TEST REPORT

Application No.:	SZCR2104020588AT(SHEM2103002246CR)
FCC ID:	2AWAS-910-00027
Applicant:	Mavenir Systems, Inc.
Address of Applicant:	1700 International Parkway, Ste 200, Richardson, Texas 75081 USA
Manufacturer:	Mavenir Systems, Inc.
Address of Manufacturer:	1700 International Parkway, Ste 200, Richardson, Texas 75081 USA
Factory:	Sunwave Communications Co., Ltd.
Address of Factory:	581 Huoju Avenue, Binjiang District, Hangzhou, P.R.China Zip: 310053
Equipment Under Test (EUT):	
EUT Name:	Remote Radio Unit
Model No.:	DRRU-R3184848
Standard(s) :	47 CFR Part 2
	47 CFR Part 96
Date of Receipt:	2021-03-03
Date of Test:	2021-03-05 to 2021-04-07
Date of Issue:	2021-04-15

Test Result:	**Pass**

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

Keny Xu
EMC Laboratory Manager

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch, Testing Center, EMC Laboratory.

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00	Original	2021-04-15		/

Authorized for issue by:				
				
		Bill Chen /Project Engineer		
				
		Eric Fu /Reviewer		

2 Test Summary

Test Item	FCC Rule No.	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §96.41	PASS (Note 2)
Peak-Average Ratio	§96.41	PASS (Note 2)
Modulation Characteristics	§2.1047	PASS (Note 2)
Bandwidth	§96.41	PASS (Note 2)
Band Edge Compliance	§2.1051, §96.41	PASS (Note 2)
Spurious emissions at antenna terminals	§2.1051, §96.41	PASS (Note 2)
Field strength of spurious radiation	§2.1051, §96.41	PASS (Note 2)
Frequency stability	§2.1055,	PASS

Note:

1.This EUT is a remote unit which is part of Distributed base station systems. The distributed base station system is an O-RAN system and contains CU & DU. CU and DU works as BBU. Detailed information of CU and DU show in clause 4.3.

2. We have done different modulation types and different RB Size and position tests, but we finally only presented the test results of Full RB QPSK modulation type.

3 Contents

4 General Information

4.1 Details of E.U.T.

Product Name:	Remote Radio Unit
Model No.:	DRRU-R3184848
Sample Type:	Fixed production
Antenna Gain:	6dBi (Provided by manufacturer)
Power Supply:	DC 48V
Type of Modulation	TDD
Frequency Band:	Downlink 3550MHz to 3700MHz
Modulation Type:	QPSK, 16QAM, 64QAM, 256QAM
Normal Output Power:	37dBm
Channel Bandwidth:	Single carrier: 5MHz, 10MHz, 15MHz, 20MHz; Multi-carrier enabled, up to 40MHz. Detailed Multi-carrier combination please refer to clause 4.2
MIMO:	2T2R MIMO and 4T4R MIMO

4.2 Test Frequency

Configuration	Carrier	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
			Low(L)	Middle(M)	High(H)
LTE_5M+20M_continuous	2C	5MHz+20MHz	3553.3 + 3565.0	3615.8 + 3627.5	3678.3 + 3690.0
LTE_20M+5M_continuous	2C	20MHz+5MHz	3560.0 + 3571.7	3622.5 + 3634.2	3685.0 + 3696.7
LTE_10M+20M_continuous	2C	10MHz+20MHz	3555.5 + 3569.9	3615.6 + 3630.0	3675.6 + 3690.0
LTE_20M+10M_continuous	2C	20MHz+10MHz	3560.0 + 3574.4	3620.1 + 3634.5	3680.1 + 3694.5
LTE_15M+20M_continuous	2C	15MHz+20MHz	3557.8 + 3574.9	3615.3 + 3632.4	3672.9 + 3690.0
LTE_20M+15M_continuous	2C	20MHz+15MHz	3560.0 + 3577.1	3617.6 + 3634.7	3675.1 + 3692.2
LTE_20M+20M_continuous	2C	20MHz+20MHz	3560.0 + 3579.8	3615.1 + 3634.9	3670.2 + 3690.0
LTE_5M+5M_non-continuous	2C	5MHz+5MHz	3552.5 + 3642.5	/	3607.5 + 3697.5
LTE_5M+10M_non-continuous	2C	5MHz+10MHz	3552.5 + 3612.5	/	3635.0 + 3695.0
LTE_5M+15M_non-continuous	2C	5MHz+15MHz	3552.5 + 3612.5	/	3632.5 + 3692.5
LTE_5M+20M_non-continuous	2C	5MHz+20MHz	3552.5 + 3612.5	/	3630.0 + 3690.0
LTE_10M+10M_non-continuous	2C	10MHz+10MHz	3555.0 + 3635.0	/	3615.0 + 3695.0
LTE_10M+15M_non-continuous	2C	10MHz+15MHz	3555.0 + 3615.0	/	3632.5 + 3692.5
LTE_10M+20M_non-continuous	2C	10MHz+20MHz	3555.0 + 3615.0	/	3630.0 + 3690.0
LTE_15M+20M_non-continuous	2C	15MHz+20MHz	3557.5 + 3617.5	/	3630.0 + 3690.0
LTE_20M+20M_non-continuous	2C	20MHz+20MHz	3560.0 + 3620.0	/	3630.0 + 3690.0

4.3 Test Support Unit

Name	Item Name	Manufacturer	Model No.	HW Version	SW Version	Serial Number
CU: Central Unit Domain proxy	Dell R740 Server	Dell	PowerEdge R470	Dell R740 Centos 7.6 OS	Mavenir 5_5_1_0	104309559705
DU: Distributed Unit (Baseband Unit)	Server	Kontron	ME1100	ME1100 Centos 7.6 OS	Mavenir 5_5_1_0	9017049531
	CPRI Network Adapter Card	Mavenir	910-02026-01	Mavenir 4.23	Mavenir 4.23	092000169

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	± 7.25 x 10^{-8}
2	Duty cycle	± 0.37%
3	Occupied Bandwidth	± 3%
4	Conduction emission	± 3.0dB (150kHz to 30MHz)
5	RF conducted power	± 0.75dB
6	RF power density	± 2.84dB
7	Conducted Spurious emissions	± 0.75dB
8	RF Radiated power	± 4.5dB (Below 1GHz)
		± 4.8dB (Above 1GHz)
9	Radiated Spurious emission test	± 4.5dB (Below 1GHz)
		± 4.8dB (Above 1GHz)
10	Temperature test	± 1°C
11	Humidity test	± 3%
12	Supply voltages	± 1.5%
13	Time	± 3%

Remark:

The U_{lab} (lab Uncertainty) is less than U_{cispr} (CISPR Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.6 Test Facility

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

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006. IC#: 4620C.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

RF Test System					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date**	**Cal. Due date**
Shielding Room	SAEMC	MSR733	SEM001-09	2019-06-13	2022-06-12
MXA Signal Analyzer (10Hz-26.5GHz)	KEYSIGHT	N9020A	SEM004-17	2020-05-21	2021-05-20
Signal Generator (9kHz-40GHz)	KEYSIGHT	N5173B	SEM006-05	2020-09-23	2021-09-22
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2020-03-24	2021-03-23
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2021-03-24	2022-03-23
ESG Vector Signal Generator	KEYSIGHT	E4438C	SEM006-15	2020-09-23	2021-09-22
DC Power Supply	Rohde & Schwarz	NGSM 32/10	SEM011-04	2020-03-24	2021-03-23
DC Power Supply	Rohde & Schwarz	NGSM 32/10	SEM011-04	2021-03-24	2022-03-23
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2020-04-08	2021-04-07
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2021-04-08	2022-04-07
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2020-04-08	2021-04-07
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2021-04-08	2022-04-07
Power Sensor	KEYSIGHT	U2021XA	SEM009-20	2020-05-21	2021-05-20
Power Sensor	KEYSIGHT	U2021XA	SEM009-21	2020-05-21	2021-05-20
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2020-03-23	2021-03-22
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2021-03-23	2022-03-22
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2020-03-24	2021-03-23
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2021-03-24	2022-03-23
Measurement Software	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-03	2020-07-10	2021-07-09
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2020-11-14	2023-11-13
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2020-03-24	2021-03-23
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2021-03-24	2022-03-23
Radiated Spurious Emissions					
RE in Chamber ＜1GHz					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date**	**Cal. Due date**
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2020-07-19	2023-07-18

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中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

MXE EMI receiver (3Hz-3.6GHz)	KEYSIGHT	N9038A	SEM004-15	2020-11-02	2021-11-01
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-02	2019-05-24	2022-05-23
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2020-03-24	2021-03-23
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2021-03-24	2022-03-23
Measurement Software	Farad	EZ-EMC	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2020-07-10	2021-07-09
RE in Chamber ＞1GHz					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date**	**Cal. Due date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2021-03-12	2024-03-11
EXA Signal Analyzer (10Hz-44GHz)	Agilent Technologies Inc	N9010A	SEM004-12	2020-04-08	2021-04-07
EXA Signal Analyzer (10Hz-44GHz)	Agilent Technologies Inc	N9010A	SEM004-12	2021-04-08	2022-04-07
Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-08	2021-04-07
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2020-11-14	2023-11-13
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22
Pre-amplifier (26-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2020-03-24	2021-03-23
Pre-amplifier (26-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2021-03-24	2022-03-23
Measurement Software	Farad	EZ-EMC	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09
General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2020-09-15	2021-09-14
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2020-09-15	2021-09-14
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2020-04-06	2021-04-05
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2021-04-06	2022-04-05

6 Radio Spectrum Matter Test Results

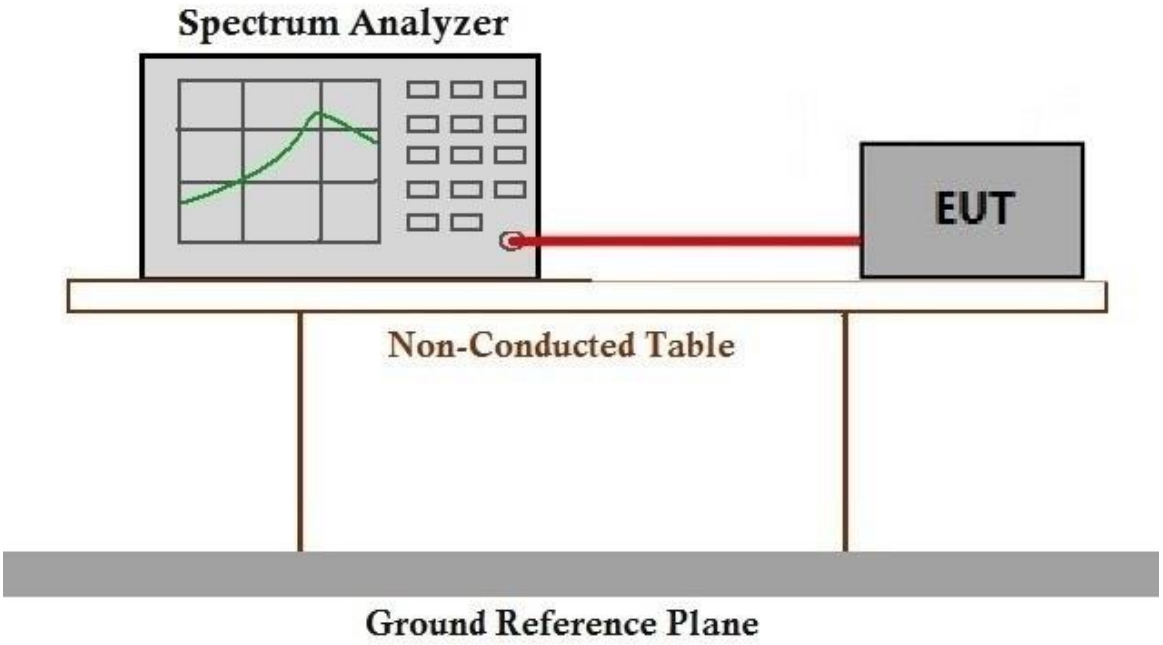
6.1 Effective (Isotropic) Radiated Power Output Data

Test Requirement: §2.1046, §96.41
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: EIRP≤ 47dBm/10MHz, PSD≤ 37dBm/MHz (LTE Band 48)

6.1.1 E.U.T. Operation

Operating Environment:
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: m: Tx mode, Keep the EUT in transmitting mode.

6.1.2 Test Setup Diagram



6.1.3 Measurement Data

Please refer to Appendix A-Output power

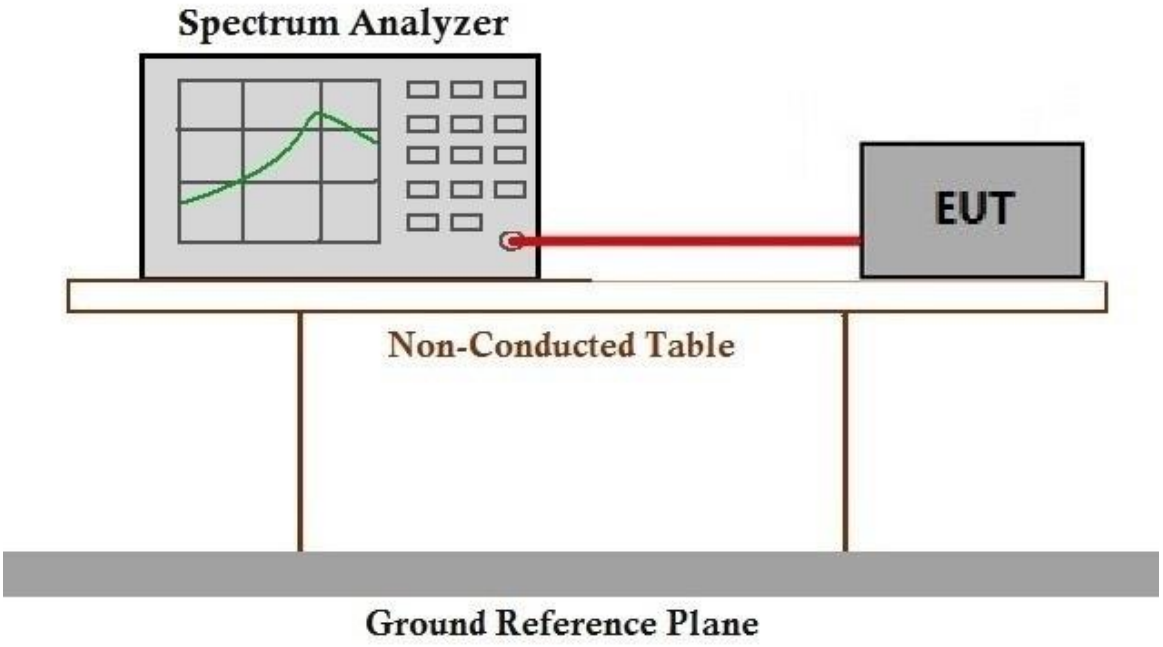
6.2 Peak-Average Ratio

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

6.2.1 E.U.T. Operation

Operating Environment:
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: m: Tx mode, Keep the EUT in transmitting mode.

6.2.2 Test Setup Diagram



6.2.3 Measurement Data

Please refer to Appendix B- Peak-Average Ratio

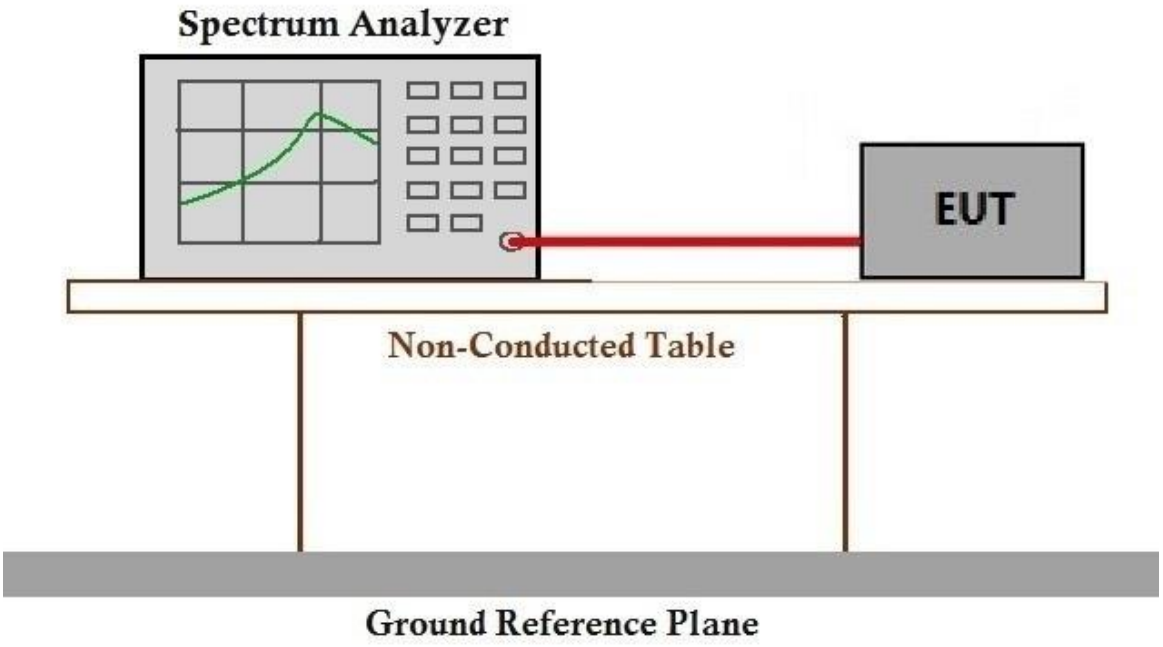
6.3 Bandwidth

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: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: m: Tx mode, Keep the EUT in transmitting mode.

6.3.2 Test Setup Diagram



6.3.3 Measurement Data

Please refer to Appendix C- Bandwidth

6.4 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 continuous channels, the upper and lower limits of the combined continuous 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.

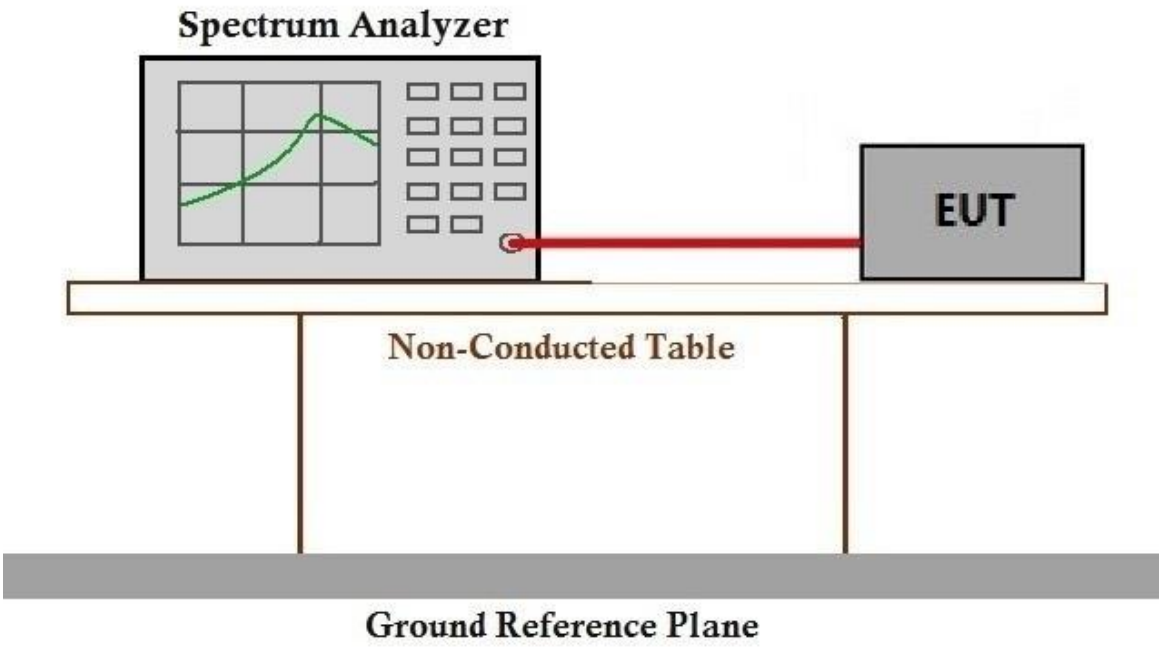
6.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar

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

6.4.2 Test Setup Diagram



6.4.3 Measurement Data

Please refer to Appendix D- Conducted band edge

6.5 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 continuous channels, the upper and lower limits of the combined continuous 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.

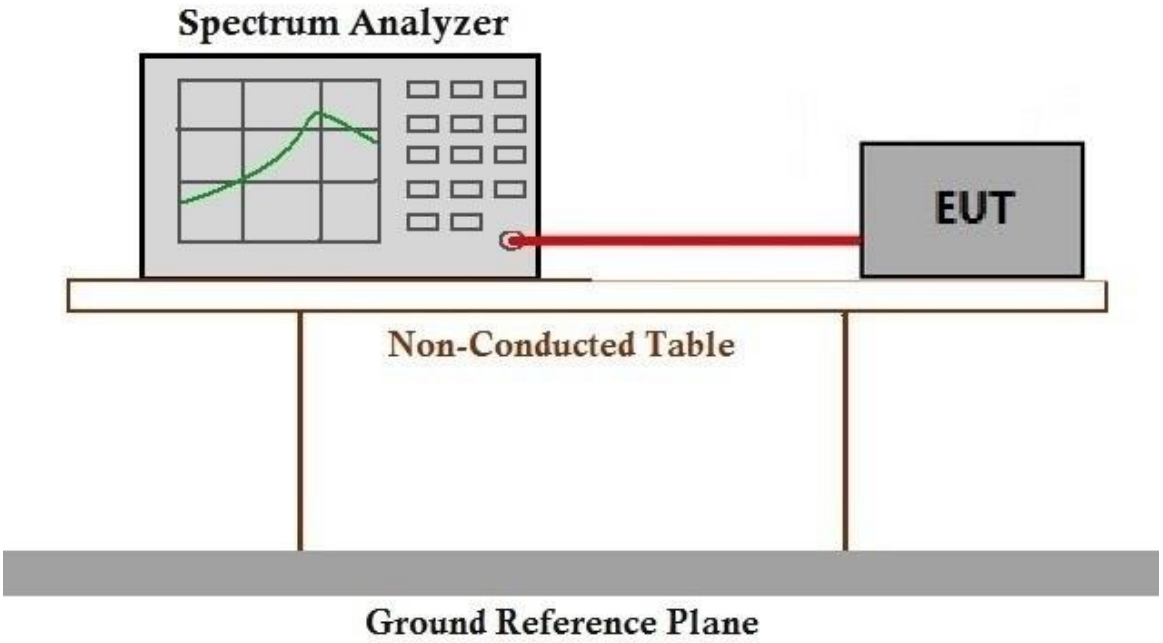
6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar

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

6.5.2 Test Setup Diagram



6.5.3 Measurement Data

Please refer to Appendix E- Conducted Spurious Emission

6.6 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 continuous channels, the upper and lower limits of the combined continuous 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.

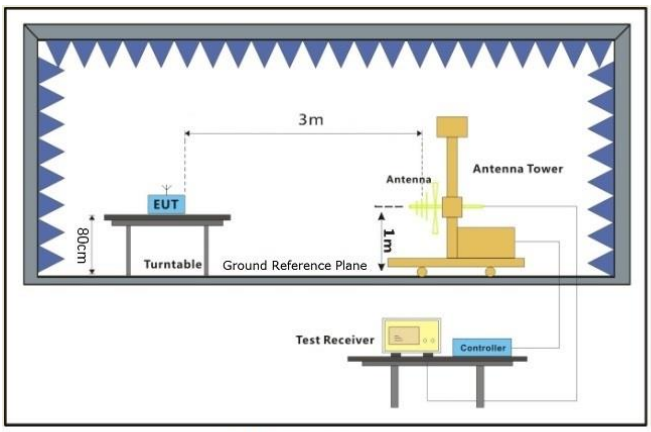
6.6.1 E.U.T. Operation

Operating Environment:

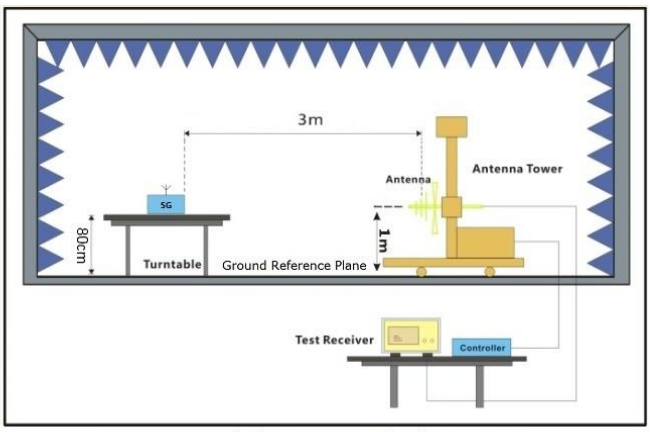
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar

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

6.6.2 Test Setup Diagram



EUT



Substiute Antenna+Signal Generator

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_5M+5M_Non-continuous_Lowest Channel_QPSK						
Frequency	Spurious Emission Level			Limit	Over limit	Result
(MHz)	(Deg)	Polaxis	(dBm)	dBm	dB	
150.80	318.80	Horizontal	-71.08	-40.00	-31.08	Pass
499.70	317.30	Horizontal	-71.92	-40.00	-31.92	Pass
796.00	194.30	Horizontal	-71.24	-40.00	-31.24	Pass
7120.00	310.30	Horizontal	-52.37	-40.00	-12.37	Pass
10680.00	345.50	Horizontal	-59.53	-40.00	-19.53	Pass
14240.00	4.20	Horizontal	-53.41	-40.00	-13.41	Pass
141.50	48.50	Vertical	-73.08	-40.00	-33.08	Pass
552.20	237.30	Vertical	-75.24	-40.00	-35.24	Pass
818.10	135.00	Vertical	-71.19	-40.00	-31.19	Pass
7120.00	210.00	Vertical	-55.23	-40.00	-15.23	Pass
10680.00	282.60	Vertical	-56.26	-40.00	-16.26	Pass
14240.00	266.70	Vertical	-57.10	-40.00	-17.10	Pass

Remark:

1) Pretest with normal and extreme conditions, only the worst case data was showed in the test report.

2) All bandwidth and frequency combinations of various modulation modes have been tested, only the worst case data 5+5M non-continuous were displayed in this report.

LTE_5M+5M_Non-continuous_Middle Channel_QPSK						
Frequency	Spurious Emission Level			Limit	Over limit	Result
(MHz)	(Deg)	Polaxis	(dBm)	dBm	dB	
158.60	48.60	Horizontal	-74.24	-40.00	-34.24	Pass
488.70	199.50	Horizontal	-72.50	-40.00	-32.50	Pass
794.60	13.70	Horizontal	-70.72	-40.00	-30.72	Pass
7260.00	88.70	Horizontal	-55.84	-40.00	-15.84	Pass
10890.00	75.60	Horizontal	-57.71	-40.00	-17.71	Pass
14520.00	229.10	Horizontal	-56.17	-40.00	-16.17	Pass
154.00	235.70	Vertical	-71.23	-40.00	-31.23	Pass
545.50	252.10	Vertical	-73.47	-40.00	-33.47	Pass
821.80	56.20	Vertical	-71.53	-40.00	-31.53	Pass
7260.00	50.80	Vertical	-56.08	-40.00	-16.08	Pass
10890.00	355.40	Vertical	-58.38	-40.00	-18.38	Pass
14520.00	96.60	Vertical	-59.07	-40.00	-19.07	Pass

Remark:

1) Pretest with normal and extreme conditions, only the worst case data was showed in the test report.

2) All bandwidth and frequency combinations of various modulation modes have been tested, only the worst case data 5+5M non-continuous were displayed in this report.

LTE_5M+5M_Non-continuous_Highest Channel_QPSK						
Frequency	Spurious Emission Level			Limit	Over limit	Result
(MHz)	(Deg)	Polaxis	(dBm)	dBm	dB	
153.00	186.60	Horizontal	-71.41	-40.00	-31.41	Pass
488.30	199.40	Horizontal	-74.92	-40.00	-34.92	Pass
791.70	315.40	Horizontal	-70.10	-40.00	-30.10	Pass
7400.00	333.60	Horizontal	-61.16	-40.00	-21.16	Pass
11100.00	69.90	Horizontal	-59.79	-40.00	-19.79	Pass
14800.00	38.70	Horizontal	-53.83	-40.00	-13.83	Pass
151.50	261.40	Vertical	-73.24	-40.00	-33.24	Pass
547.90	94.20	Vertical	-75.19	-40.00	-35.19	Pass
808.80	8.80	Vertical	-69.56	-40.00	-29.56	Pass
7400.00	63.90	Vertical	-51.95	-40.00	-11.95	Pass
11100.00	272.60	Vertical	-62.30	-40.00	-22.30	Pass
14800.00	266.50	Vertical	-53.21	-40.00	-13.21	Pass

Remark:

1) Pretest with normal and extreme conditions, only the worst case data was showed in the test report.

2) All bandwidth and frequency combinations of various modulation modes have been tested, only the worst case data 5+5M non-continuous were displayed in this report.

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6.7 Frequency stability

Test Requirement: §2.1055

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

Limit: Fundamental emission stays within authorized frequency block

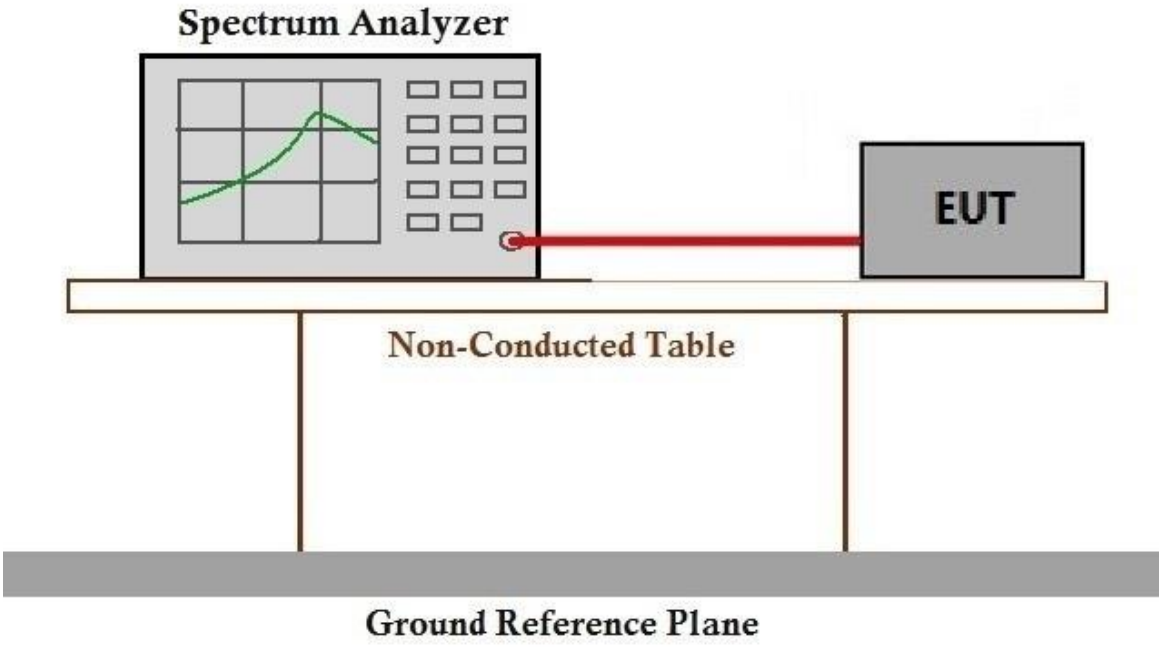
6.7.1 E.U.T. Operation

Operating Environment:

Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar

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

6.7.2 Test Setup Diagram



6.7.3 Measurement Data

Test Band: 48 _ 20MHz Bandwidth (Frequency Error VS Voltage)												
Test Mode	RB Allocation		Temp.	Volt.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset	(℃)	(Vac)	LCH	MCH	HCH	LCH	MCH	HCH		
QPSK	100	0	20	108	2.11	1.82	3.69	0.00059	0.00050	0.00100	2.50	PASS
				120	2.57	2.86	2.02	0.00072	0.00079	0.00055	2.50	PASS
				132	1.99	4.69	4.7	0.00056	0.00129	0.00127	2.50	PASS
16QAM	100	0	20	108	3.57	3.78	3.27	0.00100	0.00104	0.00089	2.50	PASS
				120	2.21	2.56	3.96	0.00062	0.00071	0.00107	2.50	PASS
				132	2.69	4.22	2.09	0.00076	0.00116	0.00057	2.50	PASS
64QAM	100	0	20	108	4.7	4.32	2.79	0.00132	0.00119	0.00076	2.50	PASS
				120	3.49	3.08	3.52	0.00098	0.00085	0.00095	2.50	PASS
				132	3.75	4.23	3.22	0.00105	0.00117	0.00087	2.50	PASS
256QAM	100	0	20	108	2.69	3.38	4.55	0.00076	0.00093	0.00123	2.50	PASS
				120	2.8	3.91	4.09	0.00079	0.00108	0.00111	2.50	PASS
				132	3.01	2.4	3.03	0.00085	0.00066	0.00082	2.50	PASS
Note: For this test item, we have done pre-tests under different bandwidths, and only the worst test results are presented												

Test Band: 48 _ 20MHz Bandwidth (Frequency Error VS Temperature)												
Test Mode	RB Allocation		Volt.	Temp.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset	(Vac)	(℃)	LCH	MCH	HCH	LCH	MCH	HCH		
QPSK	100	0	120	-30.00	3.36	3.68	3.38	0.00094	0.00102	0.00092	2.50	PASS
				-20.00	3.53	3.63	3.13	0.00099	0.00100	0.00085	2.50	PASS
				-10.00	3.8	3.42	3.95	0.00107	0.00094	0.00107	2.50	PASS
				0.00	3.02	2.42	2.58	0.00085	0.00067	0.00070	2.50	PASS
				10.00	3.92	3.86	3.35	0.00110	0.00106	0.00091	2.50	PASS
				20.00	3.35	3.13	3.87	0.00094	0.00086	0.00105	2.50	PASS
				30.00	2.85	4.01	2.35	0.00080	0.00111	0.00064	2.50	PASS
				40.00	2.59	3.44	2.67	0.00073	0.00095	0.00072	2.50	PASS
				50.00	2.36	3.1	2.84	0.00066	0.00086	0.00077	2.50	PASS
16QAM	100	0	120	-30.00	2.96	3.26	2.91	0.00083	0.00090	0.00079	2.50	PASS
				-20.00	2.26	3.06	3.16	0.00063	0.00084	0.00086	2.50	PASS
				-10.00	2.91	3.24	2.75	0.00082	0.00089	0.00075	2.50	PASS
				0.00	2.24	3.42	2.31	0.00063	0.00094	0.00063	2.50	PASS
				10.00	2.87	4.12	3.71	0.00081	0.00114	0.00101	2.50	PASS
				20.00	3.35	3.22	2.04	0.00094	0.00089	0.00055	2.50	PASS
				30.00	2.05	4.34	1.92	0.00058	0.00120	0.00052	2.50	PASS
				40.00	2.46	1.84	3.08	0.00069	0.00051	0.00083	2.50	PASS
				50.00	2.34	2.46	3.09	0.00066	0.00068	0.00084	2.50	PASS

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64QAM	100	0	120	-30.00	4	2.66	2.94	0.00112	0.00073	0.00080	2.50	PASS
				-20.00	4.16	2.66	2.73	0.00117	0.00073	0.00074	2.50	PASS
				-10.00	4.26	2.45	2.7	0.00120	0.00068	0.00073	2.50	PASS
				0.00	3.25	3.68	2.37	0.00091	0.00102	0.00064	2.50	PASS
				10.00	2.18	4.2	3.91	0.00061	0.00116	0.00106	2.50	PASS
				20.00	3.68	2.48	2.03	0.00103	0.00068	0.00055	2.50	PASS
				30.00	2.6	1.77	2.16	0.00073	0.00049	0.00059	2.50	PASS
				40.00	2.14	1.94	2.77	0.00060	0.00054	0.00075	2.50	PASS
				50.00	2.33	2.26	2.63	0.00065	0.00062	0.00071	2.50	PASS
256QAM	100	0	120	-30.00	3.66	3.06	3.99	0.00103	0.00084	0.00108	2.50	PASS
				-20.00	3.59	3.36	3.42	0.00101	0.00093	0.00093	2.50	PASS
				-10.00	3.36	3.07	4.11	0.00094	0.00085	0.00111	2.50	PASS
				0.00	3.05	2.56	3.63	0.00086	0.00071	0.00098	2.50	PASS
				10.00	3.99	4.5	3.08	0.00112	0.00124	0.00083	2.50	PASS
				20.00	2.76	2.63	4.39	0.00078	0.00073	0.00119	2.50	PASS
				30.00	2.77	4.27	4.16	0.00078	0.00118	0.00113	2.50	PASS
				40.00	3.18	2.14	3.36	0.00089	0.00059	0.00091	2.50	PASS
				50.00	2.97	2.7	2.94	0.00083	0.00074	0.00080	2.50	PASS
Note: For this test item, we have done pre-tests under different bandwidths, and only the worst test results are presented												

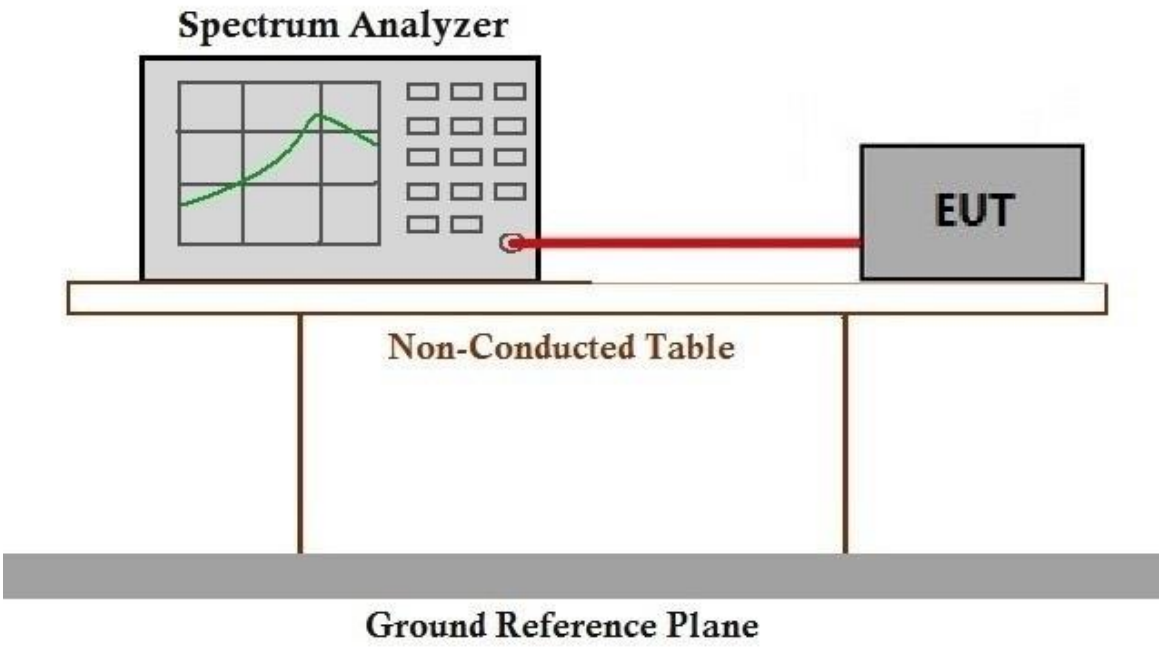
6.8 Modulation Characteristics

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: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: m: Tx mode, Keep the EUT in transmitting mode.

6.8.2 Test Setup Diagram



6.8.3 Measurement Data

Please refer to Appendix F

7 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

8 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -