requirement: §2.1051, §96.41(e)

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

Limit: Emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz)

At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dBm/MHz

Emissions below 3530MHz or above 3720 MHz shall not exceed -40dBm/MHz

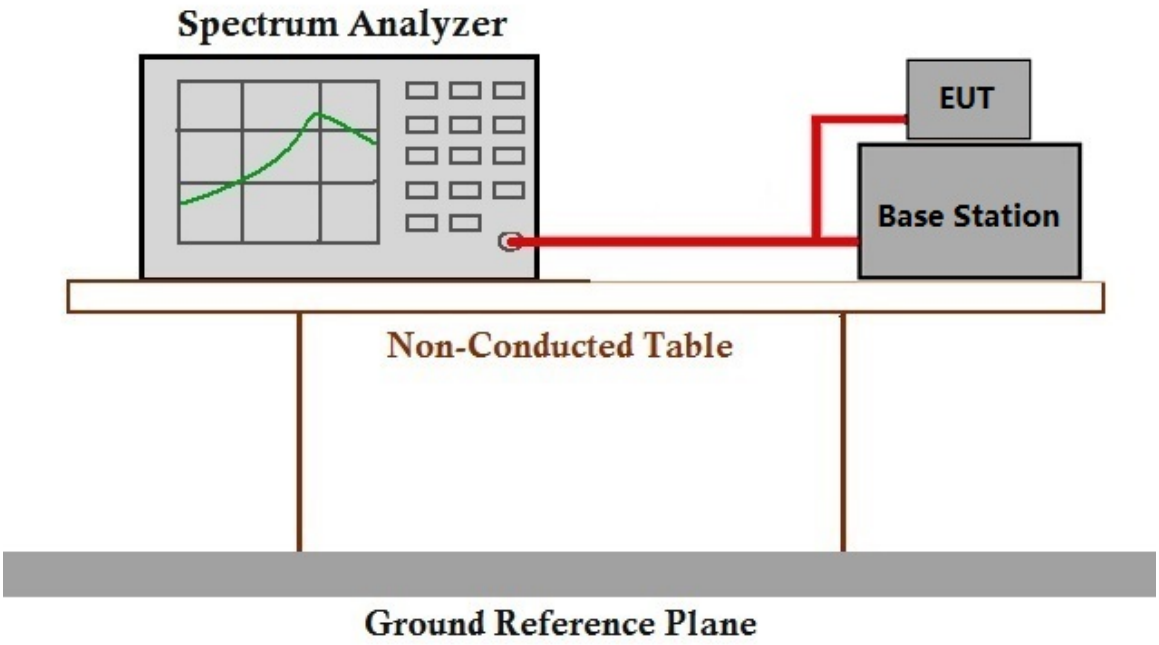
6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 21.5 °C Humidity: 53.5 % RH Atmospheric Pressure: 1020 mbar

Test mode 30: Tx mode, Keep the EUT in transmitting mode.

6.5.2 Test Setup Diagram



6.5.3 Measurement Data

Please refer to Appendix A for KSCR221100218001

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6.6 Field strength of spurious radiation

Test Requirement:	§2.1051, §96.41(e)
Test Method:	ANSI C63.26, KDB 971168 D01 v03
Limit:	Emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz) At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dBm/MHz Emissions below 3530MHz or above 3720 MHz shall not exceed -40dBm/MHz

6.6.1 E.U.T. Operation

Operating Environment:

Temperature: 18.5 °C Humidity: 39.5 % RH Atmospheric Pressure: 1020 mbar

Test mode Tx mode, Keep the EUT in transmitting mode.

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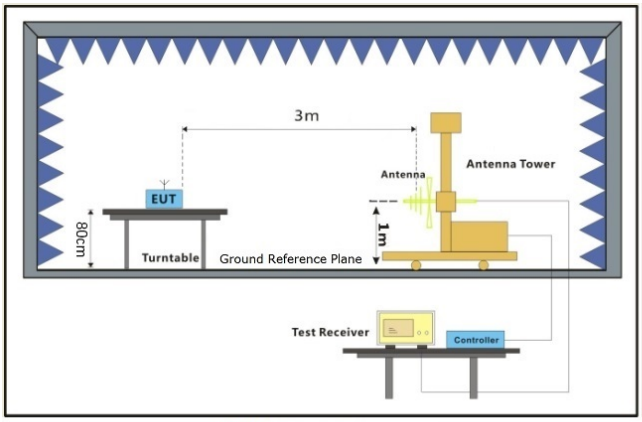
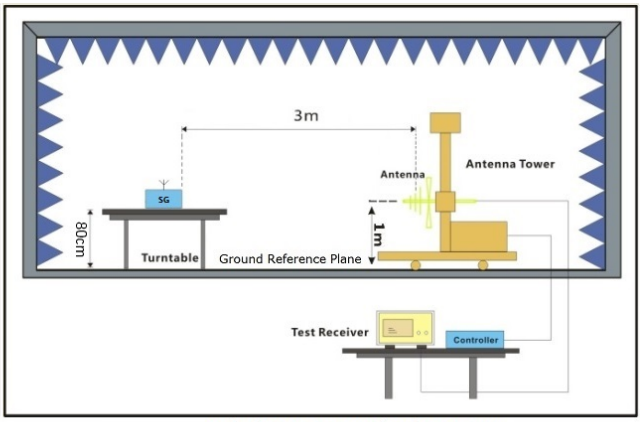
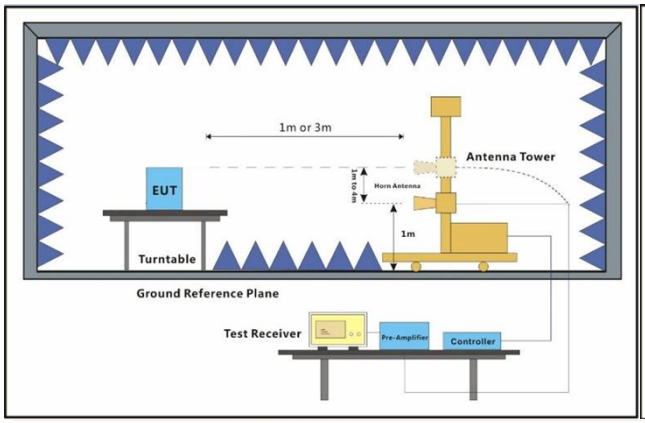
6.6.2 Test Setup Diagram



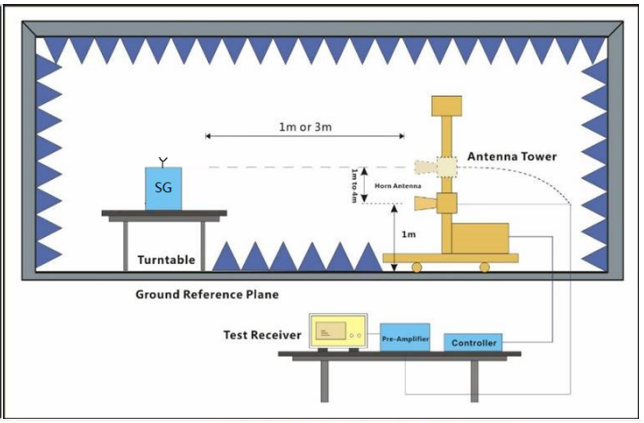
EUT



Substiute Antenna+Signal Generator



EUT



Substiute Antenna+Signal Generator

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6.6.3 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.

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LTE Band 48_ Low Channel									
Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF[dB/m]	Level [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [°]	Polarity
7102.1800	46.17	-43.66	36.35	-56.40	-40.00	16.40	245	357	Horizontal
8039.275	45.42	-41.82	37.02	-54.64	-40.00	14.64	135	360	Horizontal
8406.7	45.73	-41.40	37.34	-53.58	-40.00	13.58	126	87	Horizontal
10653.2700	35.96	-37.73	39.10	-57.93	-40.00	17.93	195	344	Horizontal
14204.3600	30.47	-35.33	40.23	-59.90	-40.00	19.90	145	271	Horizontal
17755.4500	33.18	-33.78	40.53	-55.32	-40.00	15.32	111	360	Horizontal

LTE Band 48 _ Low Channel									
Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF[dB/m]	Level [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [°]	Polarity
7102.1800	46.92	-43.66	36.35	-55.65	-40.00	15.65	284	351	Vertical
8417.625	45.56	-41.45	37.37	-53.78	-40.00	13.78	152	90	Vertical
8967.9	43.68	-40.88	38.18	-54.28	-40.00	14.28	136	328	Vertical
10653.2700	36.81	-37.73	39.10	-57.08	-40.00	17.08	256	312	Vertical
14204.3600	30.83	-35.33	40.23	-59.54	-40.00	19.54	145	73	Vertical
17755.4500	33.30	-33.78	40.53	-55.20	-40.00	15.20	129	73	Vertical

LTE Band 48_ Mid Channel									
Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF[dB/m]	Level [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [°]	Polarity
7232.1800	46.55	-43.52	36.58	-55.65	-40.00	15.65	145	283	Horizontal
8414.175	45.97	-41.43	37.36	-53.36	-40.00	13.36	195	121	Horizontal
9564.175	42.18	-39.47	38.45	-54.10	-40.00	14.10	145	360	Horizontal
10848.2700	35.05	-38.15	39.18	-59.17	-40.00	19.17	182	28	Horizontal
12673.775	35.00	-36.93	39.41	-57.78	-40.00	17.78	146	285	Horizontal
14464.3600	30.51	-34.53	40.03	-59.24	-40.00	19.24	163	329	Horizontal

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LTE Band 48_ Mid Channel									
Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF[dB/m]	Level [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [°]	Polarity
7232.1800	45.94	-43.52	36.58	-56.26	-40.00	16.26	211	256	Vertical
8431.425	46.34	-41.51	37.40	-53.03	-40.00	13.03	145	360	Vertical
9554.975	41.82	-39.54	38.45	-54.53	-40.00	14.53	162	91	Vertical
10848.2700	36.08	-38.15	39.18	-58.14	-40.00	18.14	188	196	Vertical
12835.35	35.47	-36.71	39.67	-56.83	-40.00	16.83	194	30	Vertical
14464.3600	30.34	-34.53	40.03	-59.41	-40.00	19.41	153	30	Vertical

LTE Band 48_ High Channel									
Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF[dB/m]	Level [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [°]	Polarity
7362.1800	45.41	-42.99	36.51	-56.33	-40.00	16.33	284	314	Horizontal
8404.4	45.54	-41.39	37.34	-53.77	-40.00	13.77	165	283	Horizontal
9453.2	41.85	-39.94	38.48	-54.87	-40.00	14.87	125	224	Horizontal
11043.2700	30.78	-37.66	39.08	-63.06	-40.00	23.06	145	352	Horizontal
11416.825	36.26	-37.34	39.09	-57.25	-40.00	17.25	163	224	Horizontal
14724.3600	28.58	-34.82	39.77	-61.73	-40.00	21.73	122	269	Horizontal

LTE Band 48_High Channel									
Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF[dB/m]	Level [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [°]	Polarity
7362.1800	45.41	-42.99	36.51	-56.33	-40.00	16.33	245	224	Vertical
8423.375	45.37	-41.47	37.38	-53.98	-40.00	13.98	162	194	Vertical
9563.025	41.55	-39.48	38.45	-54.74	-40.00	14.74	125	314	Vertical
11043.2700	30.76	-37.66	39.08	-63.08	-40.00	23.08	145	105	Vertical
11235.125	35.46	-36.82	39.11	-57.51	-40.00	17.51	185	360	Vertical
14724.3600	28.11	-34.82	39.77	-62.20	-40.00	22.20	166	74	Vertical

Remark:

1) Pretest was performed at the EUT in required band,channel,modulation,bandwidth, and only the data of the worst case showed in the test report.

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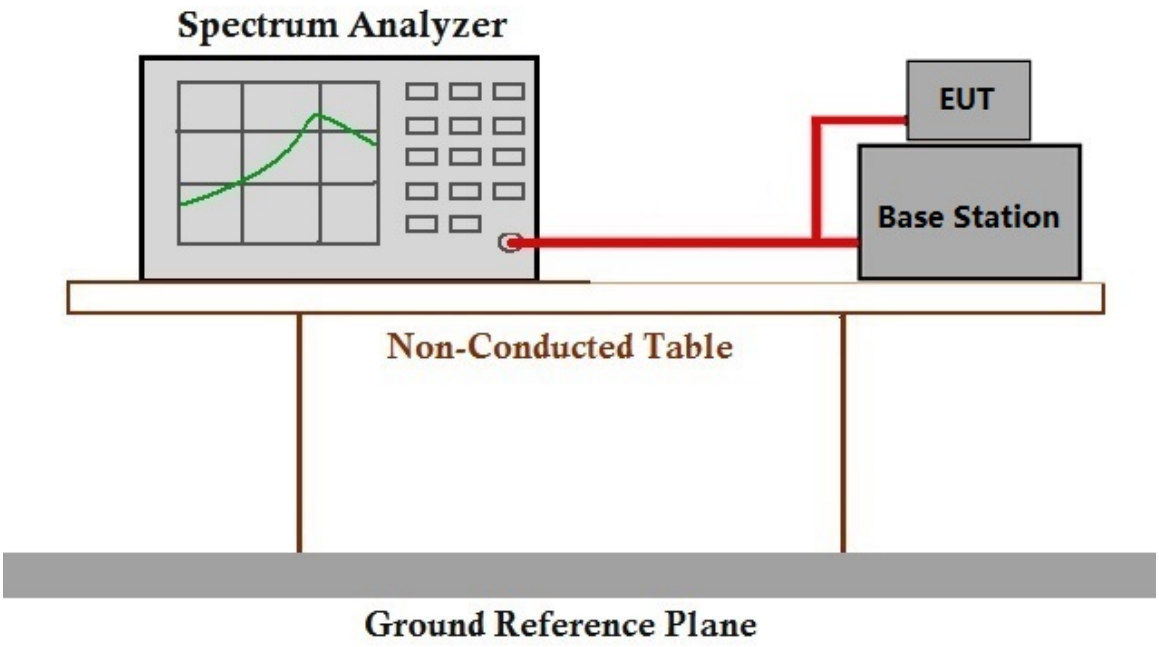
6.7 Frequency stability

Test Requirement: §2.1055
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: ≤ ±2.5ppm.

6.7.1 E.U.T. Operation

Operating Environment:
Temperature: 21.5 °C Humidity: 53.5 % RH Atmospheric Pressure: 1020 mbar
Test mode 30: Tx mode, Keep the EUT in transmitting mode.

6.7.2 Test Setup Diagram



6.7.3 Measurement Data

Please refer to Appendix A for KSCR221100218001

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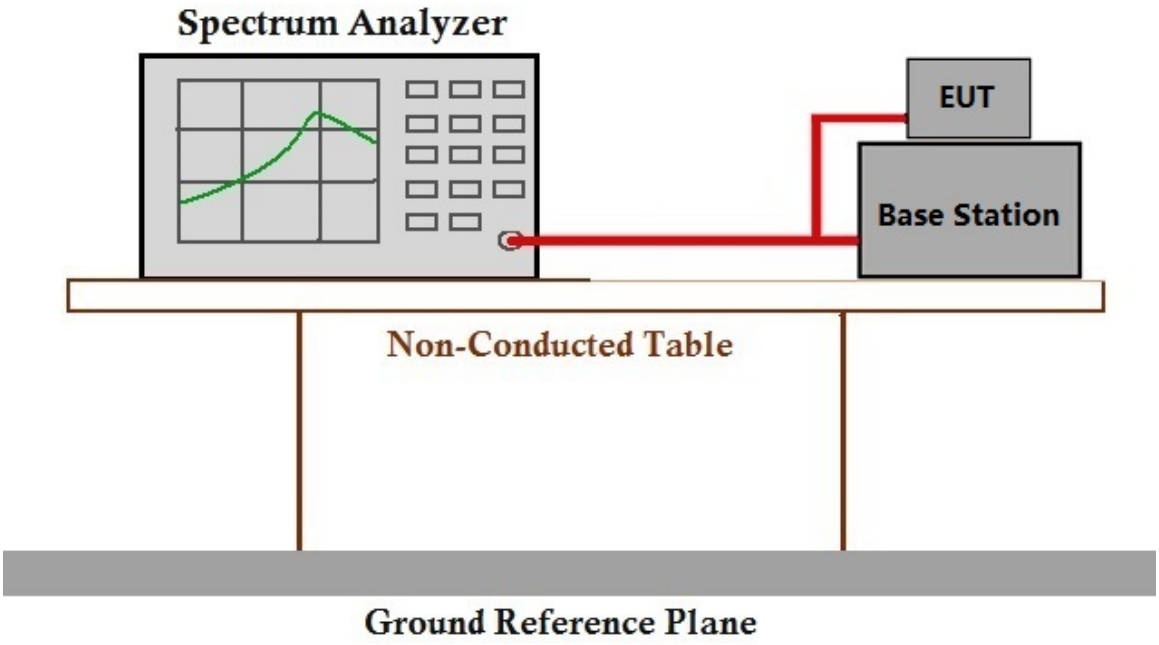
6.8 Modulation Characteristics

Test Requirement: §2.1047
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: Digital modulation

6.8.1 E.U.T. Operation

Operating Environment:
Temperature: 21.5 °C Humidity: 53.5 % RH Atmospheric Pressure: 1020 mbar
Test mode 30: Tx mode, Keep the EUT in transmitting mode.

6.8.2 Test Setup Diagram



6.8.3 Measurement Data

Please refer to Appendix A for KSCR221100218001

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7 Test Setup Photographs

Refer to Appendix - Test Setup Photo for KSCR2211002180AT

8 EUT Constructional Details

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2211002180AT

- End of the Report -

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