TEST REPORT

Application No.:	SZEM2006004500CR
Applicant:	BTI Wireless
Address of Applicant:	6185 Phyllis Drive #D, Cypress, California 90630, United States
Manufacturer:	Bravo Tech Inc
Address of Manufacturer:	14600 INDUSTRY CIRCLE LA MIRADA, CA 90638
Factory:	Bravo Tech Inc
Address of Factory:	14600 INDUSTRY CIRCLE LA MIRADA, CA 90638
Equipment Under Test (EUT):	
EUT Name:	LTE Outdoor CPE
Model No.:	CP880-A
FCC ID:	WBKCP880-A
Standard(s) :	47 CFR Part 2
	47 CFR Part 27
Date of Receipt:	2020-06-02
Date of Test:	2020-06-06 to 2020-07-07
Date of Issue:	2020-07-10
Test Result:	**Pass**

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

Keny Xu
EMC Laboratory Manager

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2020-07-10		Original

Authorized for issue by:				
				
		Jacky Li /Project Engineer		
				
		Eric Fu /Reviewer		

2 Test Summary

Test Item	FCC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(h)	EIRP≤ 2W (LTE Band 41)	PASS
Peak-Average Ratio	§27.50(h)	≤13dB	PASS
Modulation Characteristics	§2.1047	Digital modulation	PASS
Bandwidth	§2.1049(h)	OBW: No limit EBW: No limit	PASS
Band Edge Compliance	§2.1051, §27.53(m)	0-5 MHz: -10 dBm; 5-X MHz: -13 dBm; X- More: -25 dBm	PASS
Spurious emissions at antenna terminals	§2.1051, §27.53(m)	≤ -25dBm (LTE Band 41)	PASS
Field strength of spurious radiation	§2.1051, §27.53(m)	≤ -25dBm (LTE Band 41)	PASS
Frequency stability	§2.1055, §27.54	≤ ±2.5ppm.	PASS

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	Adapter Model NO.: ASSA107A-240050 Input: 100-240V~50/60Hz, 0.45A Output: 24.0V, 0.5A POE Model NO.: GRT-HCQ-1000
Test voltage:	AC 120V, 60Hz
Cable:	RJ45 Cable: 100cm DC cable: 148cm unshielded
Sample Type:	Mobile production
LTE Operation Frequency Band:	41
Frequency range:	2496-2690 MHz
Modulation Type:	UL: QPSK, 16QAM, 64QAM DL: QPSK, 16QAM, 64QAM, 256QAM
LTE Release Version:	R11
LTE Power Class:	Level 3
CA Capability:	DL 2CA 4x4 MIMO DL 4CA 2x2 MIMO UL 2CA Support Intra-band contiguous CA and Intra-band non-contiguous CA, not support UL MIMO
MIMO:	DL 2x2 (4CA 256QAM) DL 4x4 (2CA 64QAM)
Antenna Type:	Panel Antenna Ant 1: TX & RX(SISO & UL CA) Ant 3: TX & RX(UL CA) Ant 2 & 4: RX
Antenna Gain:	10 dBi
SIM Card:	This device has only one SIM Card sockets.
Extreme temp. Tolerance:	-30℃ to +50℃
Extreme vol. Limits:	20.4VDC to 27.6VDC (nominal: 24.0VDC)

4.2 Test Frequency

Test mode:	Nominal Bandwidth (MHz)	RF Channel		
		Low (L)	Middle (M)	High (H)
		MHz	MHz	MHz
LTE TDD Band 41	5	2498.5	2593.0	2687.5
	10	2501.0	2593.0	2685.0
	15	2503.5	2593.0	2682.5
	20	2506.0	2593.0	2680.0

4.3 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1015Pa	
Temperature:	TN	25 ℃
Voltage:	VL	20.4 V
	VN	24.0 V
	VH	27.6 V

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

4.4 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	T430u	REF. No.SEA1800

4.5 Measurement Uncertainty

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

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4.6 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.

4.7 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.

4.8 Deviation from Standards

None

4.9 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	2019-09-28	2020-09-27
MXG Vector Signal Generator	KEYSIGHT	N5182A	SEM006-14	2020-03-23	2021-03-22
ESG Vector Signal Generator	KEYSIGHT	E4438C	SEM006-15	2019-09-24	2020-09-23
DC Power Supply	Rohde & Schwarz	NGSM 32/10	SEM011-04	2020-03-24	2021-03-23
Manual Step Attenuator	KEYSIGHT	8494B	SEM021-05	2020-04-09	2021-04-08
Manual Step Attenuator	KEYSIGHT	8496B	SEM021-06	2020-04-09	2021-04-08
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	2020-03-25	2021-03-24
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2020-04-01	2021-03-31
Measurement Software	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-03	2019-07-10	2020-07-09

RE in Chamber (Above 1GHz)					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date**	**Cal. Due date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
EXA Signal Analyzer (10Hz-44GHz)	Agilent Technologies Inc	N9010A	SEM004-12	2020-04-09	2021-04-08
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
				2020-06-27	2023-06-26
Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12

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Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16
Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2019-09-24	2020-09-23
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-24	2020-09-23
Pre-amplifier (26-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2020-04-01	2021-03-31
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2019-07-10	2020-07-09
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2020-04-01	2021-03-31

RE in Chamber (Below 1GHz)					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date**	**Cal. Due date**
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI receiver (3Hz-3.6GHz)	KEYSIGHT	N9038A	SEM004-15	2019-12-16	2020-12-15
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	2020-04-01	2021-03-31
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2019-07-10	2020-07-09
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2020-04-01	2021-03-31

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2019-09-26	2020-09-25
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2020-04-07	2021-04-06

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6 Radio Spectrum Matter Test Results

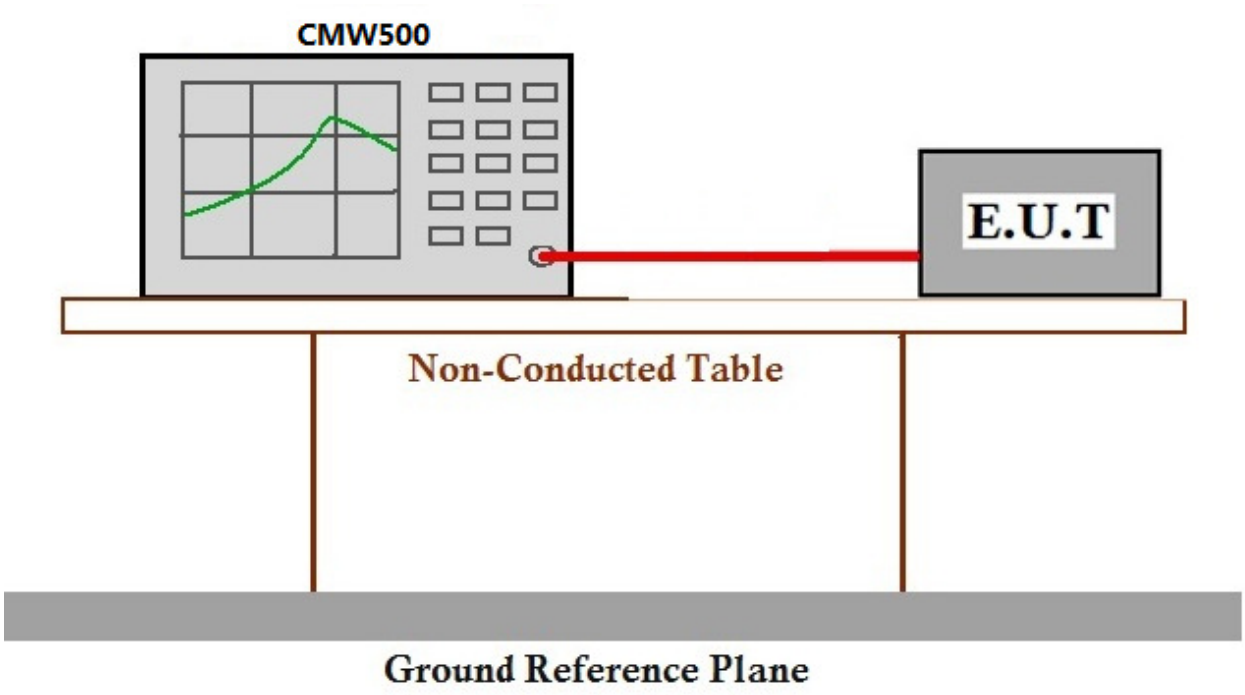
6.1 Effective (Isotropic) Radiated Power Output Data

Test Requirement: §2.1046, §27.50(h)
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: EIRP≤ 2W (LTE Band 41)

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: §27.50(h)

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

Limit: ≤13dB

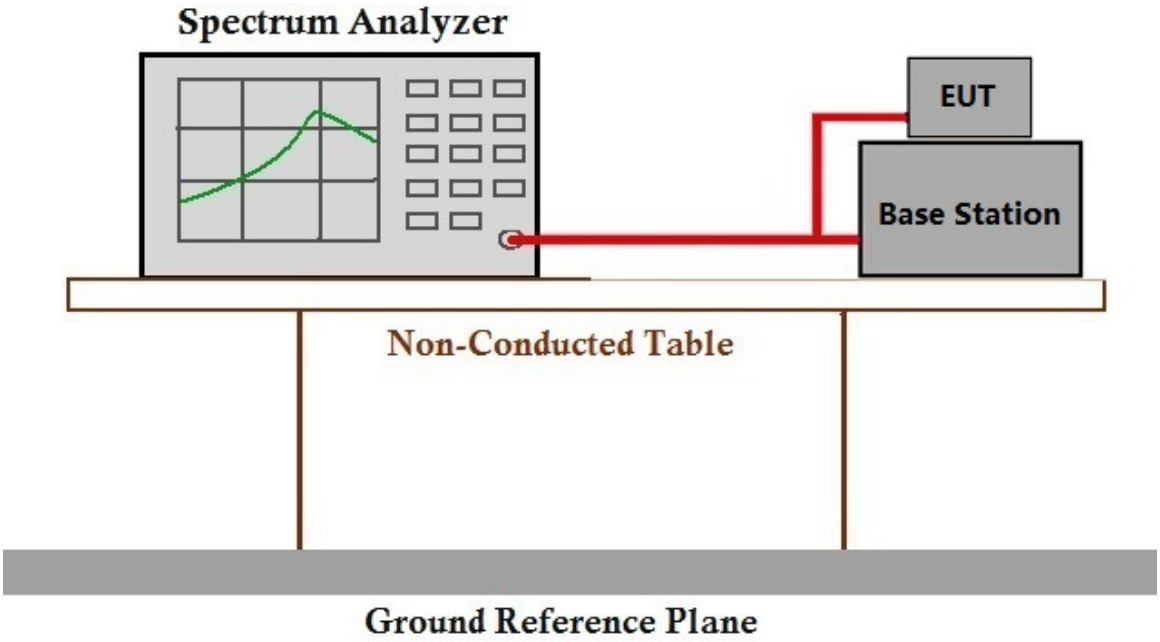
6.2.1 E.U.T. Operation

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

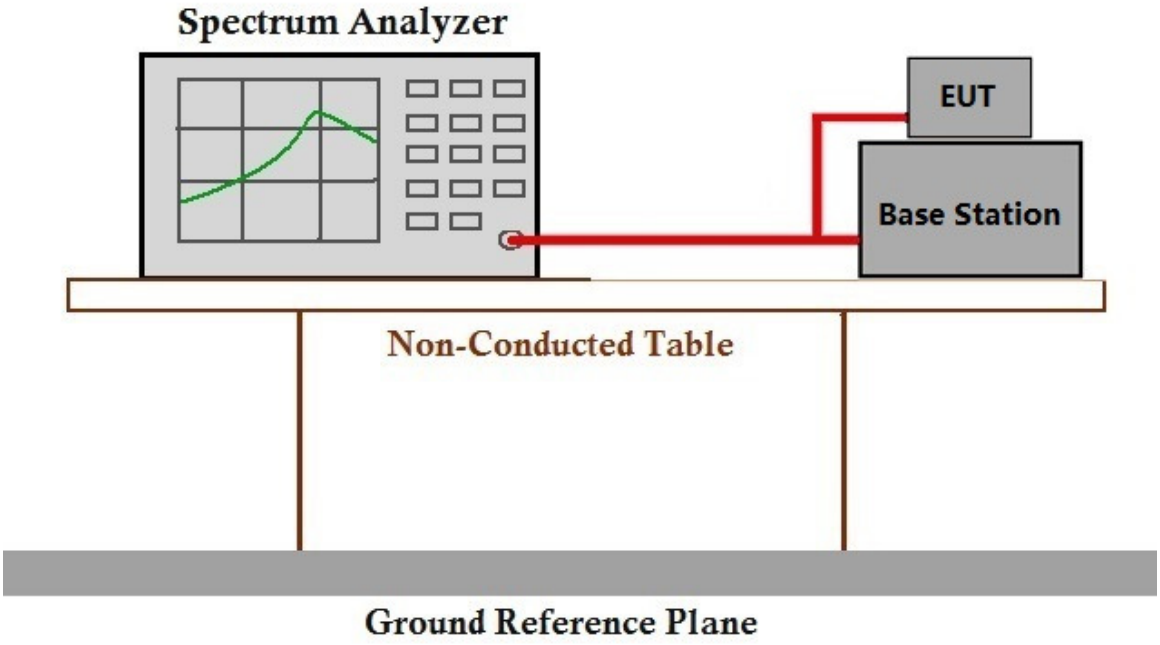
6.3 Bandwidth

Test Requirement: §2.1049(h), §27
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, §27.53(m)

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

Limit: ≤ -13dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block(LTE Band 41)

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. (LTE Band7)

≤50+10*log10(P) at bandedge and for all out-of-band emissions within 37.5KHz of block edge(LTE Band26)

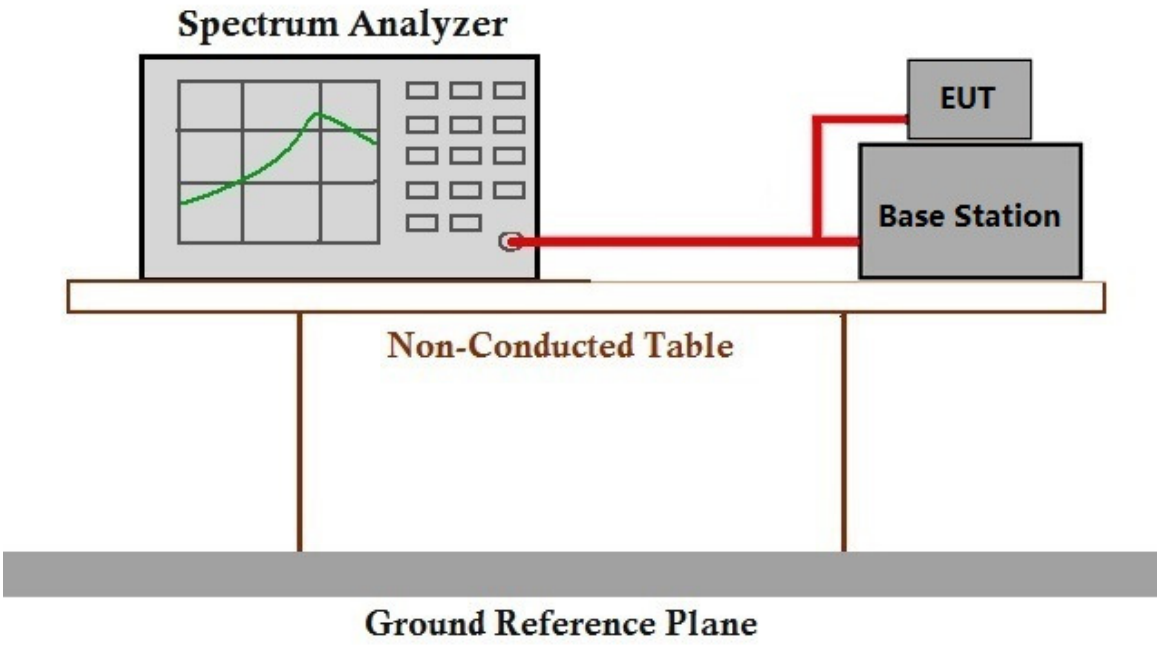
6.4.1 E.U.T. Operation

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- Band Edge

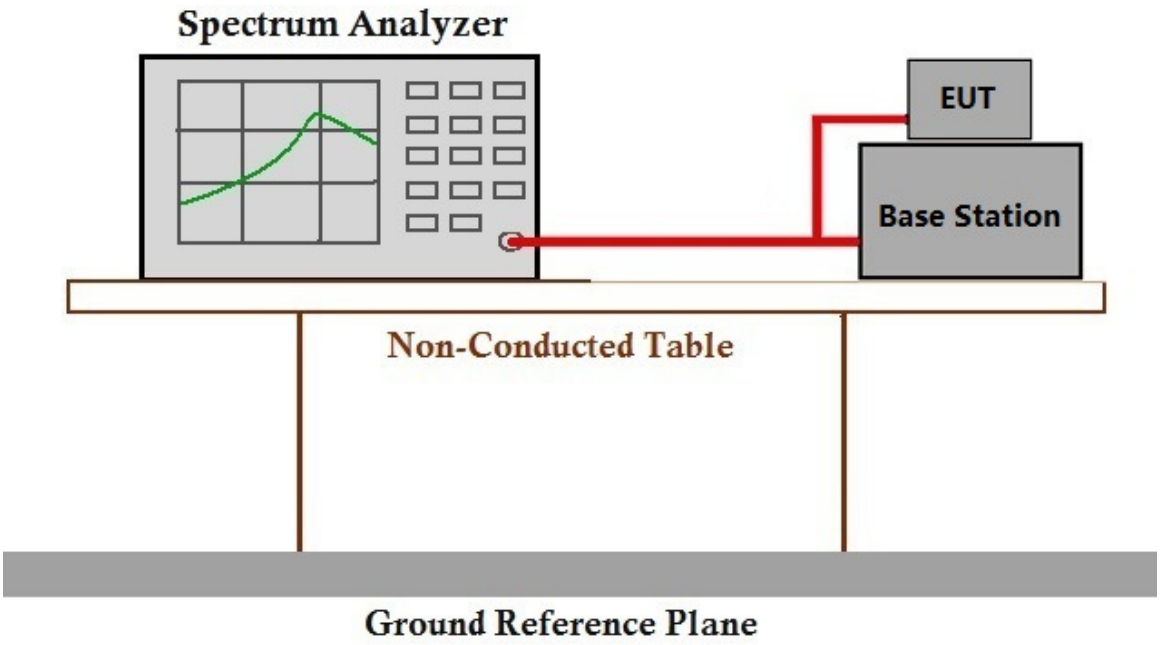
6.5 Spurious emissions at antenna terminals

Test Requirement: §2.1051, §27.53(m)
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: ≤ -25dBm (LTE Band 41)

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- Spurious emissions at antenna terminals

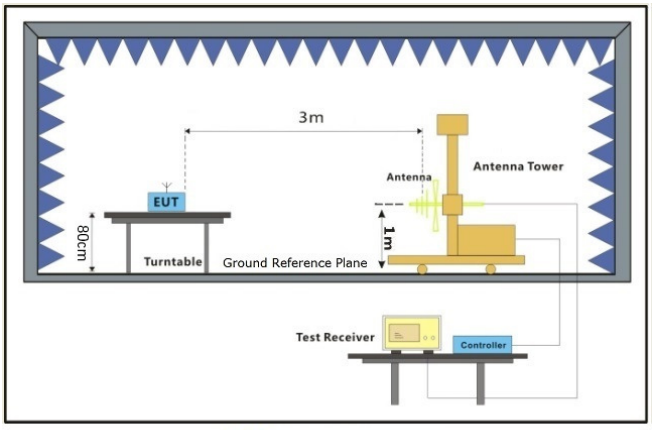
6.6 Field strength of spurious radiation

Test Requirement: §2.1051, §27.53(m)
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: ≤ -25dBm (LTE Band 41)

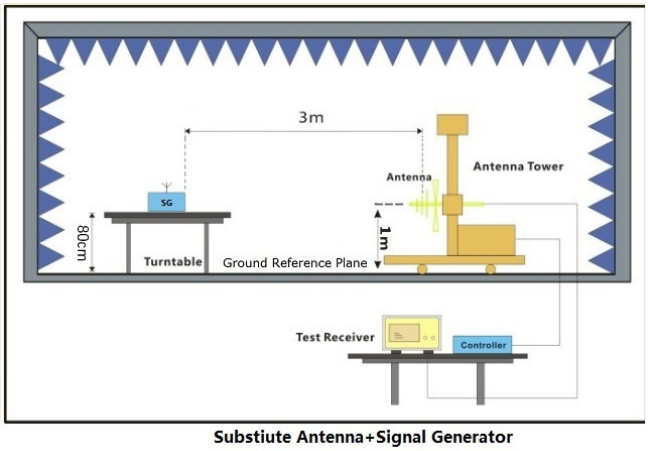
6.6.1 E.U.T. Operation

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.

SISO Ant 1

LTE Band 41_QPSK_5MHz_Low Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
4997	-37.34	0.76	9.7	-28.4	-25	-3.4	Horizontal	Pass
7495.5	-45.05	1	12.9	-33.15	-25	-8.15	Horizontal	Pass
9994	-44.71	1.27	13	-32.98	-25	-7.98	Horizontal	Pass
4997	-39.96	0.76	9.7	-31.02	-25	-6.02	Vertical	Pass
7495.5	-46.08	1	12.9	-34.18	-25	-9.18	Vertical	Pass
9994	-40.13	1.27	13	-28.4	-25	-3.4	Vertical	Pass

LTE Band 41_QPSK_5MHz_Middle Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5186	-37.39	0.82	9.6	-28.61	-25	-3.61	Horizontal	Pass
7779	-44.4	0.99	13.2	-32.19	-25	-7.19	Horizontal	Pass
10372	-41.83	1.26	12.7	-30.39	-25	-5.39	Horizontal	Pass
5186	-38.13	0.82	9.6	-29.35	-25	-4.35	Vertical	Pass
7779	-46.9	0.99	13.2	-34.69	-25	-9.69	Vertical	Pass
10372	-40.92	1.26	12.7	-29.48	-25	-4.48	Vertical	Pass

LTE Band 41_QPSK_5MHz_High Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5375	-40.43	0.82	9.6	-31.65	-25	-6.65	Horizontal	Pass
8062.5	-44.39	1.01	12.9	-32.5	-25	-7.5	Horizontal	Pass
10750	-43.67	1.49	13.5	-31.66	-25	-6.66	Horizontal	Pass
5375	-38.82	0.82	9.6	-30.04	-25	-5.04	Vertical	Pass
8062.5	-43.38	1.01	12.9	-31.49	-25	-6.49	Vertical	Pass
10750	-41.7	1.49	13.5	-29.69	-25	-4.69	Vertical	Pass

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LTE Band 41_QPSK_10MHz_Low Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5002	-40.07	0.82	9.6	-31.29	-25	-6.29	Horizontal	Pass
7503	-44.02	0.99	13.2	-31.81	-25	-6.81	Horizontal	Pass
10004	-41.09	1.26	12.7	-29.65	-25	-4.65	Horizontal	Pass
5002	-41.47	0.82	9.6	-32.69	-25	-7.69	Vertical	Pass
7503	-41.63	0.99	13.2	-29.42	-25	-4.42	Vertical	Pass
10004	-40.61	1.26	12.7	-29.17	-25	-4.17	Vertical	Pass

LTE Band 41_QPSK_10MHz_Middle Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5186	-38.77	0.82	9.6	-29.99	-25	-4.99	Horizontal	Pass
7779	-42.35	0.99	13.2	-30.14	-25	-5.14	Horizontal	Pass
10372	-41.03	1.26	12.7	-29.59	-25	-4.59	Horizontal	Pass
5186	-37.9	0.82	9.6	-29.12	-25	-4.12	Vertical	Pass
7779	-43.47	0.99	13.2	-31.26	-25	-6.26	Vertical	Pass
10372	-40.3	1.26	12.7	-28.86	-25	-3.86	Vertical	Pass

LTE Band 41_QPSK_10MHz_High Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5370	-37.39	0.82	9.6	-28.61	-25	-3.61	Horizontal	Pass
8055	-40.46	1.01	12.9	-28.57	-25	-3.57	Horizontal	Pass
10740	-40.15	1.49	13.5	-28.14	-25	-3.14	Horizontal	Pass
5370	-39.44	0.82	9.6	-30.66	-25	-5.66	Vertical	Pass
8055	-45.5	1.01	12.9	-33.61	-25	-8.61	Vertical	Pass
10740	-40.66	1.49	13.5	-28.65	-25	-3.65	Vertical	Pass

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LTE Band 41_QPSK_15MHz_Low Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5007	-37.88	0.82	9.6	-29.1	-25	-4.1	Horizontal	Pass
7510.5	-45.58	0.99	13.2	-33.37	-25	-8.37	Horizontal	Pass
10014	-40.76	1.26	12.7	-29.32	-25	-4.32	Horizontal	Pass
5007	-39.15	0.82	9.6	-30.37	-25	-5.37	Vertical	Pass
7510.5	-41.37	0.99	13.2	-29.16	-25	-4.16	Vertical	Pass
10014	-41.16	1.26	12.7	-29.72	-25	-4.72	Vertical	Pass

LTE Band 41_QPSK_15MHz_Middle Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5186	-37.89	0.82	9.6	-29.11	-25	-4.11	Horizontal	Pass
7779	-46.79	0.99	13.2	-34.58	-25	-9.58	Horizontal	Pass
10372	-39.24	1.26	12.7	-27.8	-25	-2.8	Horizontal	Pass
5186	-39.67	0.82	9.6	-30.89	-25	-5.89	Vertical	Pass
7779	-46.56	0.99	13.2	-34.35	-25	-9.35	Vertical	Pass
10372	-42.16	1.26	12.7	-30.72	-25	-5.72	Vertical	Pass

LTE Band 41_QPSK_15MHz_High Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5365	-39.74	0.82	9.6	-30.96	-25	-5.96	Horizontal	Pass
8047.5	-47.45	1.01	12.9	-35.56	-25	-10.56	Horizontal	Pass
10730	-45.13	1.49	13.5	-33.12	-25	-8.12	Horizontal	Pass
5365	-38.16	0.82	9.6	-29.38	-25	-4.38	Vertical	Pass
8047.5	-41.99	1.01	12.9	-30.1	-25	-5.1	Vertical	Pass
10730	-40.7	1.49	13.5	-28.69	-25	-3.69	Vertical	Pass

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LTE Band 41_QPSK_20MHz_Low Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5007	-40.24	0.82	9.6	-31.46	-25	-6.46	Horizontal	Pass
7510.5	-43.01	0.99	13.2	-30.8	-25	-5.8	Horizontal	Pass
10014	-44.83	1.26	12.7	-33.39	-25	-8.39	Horizontal	Pass
5007	-38.67	0.82	9.6	-29.89	-25	-4.89	Vertical	Pass
7510.5	-43.3	0.99	13.2	-31.09	-25	-6.09	Vertical	Pass
10014	-41.43	1.26	12.7	-29.99	-25	-4.99	Vertical	Pass

LTE Band 41_QPSK_20MHz_Middle Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5186	-37.66	0.82	9.6	-28.88	-25	-3.88	Horizontal	Pass
7779	-44.01	0.99	13.2	-31.8	-25	-6.8	Horizontal	Pass
10372	-41.03	1.26	12.7	-29.59	-25	-4.59	Horizontal	Pass
5186	-39.97	0.82	9.6	-31.19	-25	-6.19	Vertical	Pass
7779	-46.27	0.99	13.2	-34.06	-25	-9.06	Vertical	Pass
10372	-41.53	1.26	12.7	-30.09	-25	-5.09	Vertical	Pass

LTE Band 41_QPSK_20MHz_High Channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5360	-39.22	0.82	9.6	-30.44	-25	-5.44	Horizontal	Pass
8040	-41.97	1.01	12.9	-30.08	-25	-5.08	Horizontal	Pass
10720	-44.05	1.49	13.5	-32.04	-25	-7.04	Horizontal	Pass
5360	-42.48	0.82	9.6	-33.7	-25	-8.7	Vertical	Pass
8040	-42.56	1.01	12.9	-30.67	-25	-5.67	Vertical	Pass
10720	-41.57	1.49	13.5	-29.56	-25	-4.56	Vertical	Pass

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LTE Band 41_QPSK_ Intra-band CA Non-continuous_5+5 MHz								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
4997	-37.28	0.76	9.7	-28.34	-25	-3.34	Horizontal	Pass
7495.5	-44.76	1	12.9	-32.86	-25	-7.86	Horizontal	Pass
9994	-41.82	1.27	13	-30.09	-25	-5.09	Horizontal	Pass
4997	-38.54	0.76	9.7	-29.6	-25	-4.6	Vertical	Pass
7495.5	-43.78	1	12.9	-31.88	-25	-6.88	Vertical	Pass
9994	-41.91	1.27	13	-30.18	-25	-5.18	Vertical	Pass

LTE Band 41_QPSK_ Intra-band CA Non-continuous_20+20 MHz								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
5375	-37.66	0.82	9.6	-28.88	-25	-3.88	Horizontal	Pass
8062.5	-42.51	1.01	12.9	-30.62	-25	-5.62	Horizontal	Pass
10750	-45.49	1.49	13.5	-33.48	-25	-8.48	Horizontal	Pass
5375	-37.72	0.82	9.6	-28.94	-25	-3.94	Vertical	Pass
8062.5	-42.53	1.01	12.9	-30.64	-25	-5.64	Vertical	Pass
10750	-46.03	1.49	13.5	-34.02	-25	-9.02	Vertical	Pass

Remark:

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

2) We have tested all mode, modulation and all Channel, but only the worst-case data displayed in this report.

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6.7 Frequency stability

Test Requirement: §2.1055, §27.54

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

Limit: ≤ ±2.5ppm.

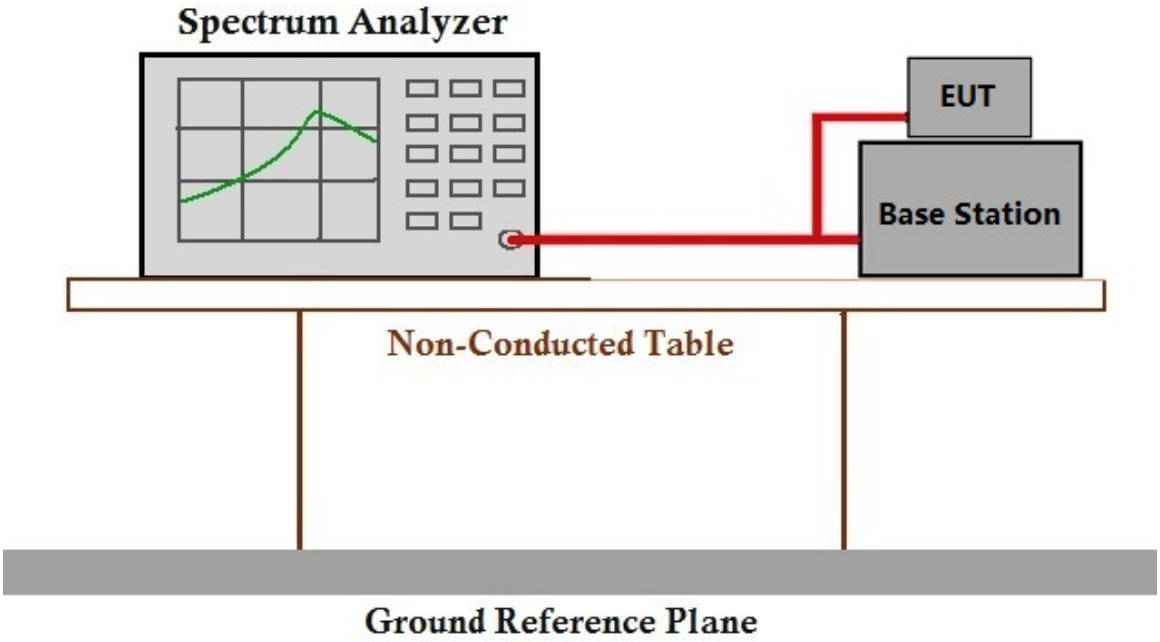
6.7.1 E.U.T. Operation

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

Please refer to Appendix F

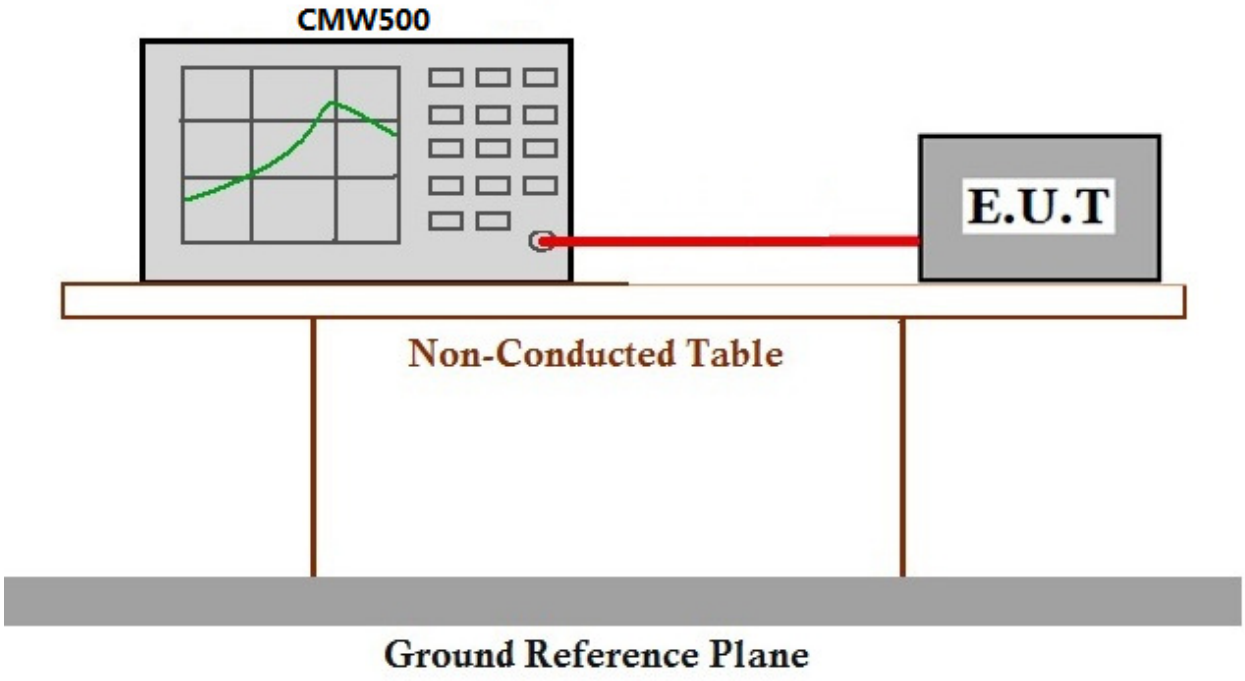
6.8 Modulation Characteristics

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 Photographs

7.1 Setup photo

Please refer to setup photos.

7.2 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for details.

8 Appendix F

8.1 7.1. Frequency stability

7.1.1 Test Result

Test Band: 41 _ 5MHz Bandwidth (Frequency Error VS. Voltage)												
Test Mode	RB Allocation		Test Temp.	Test Volt.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
64QAM	25	0	NT	LV	-4	3	5	-0.0016	0.0012	0.0019	2.50	PASS
				NV	7	-1	7	0.0028	-0.0004	0.0026	2.50	PASS
				HV	2	-6	2	0.0008	-0.0023	0.0007	2.50	PASS
16QAM	25	0	NT	LV	10	2	-6	0.0040	0.0008	-0.0022	2.50	PASS
				NV	4	-5	5	0.0016	-0.0019	0.0019	2.50	PASS
				HV	2	-1	7	0.0008	-0.0004	0.0026	2.50	PASS
QPSK	25	0	NT	LV	-10	1	-8	-0.0040	0.0004	-0.0030	2.50	PASS
				NV	2	-3	-7	0.0008	-0.0012	-0.0026	2.50	PASS
				HV	0	8	6	0.0000	0.0031	0.0022	2.50	PASS

Test Band: 41 _ 5MHz Bandwidth (Frequency Error VS. Temperature)												
Test Mode	RB Allocation		Test Volt.	Test Temp.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
64QAM	25	0	NV	-30.00	-9	3	-3	-0.0036	0.0012	-0.0011	2.50	PASS
				-20.00	9	-4	-10	0.0036	-0.0015	-0.0037	2.50	PASS
				-10.00	-1	2	-8	-0.0004	0.0008	-0.0030	2.50	PASS
				0.00	-6	9	10	-0.0024	0.0035	0.0037	2.50	PASS
				10.00	8	-10	8	0.0032	-0.0039	0.0030	2.50	PASS
				20.00	-10	7	7	-0.0040	0.0027	0.0026	2.50	PASS
				30.00	-7	-9	6	-0.0028	-0.0035	0.0022	2.50	PASS
				40.00	-5	9	-10	-0.0020	0.0035	-0.0037	2.50	PASS
				50.00	-1	-5	2	-0.0004	-0.0019	0.0007	2.50	PASS
16QAM	25	0	NV	-30.00	7	1	0	0.0028	0.0004	0.0000	2.50	PASS
				-20.00	4	8	10	0.0016	0.0031	0.0037	2.50	PASS
				-10.00	-1	9	0	-0.0004	0.0035	0.0000	2.50	PASS
				0.00	-9	1	-9	-0.0036	0.0004	-0.0033	2.50	PASS
				10.00	9	2	-10	0.0036	0.0008	-0.0037	2.50	PASS
				20.00	10	7	-2	0.0040	0.0027	-0.0007	2.50	PASS
				30.00	-9	-4	-5	-0.0036	-0.0015	-0.0019	2.50	PASS
				40.00	-10	1	6	-0.0040	0.0004	0.0022	2.50	PASS
				50.00	5	8	7	0.0020	0.0031	0.0026	2.50	PASS

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QPSK	25	0	NV	-30.00	-5	3	7	-0.0020	0.0012	0.0026	2.50	PASS
				-20.00	4	-6	-9	0.0016	-0.0023	-0.0033	2.50	PASS
				-10.00	7	2	3	0.0028	0.0008	0.0011	2.50	PASS
				0.00	5	-1	-8	0.0020	-0.0004	-0.0030	2.50	PASS
				10.00	2	-1	-3	0.0008	-0.0004	-0.0011	2.50	PASS
				20.00	4	-1	10	0.0016	-0.0004	0.0037	2.50	PASS
				30.00	-5	-7	9	-0.0020	-0.0027	0.0033	2.50	PASS
				40.00	-5	8	-8	-0.0020	0.0031	-0.0030	2.50	PASS
				50.00	4	0	-7	0.0016	0.0000	-0.0026	2.50	PASS

Test Band: 41 _ 10MHz Bandwidth (Frequency Error VS. Voltage)												
Test Mode	RB Allocation		Test Temp.	Test Volt.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
64QAM	50	0	NT	LV	4	2	-7	0.0016	0.0008	-0.0026	2.50	PASS
				NV	0	6	1	0.0000	0.0023	0.0004	2.50	PASS
				HV	-2	7	-4	-0.0008	0.0027	-0.0015	2.50	PASS
16QAM	50	0	NT	LV	5	7	4	0.0020	0.0027	0.0015	2.50	PASS
				NV	7	-7	8	0.0028	-0.0027	0.0030	2.50	PASS
				HV	-1	7	-7	-0.0004	0.0027	-0.0026	2.50	PASS
QPSK	50	0	NT	LV	-4	-6	5	-0.0016	-0.0023	0.0019	2.50	PASS
				NV	-9	4	-4	-0.0036	0.0015	-0.0015	2.50	PASS
				HV	-6	5	9	-0.0024	0.0019	0.0034	2.50	PASS

Test Band: 41 _ 10MHz Bandwidth (Frequency Error VS. Temperature)												
Test Mode	RB Allocation		Test Volt.	Test Temp.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
64QAM	50	0	NV	-30.00	2	1	2	0.0008	0.0004	0.0007	2.50	PASS
				-20.00	-4	-4	-5	-0.0016	-0.0015	-0.0019	2.50	PASS
				-10.00	2	5	-3	0.0008	0.0019	-0.0011	2.50	PASS
				0.00	-6	-9	-1	-0.0024	-0.0035	-0.0004	2.50	PASS
				10.00	-10	4	-10	-0.0040	0.0015	-0.0037	2.50	PASS
				20.00	-6	-7	-1	-0.0024	-0.0027	-0.0004	2.50	PASS
				30.00	7	8	8	0.0028	0.0031	0.0030	2.50	PASS
				40.00	-4	-6	-10	-0.0016	-0.0023	-0.0037	2.50	PASS
				50.00	-2	3	-8	-0.0008	0.0012	-0.0030	2.50	PASS
16QAM	50	0	NV	-30.00	-5	-7	2	-0.0020	-0.0027	0.0007	2.50	PASS
				-20.00	-9	-7	-1	-0.0036	-0.0027	-0.0004	2.50	PASS
				-10.00	-7	-6	-3	-0.0028	-0.0023	-0.0011	2.50	PASS
				0.00	5	4	-6	0.0020	0.0015	-0.0022	2.50	PASS

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				10.00	-10	-9	-8	-0.0040	-0.0035	-0.0030	2.50	PASS
				20.00	9	-9	5	0.0036	-0.0035	0.0019	2.50	PASS
				30.00	-4	-4	-8	-0.0016	-0.0015	-0.0030	2.50	PASS
				40.00	-2	5	-8	-0.0008	0.0019	-0.0030	2.50	PASS
				50.00	4	-8	1	0.0016	-0.0031	0.0004	2.50	PASS
QPSK	50	0	NV	-30.00	-6	-4	7	-0.0024	-0.0015	0.0026	2.50	PASS
				-20.00	9	6	7	0.0036	0.0023	0.0026	2.50	PASS
				-10.00	-6	2	1	-0.0024	0.0008	0.0004	2.50	PASS
				0.00	-7	10	-7	-0.0028	0.0039	-0.0026	2.50	PASS
				10.00	6	-8	0	0.0024	-0.0031	0.0000	2.50	PASS
				20.00	9	9	-2	0.0036	0.0035	-0.0007	2.50	PASS
				30.00	-7	5	4	-0.0028	0.0019	0.0015	2.50	PASS
				40.00	-10	9	-2	-0.0040	0.0035	-0.0007	2.50	PASS
				50.00	-10	-7	-1	-0.0040	-0.0027	-0.0004	2.50	PASS

Test Band: 41 _ 15MHz Bandwidth (Frequency Error VS. Voltage)												
Test Mode	RB Allocation		Test Temp.	Test Volt.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
64QAM	75	0	NT	LV	4	-2	-9	0.0016	-0.0008	-0.0034	2.50	PASS
				NV	-3	-6	4	-0.0012	-0.0023	0.0015	2.50	PASS
				HV	5	-7	4	0.0020	-0.0027	0.0015	2.50	PASS
16QAM	75	0	NT	LV	-2	6	9	-0.0008	0.0023	0.0034	2.50	PASS
				NV	3	5	8	0.0012	0.0019	0.0030	2.50	PASS
				HV	0	-3	-7	0.0000	-0.0012	-0.0026	2.50	PASS
QPSK	75	0	NT	LV	4	2	-10	0.0016	0.0008	-0.0037	2.50	PASS
				NV	0	-3	0	0.0000	-0.0012	0.0000	2.50	PASS
				HV	1	2	-10	0.0004	0.0008	-0.0037	2.50	PASS

Test Band: 41 _ 15MHz Bandwidth (Frequency Error VS. Temperature)												
Test Mode	RB Allocation		Test Volt.	Test Temp.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
64QAM	75	0	NV	-30.00	-9	3	3	-0.0036	0.0012	0.0011	2.50	PASS
				-20.00	-6	-8	1	-0.0024	-0.0031	0.0004	2.50	PASS
				-10.00	1	-2	6	0.0004	-0.0008	0.0022	2.50	PASS
				0.00	-1	5	5	-0.0004	0.0019	0.0019	2.50	PASS
				10.00	4	-3	0	0.0016	-0.0012	0.0000	2.50	PASS
				20.00	-4	8	10	-0.0016	0.0031	0.0037	2.50	PASS
				30.00	1	-8	0	0.0004	-0.0031	0.0000	2.50	PASS
				40.00	-6	-6	-3	-0.0024	-0.0023	-0.0011	2.50	PASS

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				50.00	-8	-10	-4	-0.0032	-0.0039	-0.0015	2.50	PASS
16QAM	75	0	NV	-30.00	8	1	-6	0.0032	0.0004	-0.0022	2.50	PASS
				-20.00	-10	5	-6	-0.0040	0.0019	-0.0022	2.50	PASS
				-10.00	5	9	-8	0.0020	0.0035	-0.0030	2.50	PASS
				0.00	0	6	0	0.0000	0.0023	0.0000	2.50	PASS
				10.00	-4	-4	-9	-0.0016	-0.0015	-0.0034	2.50	PASS
				20.00	-2	1	6	-0.0008	0.0004	0.0022	2.50	PASS
				30.00	-1	3	5	-0.0004	0.0012	0.0019	2.50	PASS
				40.00	9	-1	4	0.0036	-0.0004	0.0015	2.50	PASS
				50.00	-10	2	-2	-0.0040	0.0008	-0.0007	2.50	PASS
QPSK	75	0	NV	-30.00	-4	7	4	-0.0016	0.0027	0.0015	2.50	PASS
				-20.00	0	8	-4	0.0000	0.0031	-0.0015	2.50	PASS
				-10.00	-9	-7	-6	-0.0036	-0.0027	-0.0022	2.50	PASS
				0.00	-1	0	-5	-0.0004	0.0000	-0.0019	2.50	PASS
				10.00	9	2	-1	0.0036	0.0008	-0.0004	2.50	PASS
				20.00	-2	-6	8	-0.0008	-0.0023	0.0030	2.50	PASS
				30.00	-6	0	-1	-0.0024	0.0000	-0.0004	2.50	PASS
				40.00	7	4	-2	0.0028	0.0015	-0.0007	2.50	PASS
				50.00	-4	-3	-4	-0.0016	-0.0012	-0.0015	2.50	PASS

Test Band: 41 _ 20MHz Bandwidth (Frequency Error VS. Voltage)

Test Mode	RB Allocation		Test Temp.	Test Volt.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
64QAM	100	0	NT	LV	-5	5	3	-0.0020	0.0019	0.0011	2.50	PASS
				NV	-8	-10	2	-0.0032	-0.0039	0.0007	2.50	PASS
				HV	-6	9	5	-0.0024	0.0035	0.0019	2.50	PASS
16QAM	100	0	NT	LV	4	7	-6	0.0016	0.0027	-0.0022	2.50	PASS
				NV	2	5	3	0.0008	0.0019	0.0011	2.50	PASS
				HV	0	-5	0	0.0000	-0.0019	0.0000	2.50	PASS
QPSK	100	0	NT	LV	8	6	-8	0.0032	0.0023	-0.0030	2.50	PASS
				NV	3	-10	2	0.0012	-0.0039	0.0007	2.50	PASS
				HV	-4	-6	2	-0.0016	-0.0023	0.0007	2.50	PASS

Test Band: 41 _ 20MHz Bandwidth (Frequency Error VS. Temperature)

Test Mode	RB Allocation		Test Volt.	Test Temp.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
64QAM	100	0	NV	-30.00	10	-9	-6	0.0040	-0.0035	-0.0022	2.50	PASS
				-20.00	-6	-5	4	-0.0024	-0.0019	0.0015	2.50	PASS
				-10.00	2	6	-4	0.0008	0.0023	-0.0015	2.50	PASS

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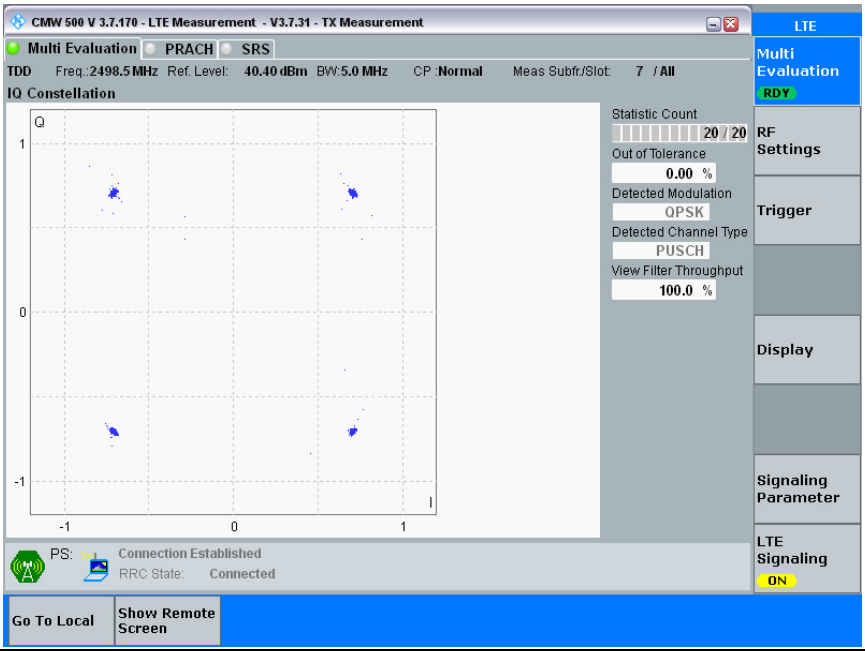
				0.00	4	7	-10	0.0016	0.0027	-0.0037	2.50	PASS
				10.00	9	0	-10	0.0036	0.0000	-0.0037	2.50	PASS
				20.00	-10	3	3	-0.0040	0.0012	0.0011	2.50	PASS
				30.00	10	-5	-8	0.0040	-0.0019	-0.0030	2.50	PASS
				40.00	-3	-2	-9	-0.0012	-0.0008	-0.0034	2.50	PASS
				50.00	-4	-4	-9	-0.0016	-0.0015	-0.0034	2.50	PASS
16QAM	100	0	NV	-30.00	-3	-1	-1	-0.0012	-0.0004	-0.0004	2.50	PASS
				-20.00	3	-5	7	0.0012	-0.0019	0.0026	2.50	PASS
				-10.00	3	-1	1	0.0012	-0.0004	0.0004	2.50	PASS
				0.00	3	-1	-2	0.0012	-0.0004	-0.0007	2.50	PASS
				10.00	2	3	3	0.0008	0.0012	0.0011	2.50	PASS
				20.00	8	9	10	0.0032	0.0035	0.0037	2.50	PASS
				30.00	9	0	-9	0.0036	0.0000	-0.0034	2.50	PASS
				40.00	-8	-8	-2	-0.0032	-0.0031	-0.0007	2.50	PASS
				50.00	5	3	9	0.0020	0.0012	0.0034	2.50	PASS
QPSK	100	0	NV	-30.00	2	-10	5	0.0008	-0.0039	0.0019	2.50	PASS
				-20.00	-1	-4	-8	-0.0004	-0.0015	-0.0030	2.50	PASS
				-10.00	3	8	7	0.0012	0.0031	0.0026	2.50	PASS
				0.00	10	5	1	0.0040	0.0019	0.0004	2.50	PASS
				10.00	8	-2	-6	0.0032	-0.0008	-0.0022	2.50	PASS
				20.00	9	8	2	0.0036	0.0031	0.0007	2.50	PASS
				30.00	6	4	-8	0.0024	0.0015	-0.0030	2.50	PASS
				40.00	1	-5	-10	0.0004	-0.0019	-0.0037	2.50	PASS
				50.00	-10	-3	-10	-0.0040	-0.0012	-0.0037	2.50	PASS

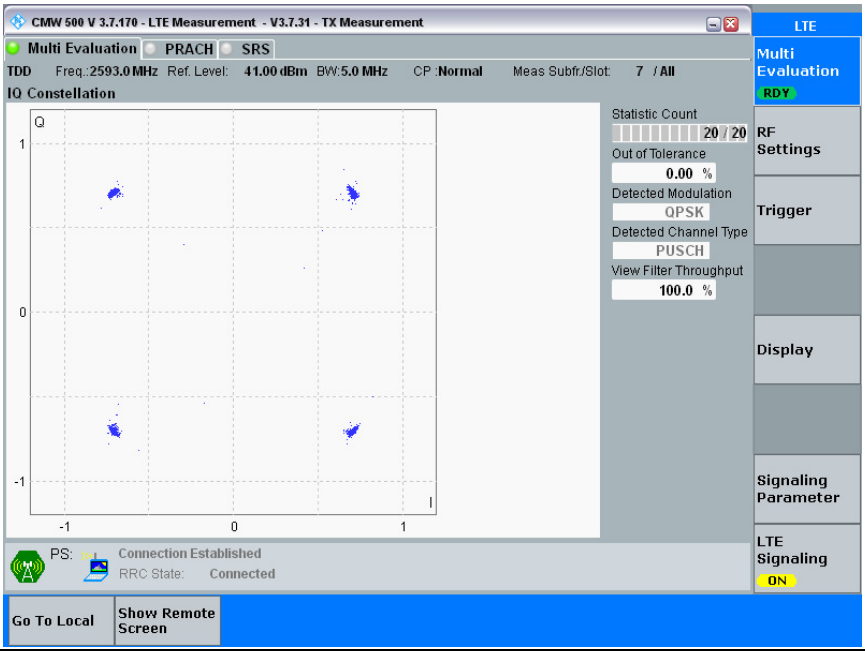
7.2. Modulation Characteristics

7.2.1 Test Graph

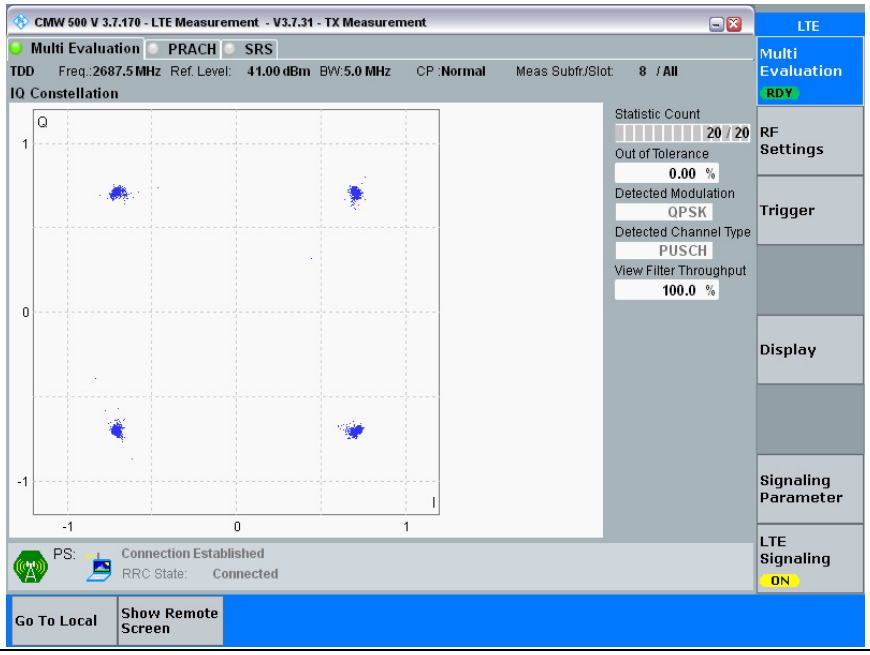
LTE Band 41 QPSK 5MHz LCH



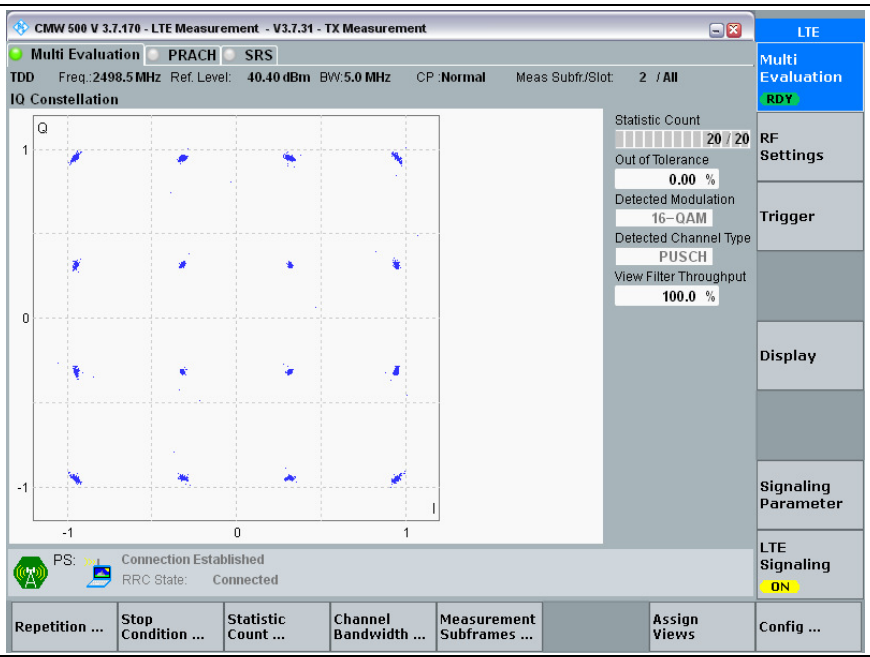
LTE Band 41 QPSK 5MHz MCH



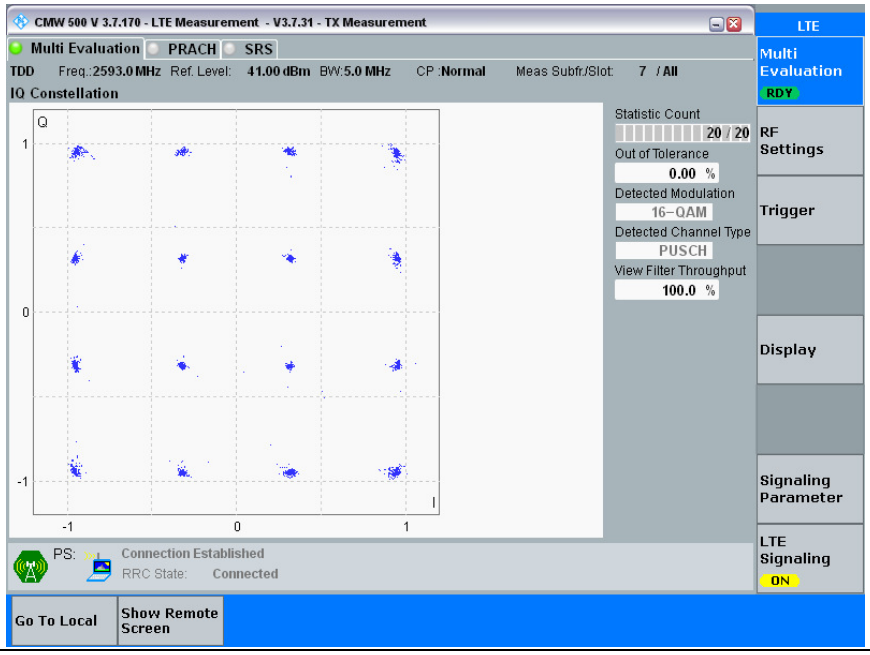
LTE Band 41 QPSK 5MHz HCH



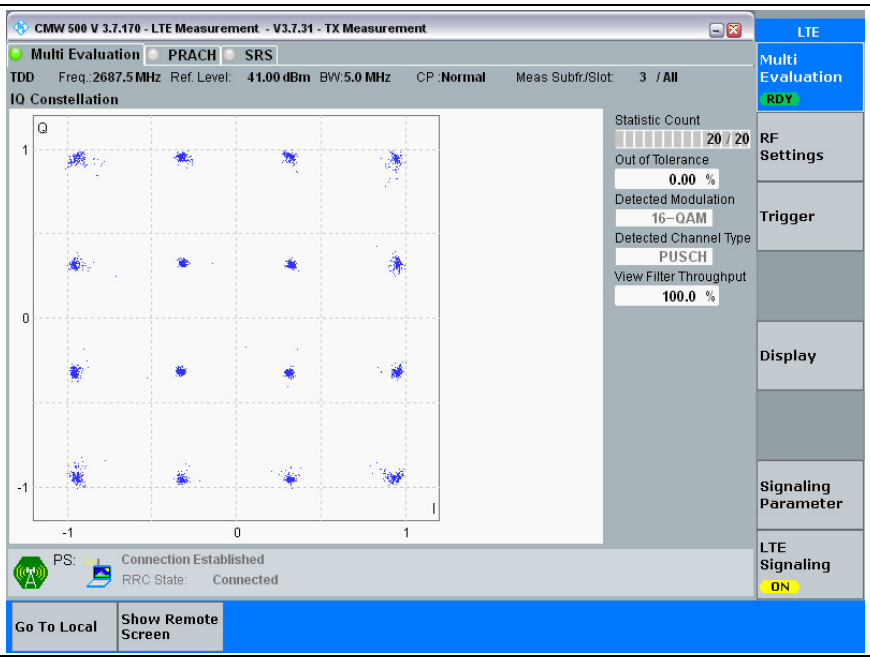
LTE Band 41 16QAM 5MHz LCH

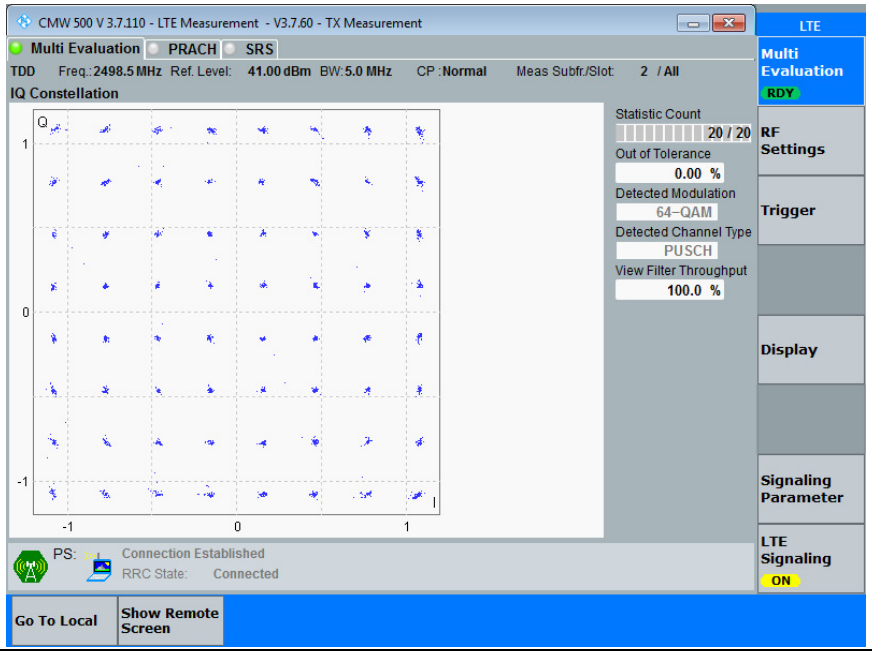
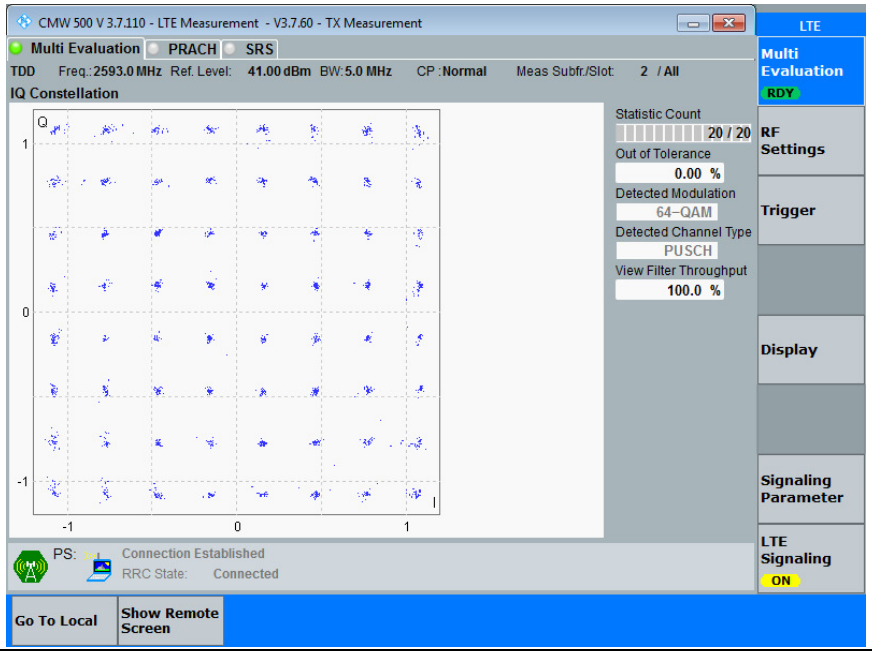


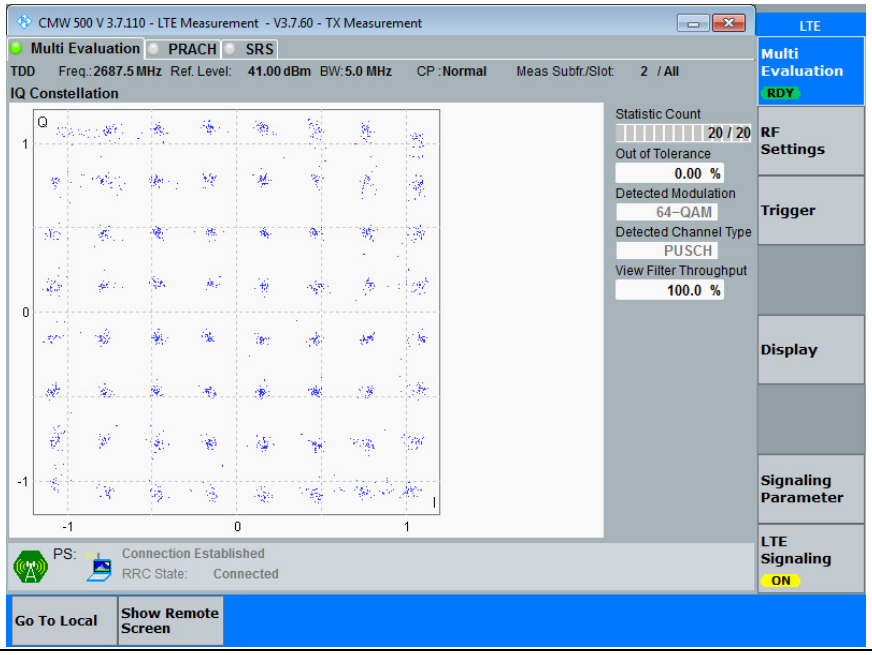
LTE Band 41 16QAM 5MHz MCH



LTE Band 41 16QAM 5MHz HCH



LTE Band 41 64QAM 5MHz LCH

LTE Band 41 64QAM 5MHz MCH


LTE Band 41 64QAM 5MHz HCH


- End of the Report -