FCC CFR47 PART 22H, 24E, 27
CERTIFICATION TEST REPORT
FCC ID: 2AULE-TAZPADLTR

Product：	TazPad LTR
Trade Mark：	TazTag
Model Number：	TazPad LTR
Family Model：	TazPad LTR7, TazPad LTR8
Report No.：	STR190826001006E

Prepared for

TazTag

24 Rue de Rennes 35230 Noyal-Chatillon, France

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.
1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street
Bao'an District, Shenzhen 518126 P.R. China
Tel.: +86-755-6115 6588 Fax.: +86-755-6115 6599
Website:http://www.ntek.org.cn

TEST RESULT CERTIFICATION

Applicant's name ..... :	TazTag
Address ..... :	24 Rue de Rennes 35230 Noyal-Chatillon, France
Manufacturer's Name ..... :	EATONE TECHNOLOGY CO.,LTD
Address ..... :	1018-1019, China Merchants Tower, Sea World, NanShan, ShenZhen, PRC
Product name ..... :	TazPad LTR
Model and/or type reference ...:	TazPad LTR
Family Model:	TazPad LTR7, TazPad LTR8
Standards ..... :	FCC CFR 47 Part 22H, Part 24E, Part 27
Test procedure ..... :	ANSI C63.26:2015 ANSI/TIA-603-E-2016

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test .....

Date (s) of performance of tests ..... 26 Aug. 2019 ~ 16 Sep, 2019

Date of Issue ..... 16 Sep, 2019

Test Result ..... **Pass**

Testing Engineer : Mary. Hu

(Mary Hu)

Technical Manager : Jason Chen

(Jason Chen)

Authorized Signatory : Sam. Chen

(Sam Chen)

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	TazPad LTR
Trade Mark	TazTag
Model Name	TazPad LTR
Family Model	TazPad LTR7, TazPad LTR8
Model Difference	All models are the same circuit and RF module, except the model name.
FCC ID:	2AULE-TAZPADLTR
Frequency Bands:	U.S. Bands: ☒LTE FDD Band 2,4,5,7,12
Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE FDD Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE-FDD Band 7 Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz; LTE FDD Band 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz;
Type of Modulation:	QPSK/16QAM
SIM Card	SIM 1 and SIM 2 is a chipset unit and tested as a single chipset. The SIM 1 is chosen for test.
Antenna:	FPCB Antenna
Antenna gain:	0dBi
Power Supply:	☒DC supply: 3.7V/8000mAh from Battery or DC 12V from DC Port.
Adapter:	☒Adapter supply: Model: GME36A-120300FXR Input: 100-240V~50/60Hz 1.2A Output: 12V⎓3A
Extreme Vol. Limits:	DC 3.2V to DC 4.3V (Nominal DC 3.7V)（Note 1）
HW Version	G909-MB-V04
SW Version	TazTag_TazPad_LTR_MP_V1.0
** Note1: The High Voltage DC 4.4V and Low Voltage 3.3V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.	

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AULE-TAZPADLTR** filing to comply with the FCC Part 22H&24E &27.

1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-E-2016, FCC CFR 47 Part 2, Part 22, Part 24, Part 27, ANSI C63.26:2015.

1.4 TEST FACILITY

The test site used to collect the radiated data is located at:

ShenZhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R.China.

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.26:2015& ANSI C63.4: 2014.

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.5dB

1.5 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

1.6 WORST-CASE CONFIGURATION AND MODE

The worst-case scenario for all measurements is based on the investigation results.

The device has LTE Bands of: Band 2, Band 4, Band 5, Band 7, Band 12

The RB Size was selected to measure for peak or average ERP and EIRP, which was based on the conducted power verification baseline data.

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientations of the EUT alone. After the investigations the worst case was determined to be at X orientation for all LTE bands.

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

2.3 CONFIGURATION OF EUT SYSTEM

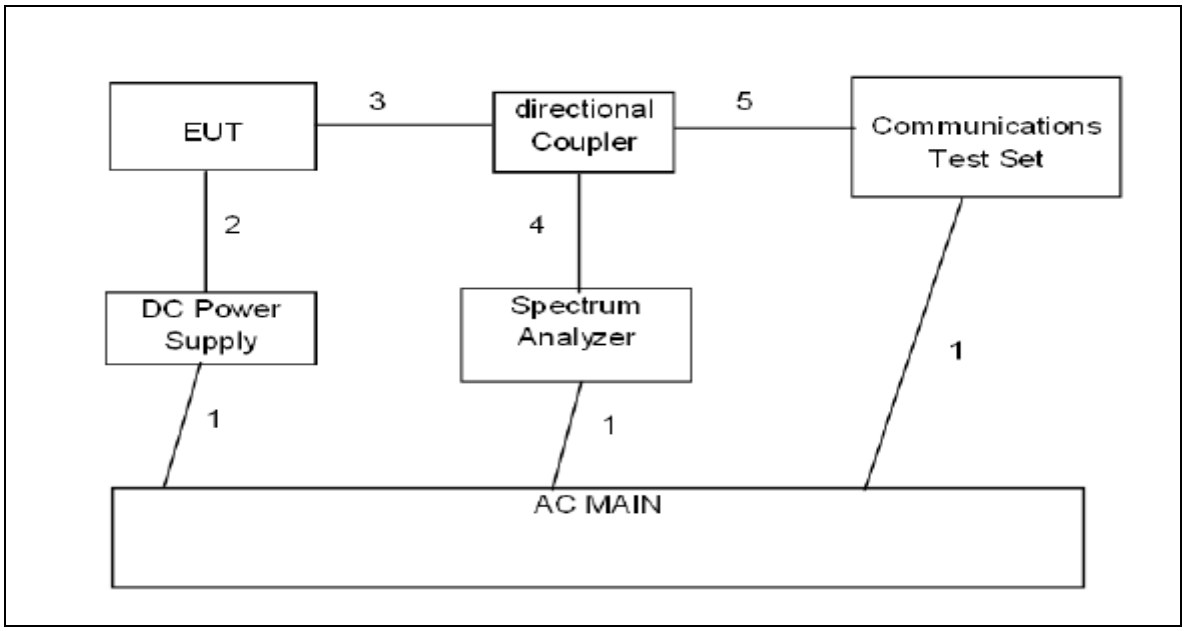
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	TazPad LTR	TazPad LTR	FCC ID: 2AULE-TAZPADLTR	EUT

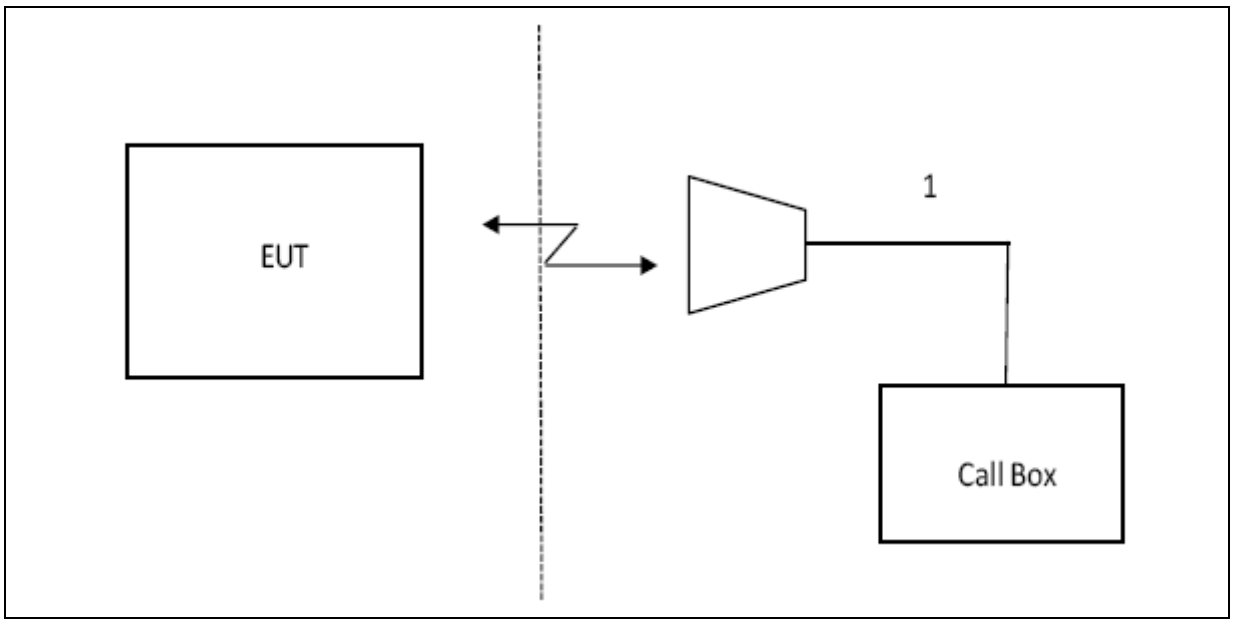
Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.

2.4 TEST SETUP

CONDUCTED SETUP DIAGRAM FOR TESTS



RADIATED SETUP DIAGRAM FOR TESTS



3.TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	NEXT CAL. DATE
SPECTRUM ANALYZER	AGILENT	N9020A	MY49100060	2019.10.07
TEST RECEIVER	R&S	ESCI	A0304218	2020.05.12
COMMUNICATION TESTER	R&S	CMU200	117858	2020.05.12
COMMUNICATION TESTER	R&S	CMW500	148500	2020.05.12
TEST RECEIVER	R&S	ESPI	101318	2020.05.12
LISN	SCHWARZBECK	NSLK8127	A0304233	2020.05.12
CLIMATE CHAMBER	ALBATROSS	--	--	2020.05.12
Loop Antenna	ARA	PLA-1030/B	1029	2020.05.12
Bilogical Antenna	TESEQ	CBL6111D	31216	2020.05.12
Horn Antenna	EM	EM-AH-10180	2011071402	2020.05.12
DC Power Source	N/A	PS-6005D	20170402923	2020.05.12

4. OUTPUT POWER

4.1 OUTPUT POWER MEASUREMENT

LTE Measurement Procedure:

All LTE bands conducted power peak and average are obtained from the CMW500 telecommunication test set. The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of “NS_01”.3

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
--					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

Test data reference attachment.

5. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

MODES TESTED

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53, and §90.691
FCC: §22.359

LIMITS

FCC: §22.359, §24.238,
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

(m)(4) 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.Show citation box.

TEST PROCEDURE

The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.
For each band edge measurement:
Set the spectrum analyzer span to include the block edge frequency (704, 716, 824, 849, 1710 and 1755, 1850 and 1910MHz)
Set a marker to point the corresponding band edge frequency in each test case.
Set display line at -13 dBm
Set resolution bandwidth to at least 1% of emission bandwidth.

MODES TESTED

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12

RESULTS

Test data reference attachment.

7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238 and §27.53

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

- Set display line at-13 dBm
- Set RBW & VBW to 100 kHz for the measurementbelow 1 GHz, and 1 MHz for the measurement above 1 GHz.

MODES TESTED

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12

7.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

Test data reference attachment.

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232 and §27.50

LIMITS:

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.
27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.
27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17
KDB 971168 v02r01 RF power output using broadband peak and average power meter method.
KDB 971168 D01 Power Meas License Digital Systems v02r01, “Measurement Guidance for Certification of Licensed Digital Transmitters”

MODES TESTED

- ☐ LTE Band 2
- LTE Band 4
- ☐ LTE Band 5
- LTE Band 7
- LTE Band 12

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1850.7	-0.36	3.76	28.24	24.12	258.437	Vertical	Pass
		1880	0.26	3.91	28.22	24.57	286.287	Vertical	Pass
		1909.3	0.23	3.93	28.20	24.50	281.595	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-1.13	3.76	28.24	23.35	216.251	Vertical	Pass
		1880	-1.34	3.91	28.22	22.97	197.986	Vertical	Pass
		1909.3	-1.13	3.93	28.20	23.14	206.243	Vertical	Pass
3.0MHz Band QPSK	15/0	1851.5	-0.07	3.77	28.23	24.39	274.647	Vertical	Pass
		1880	0.40	3.91	28.24	24.73	297.302	Vertical	Pass
		1908.5	0.31	3.94	28.25	24.62	289.507	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-0.61	3.77	28.23	23.85	242.773	Vertical	Pass
		1880	-0.54	3.91	28.24	23.79	239.488	Vertical	Pass
		1908.5	-0.82	3.94	28.25	23.49	223.546	Vertical	Pass
5.0MHz Band QPSK	25/0	1852.5	-0.12	3.77	28.31	24.42	276.935	Vertical	Pass
		1880	0.16	3.91	28.22	24.47	280.119	Vertical	Pass
		1907.5	0.12	3.94	28.20	24.38	274.448	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-1.24	3.77	28.31	23.30	213.743	Vertical	Pass
		1880	-0.77	3.91	28.22	23.54	226.081	Vertical	Pass
		1907.5	-0.58	3.94	28.20	23.68	233.582	Vertical	Pass
10.0MHz Band QPSK	50/0	1855	0.12	3.79	28.33	24.66	292.443	Vertical	Pass
		1880	-0.14	3.95	28.22	24.13	258.980	Vertical	Pass
		1905	0.34	3.97	28.19	24.56	285.485	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1855	-0.89	3.79	28.33	23.65	231.492	Vertical	Pass
		1880	-0.92	3.95	28.22	23.35	216.265	Vertical	Pass
		1905	-1.04	3.97	28.19	23.18	207.982	Vertical	Pass
15.0MHz Band QPSK	75/0	1857.5	-0.65	3.79	28.34	23.90	245.467	Vertical	Pass
		1880	0.40	3.95	28.22	24.67	293.128	Vertical	Pass
		1902.5	0.67	3.97	28.18	24.88	307.524	Vertical	Pass
15.0MHz Band	75/0	1857.5	-1.57	3.79	28.34	22.98	198.725	Vertical	Pass
		1880	-0.49	3.95	28.22	23.78	238.898	Vertical	Pass

16 QAM		1902.5	-1.18	3.97	28.18	23.03	201.083	Vertical	Pass
20.0MHz Band QPSK	100/0	1860	-1.19	3.81	28.35	23.35	216.114	Vertical	Pass
		1880	0.32	3.96	28.22	24.58	287.042	Vertical	Pass
		1900	0.03	4.00	28.16	24.19	262.359	Vertical	Pass
20.0MHz Band 16 QAM	100/0	1860	-1.03	3.81	28.35	23.51	224.182	Vertical	Pass
		1880	-1.12	3.96	28.22	23.14	206.023	Vertical	Pass
		1900	-0.69	4.00	28.16	23.47	222.118	Vertical	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1850.7	-0.51	3.76	28.24	23.97	249.571	Horizontal	Pass
		1880	0.39	3.91	28.22	24.70	295.168	Horizontal	Pass
		1909.3	-0.25	3.93	28.20	24.02	252.367	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-1.03	3.76	28.24	23.45	221.496	Horizontal	Pass
		1880	-1.51	3.91	28.22	22.80	190.584	Horizontal	Pass
		1909.3	-1.31	3.93	28.20	22.96	197.566	Horizontal	Pass
3.0MHz Band QPSK	15/0	1851.5	-0.35	3.77	28.23	24.11	257.636	Horizontal	Pass
		1880	-0.46	3.91	28.24	23.87	244.033	Horizontal	Pass
		1908.5	-0.01	3.94	28.25	24.30	268.942	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-1.15	3.77	28.23	23.31	214.512	Horizontal	Pass
		1880	-0.96	3.91	28.24	23.37	217.442	Horizontal	Pass
		1908.5	-1.54	3.94	28.25	22.77	189.185	Horizontal	Pass
5.0MHz Band QPSK	25/0	1852.5	-0.40	3.77	28.31	24.14	259.663	Horizontal	Pass
		1880	-0.26	3.91	28.22	24.05	254.242	Horizontal	Pass
		1907.5	0.18	3.94	28.20	24.44	277.666	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-1.31	3.77	28.31	23.23	210.452	Horizontal	Pass
		1880	-0.50	3.91	28.22	23.81	240.163	Horizontal	Pass
		1907.5	-1.30	3.94	28.20	22.96	197.495	Horizontal	Pass
10.0MHz Band QPSK	50/0	1855	-0.60	3.79	28.33	23.94	247.800	Horizontal	Pass
		1880	0.05	3.95	28.22	24.32	270.114	Horizontal	Pass
		1905	0.15	3.97	28.19	24.37	273.557	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1855	-1.35	3.79	28.33	23.19	208.582	Horizontal	Pass
		1880	-1.14	3.95	28.22	23.13	205.510	Horizontal	Pass
		1905	-1.14	3.97	28.19	23.08	203.430	Horizontal	Pass
15.0MHz Band QPSK	75/0	1857.5	-0.63	3.79	28.34	23.92	246.660	Horizontal	Pass
		1880	-0.19	3.95	28.22	24.08	255.698	Horizontal	Pass
		1902.5	0.16	3.97	28.18	24.37	273.577	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1857.5	-1.33	3.79	28.34	23.22	209.743	Horizontal	Pass
		1880	-1.41	3.95	28.22	22.86	193.053	Horizontal	Pass
		1902.5	-1.21	3.97	28.18	23.00	199.555	Horizontal	Pass
20.0MHz Band	100/0	1860	-1.67	3.81	28.35	22.87	193.571	Horizontal	Pass
		1880	-0.23	3.96	28.22	24.03	252.642	Horizontal	Pass

QPSK		1900	-0.82	4.00	28.16	23.34	215.647	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1860	-1.36	3.81	28.35	23.18	208.208	Horizontal	Pass
		1880	-1.65	3.96	28.22	22.61	182.512	Horizontal	Pass
		1900	-1.40	4.00	28.16	22.76	188.649	Horizontal	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1710.7	-1.35	3.12	27.58	23.11	204.794	Vertical	Pass
		1732.5	-1.71	3.27	27.61	22.63	183.201	Vertical	Pass
		1754.3	-1.61	3.29	27.63	22.73	187.348	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-2.05	3.12	27.58	22.41	174.191	Vertical	Pass
		1732.5	-2.71	3.27	27.61	21.63	145.567	Vertical	Pass
		1754.3	-2.77	3.29	27.63	21.57	143.660	Vertical	Pass
3.0MHz Band QPSK	15/0	1711.5	-1.46	3.13	27.61	23.02	200.301	Vertical	Pass
		1732.5	-1.84	3.27	27.61	22.50	178.015	Vertical	Pass
		1753.5	-1.28	3.30	27.62	23.04	201.486	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-2.73	3.13	27.61	21.75	149.756	Vertical	Pass
		1732.5	-2.15	3.27	27.61	22.19	165.427	Vertical	Pass
		1753.5	-2.48	3.30	27.62	21.84	152.825	Vertical	Pass
5.0MHz Band QPSK	25/0	1712.5	-1.31	3.13	27.63	23.19	208.384	Vertical	Pass
		1732.5	-0.90	3.27	27.61	23.44	220.664	Vertical	Pass
		1752.5	-1.42	3.30	27.60	22.88	194.012	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.11	3.13	27.63	22.39	173.205	Vertical	Pass
		1732.5	-1.99	3.27	27.61	22.35	171.844	Vertical	Pass
		1752.5	-2.54	3.30	27.60	21.76	150.080	Vertical	Pass
10.0MHz Band QPSK	50/0	1715	-1.67	3.15	27.64	22.82	191.384	Vertical	Pass
		1732.5	-1.02	3.31	27.61	23.28	212.610	Vertical	Pass
		1750	-0.77	3.33	27.59	23.49	223.122	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1715	-2.89	3.15	27.64	21.60	144.710	Vertical	Pass
		1732.5	-1.87	3.31	27.61	22.43	175.057	Vertical	Pass
		1750	-2.69	3.33	27.59	21.57	143.569	Vertical	Pass
15.0MHz Band QPSK	75/0	1717.5	-1.67	3.15	27.65	22.83	191.849	Vertical	Pass
		1732.5	-1.68	3.31	27.61	22.62	182.860	Vertical	Pass
		1747.5	-1.23	3.33	27.57	23.01	200.066	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-2.29	3.15	27.65	22.21	166.520	Vertical	Pass
		1732.5	-2.69	3.31	27.61	21.61	144.950	Vertical	Pass
		1747.5	-2.27	3.33	27.57	21.97	157.430	Vertical	Pass

20.0MHz Band QPSK	100/0	1720	-1.81	3.17	27.66	22.68	185.414	Vertical	Pass
		1732.5	-1.78	3.32	27.61	22.51	178.436	Vertical	Pass
		1745	-0.98	3.36	27.56	23.22	209.792	Vertical	Pass
20.0MHz Band 16 QAM	100/0	1720	-2.43	3.17	27.66	22.06	160.603	Vertical	Pass
		1732.5	-2.23	3.32	27.61	22.06	160.581	Vertical	Pass
		1745	-2.38	3.36	27.56	21.82	151.899	Vertical	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1710.7	-1.75	3.12	27.58	22.71	186.749	Horizontal	Pass
		1732.5	-1.74	3.27	27.61	22.60	181.833	Horizontal	Pass
		1754.3	-1.50	3.29	27.63	22.84	192.402	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-2.68	3.12	27.58	21.78	150.739	Horizontal	Pass
		1732.5	-2.81	3.27	27.61	21.53	142.208	Horizontal	Pass
		1754.3	-2.91	3.29	27.63	21.43	139.091	Horizontal	Pass
3.0MHz Band QPSK	15/0	1711.5	-1.98	3.13	27.61	22.50	177.971	Horizontal	Pass
		1732.5	-1.85	3.27	27.61	22.49	177.575	Horizontal	Pass
		1753.5	-1.56	3.30	27.62	22.76	188.759	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-3.33	3.13	27.61	21.15	130.335	Horizontal	Pass
		1732.5	-2.40	3.27	27.61	21.94	156.248	Horizontal	Pass
		1753.5	-2.41	3.30	27.62	21.91	155.400	Horizontal	Pass
5.0MHz Band QPSK	25/0	1712.5	-0.97	3.13	27.63	23.53	225.243	Horizontal	Pass
		1732.5	-1.26	3.27	27.61	23.08	203.377	Horizontal	Pass
		1752.5	-1.31	3.30	27.60	22.99	198.920	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.17	3.13	27.63	22.33	171.085	Horizontal	Pass
		1732.5	-2.54	3.27	27.61	21.80	151.309	Horizontal	Pass
		1752.5	-2.93	3.30	27.60	21.37	137.115	Horizontal	Pass
10.0MHz Band QPSK	50/0	1715	-1.83	3.15	27.64	22.66	184.307	Horizontal	Pass
		1732.5	-1.45	3.31	27.61	22.85	192.872	Horizontal	Pass
		1750	-1.14	3.33	27.59	23.12	204.908	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1715	-2.59	3.15	27.64	21.90	155.015	Horizontal	Pass
		1732.5	-3.04	3.31	27.61	21.26	133.632	Horizontal	Pass
		1750	-2.47	3.33	27.59	21.79	151.101	Horizontal	Pass
15.0MHz Band QPSK	75/0	1717.5	-2.17	3.15	27.65	22.33	171.141	Horizontal	Pass
		1732.5	-1.63	3.31	27.61	22.67	184.990	Horizontal	Pass
		1747.5	-1.46	3.33	27.57	22.78	189.683	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-2.30	3.15	27.65	22.20	165.967	Horizontal	Pass
		1732.5	-2.60	3.31	27.61	21.70	147.969	Horizontal	Pass
		1747.5	-2.94	3.33	27.57	21.30	134.900	Horizontal	Pass
20.0MHz Band	100/0	1720	-2.15	3.17	27.66	22.34	171.395	Horizontal	Pass
		1732.5	-2.06	3.32	27.61	22.23	167.193	Horizontal	Pass

QPSK		1745	-1.93	3.36	27.56	22.27	168.554	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1720	-2.90	3.17	27.66	21.59	144.315	Horizontal	Pass
		1732.5	-2.38	3.32	27.61	21.91	155.144	Horizontal	Pass
		1745	-2.56	3.36	27.56	21.64	146.045	Horizontal	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	824.7	7.32	2.01	19.68	2.15	22.84	192.367	Vertical	Pass
		836.5	8.10	2.01	19.77	2.15	23.71	235.209	Vertical	Pass
		848.3	7.26	2.02	19.82	2.15	22.91	195.589	Vertical	Pass
1.4MHz Band 16 QAM	6/0	824.7	7.08	2.01	19.68	2.15	22.60	181.943	Vertical	Pass
		836.5	7.25	2.01	19.77	2.15	22.86	193.070	Vertical	Pass
		848.3	6.88	2.02	19.82	2.15	22.53	179.039	Vertical	Pass
3.0MHz Band QPSK	15/0	825.5	7.83	2.01	19.70	2.15	23.37	217.365	Vertical	Pass
		836.5	8.15	2.01	19.77	2.15	23.76	237.706	Vertical	Pass
		847.5	7.91	2.02	19.81	2.15	23.55	226.266	Vertical	Pass
3.0MHz Band 16 QAM	15/0	825.5	6.65	2.01	19.70	2.15	22.19	165.609	Vertical	Pass
		836.5	6.29	2.01	19.77	2.15	21.90	154.923	Vertical	Pass
		847.5	7.07	2.02	19.81	2.15	22.71	186.655	Vertical	Pass
5.0MHz Band QPSK	25/0	826.5	7.44	2.01	19.71	2.15	22.99	199.064	Vertical	Pass
		836.5	7.45	2.01	19.77	2.15	23.06	202.258	Vertical	Pass
		846.5	7.62	2.02	19.79	2.15	23.24	210.800	Vertical	Pass
5.0MHz Band 16 QAM	25/0	826.5	7.13	2.01	19.71	2.15	22.68	185.192	Vertical	Pass
		836.5	6.21	2.01	19.77	2.15	21.82	152.127	Vertical	Pass
		846.5	7.03	2.02	19.79	2.15	22.65	183.938	Vertical	Pass
10.0MHz Band QPSK	50/0	829	7.33	2.01	19.73	2.15	22.90	195.116	Vertical	Pass
		836.5	8.17	2.01	19.77	2.15	23.78	238.733	Vertical	Pass
		844	7.79	2.02	19.78	2.15	23.40	218.534	Vertical	Pass
10.0MHz Band 16 QAM	50/0	829	7.87	2.01	19.73	2.15	23.44	220.978	Vertical	Pass
		836.5	8.16	2.01	19.77	2.15	23.77	238.191	Vertical	Pass
		844	7.76	2.02	19.78	2.15	23.37	217.294	Vertical	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Radiated Power (ERP) for Band 5										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	824.7	7.09	2.01	19.68	2.15	22.61	182.489	Horizontal	Pass
		836.5	6.96	2.01	19.77	2.15	22.57	180.736	Horizontal	Pass
		848.3	6.96	2.02	19.82	2.15	22.61	182.230	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	824.7	7.12	2.01	19.68	2.15	22.64	183.697	Horizontal	Pass
		836.5	6.26	2.01	19.77	2.15	21.87	153.815	Horizontal	Pass
		848.3	6.32	2.02	19.82	2.15	21.97	157.562	Horizontal	Pass
3.0MHz Band QPSK	15/0	825.5	6.42	2.01	19.70	2.15	21.96	157.040	Horizontal	Pass
		836.5	7.11	2.01	19.77	2.15	22.72	187.029	Horizontal	Pass
		847.5	6.83	2.02	19.81	2.15	22.47	176.706	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	825.5	6.37	2.01	19.70	2.15	21.91	155.109	Horizontal	Pass
		836.5	6.25	2.01	19.77	2.15	21.86	153.428	Horizontal	Pass
		847.5	6.43	2.02	19.81	2.15	22.07	160.897	Horizontal	Pass
5.0MHz Band QPSK	25/0	826.5	6.47	2.01	19.71	2.15	22.02	159.039	Horizontal	Pass
		836.5	6.57	2.01	19.77	2.15	22.18	165.325	Horizontal	Pass
		846.5	6.80	2.02	19.79	2.15	22.42	174.730	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	826.5	6.13	2.01	19.71	2.15	21.68	147.192	Horizontal	Pass
		836.5	6.21	2.01	19.77	2.15	21.82	152.045	Horizontal	Pass
		846.5	6.73	2.02	19.79	2.15	22.35	171.741	Horizontal	Pass
10.0MHz Band QPSK	50/0	829	7.34	2.01	19.73	2.15	22.91	195.347	Horizontal	Pass
		836.5	7.33	2.01	19.77	2.15	22.94	197.001	Horizontal	Pass
		844	7.26	2.02	19.78	2.15	22.87	193.482	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	829	7.35	2.01	19.73	2.15	22.92	195.940	Horizontal	Pass
		836.5	6.23	2.01	19.77	2.15	21.84	152.913	Horizontal	Pass
		844	6.44	2.02	19.78	2.15	22.05	160.235	Horizontal	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/ RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	25/0	2502.5	0.59	4.54	27.75	23.80	239.785	Vertical	Pass
		2535	0.93	4.69	27.72	23.96	248.601	Vertical	Pass
		2567.5	0.78	4.71	27.71	23.78	238.749	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-0.50	4.54	27.75	22.71	186.803	Vertical	Pass
		2535	-0.29	4.69	27.72	22.74	187.875	Vertical	Pass
		2567.5	-0.23	4.71	27.71	22.77	189.339	Vertical	Pass
10.0MHz Band QPSK	50/0	2505	0.94	4.55	27.76	24.15	260.063	Vertical	Pass
		2535	1.15	4.69	27.72	24.18	262.113	Vertical	Pass
		2565	1.66	4.72	27.70	24.64	291.387	Vertical	Pass
10.0MHz Band 16 QAM	50/0	2505	-0.01	4.55	27.76	23.20	208.984	Vertical	Pass
		2535	0.21	4.69	27.72	23.24	211.053	Vertical	Pass
		2565	-0.07	4.72	27.70	22.91	195.560	Vertical	Pass
15.0MHz Band QPSK	75/0	2507.5	0.74	4.55	27.77	23.96	248.764	Vertical	Pass
		2535	1.44	4.69	27.72	24.47	279.695	Vertical	Pass
		2562.5	1.21	4.72	27.69	24.18	262.118	Vertical	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-0.05	4.55	27.77	23.17	207.491	Vertical	Pass
		2535	0.65	4.69	27.72	23.68	233.100	Vertical	Pass
		2562.5	0.41	4.72	27.69	23.38	217.651	Vertical	Pass
20.0MHz Band QPSK	100/ 0	2510	1.55	4.57	27.78	24.76	298.975	Vertical	Pass
		2535	1.02	4.73	27.72	24.01	251.543	Vertical	Pass
		2560	1.77	4.75	27.68	24.70	295.207	Vertical	Pass
20.0MHz Band 16 QAM	100/ 0	2510	-0.11	4.57	27.78	23.10	204.217	Vertical	Pass
		2535	0.23	4.73	27.72	23.22	210.054	Vertical	Pass
		2560	0.36	4.75	27.68	23.29	213.423	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Radiated Power (EIRP) for Band 7									
Mode	RB/ RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	25/0	2502.5	0.50	4.54	27.75	23.71	235.023	Horizontal	Pass
		2535	0.80	4.69	27.72	23.83	241.583	Horizontal	Pass
		2567.5	0.52	4.71	27.71	23.52	224.681	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-0.52	4.54	27.75	22.69	185.851	Horizontal	Pass
		2535	-0.52	4.69	27.72	22.51	178.401	Horizontal	Pass
		2567.5	-0.27	4.71	27.71	22.73	187.344	Horizontal	Pass
10.0MHz Band QPSK	50/0	2505	1.17	4.55	27.76	24.38	274.250	Horizontal	Pass
		2535	1.07	4.69	27.72	24.10	257.096	Horizontal	Pass
		2565	1.16	4.72	27.7	24.14	259.459	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	2505	-0.54	4.55	27.76	22.67	185.032	Horizontal	Pass
		2535	0.80	4.69	27.72	23.83	241.389	Horizontal	Pass
		2565	0.38	4.72	27.7	23.36	216.630	Horizontal	Pass
15.0MHz Band QPSK	75/0	2507.5	0.71	4.55	27.77	23.93	247.019	Horizontal	Pass
		2535	0.96	4.69	27.72	23.99	250.784	Horizontal	Pass
		2562.5	0.49	4.72	27.69	23.46	221.810	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	2507.5	0.30	4.55	27.77	23.52	224.975	Horizontal	Pass
		2535	0.08	4.69	27.72	23.11	204.417	Horizontal	Pass
		2562.5	-0.21	4.72	27.69	22.76	188.934	Horizontal	Pass
20.0MHz Band QPSK	100/0	2510	1.12	4.57	27.78	24.33	271.273	Horizontal	Pass
		2535	1.32	4.73	27.72	24.31	270.021	Horizontal	Pass
		2560	0.85	4.75	27.68	23.78	238.993	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	2510	-0.15	4.57	27.78	23.06	202.321	Horizontal	Pass
		2535	-0.55	4.73	27.72	22.44	175.220	Horizontal	Pass
		2560	-0.07	4.75	27.68	22.86	193.278	Horizontal	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.6 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	699.7	9.24	1.91	19.21	2.15	24.39	274.974	Vertical	Pass
		707.5	8.99	1.91	19.26	2.15	24.19	262.264	Vertical	Pass
		715.3	8.24	1.93	19.34	2.15	23.50	223.794	Vertical	Pass
1.4MHz Band 16 QAM	6/0	699.7	8.01	1.91	19.21	2.15	23.16	207.183	Vertical	Pass
		707.5	7.39	1.91	19.26	2.15	22.59	181.482	Vertical	Pass
		715.3	6.96	1.93	19.34	2.15	22.22	166.756	Vertical	Pass
3.0MHz Band QPSK	15/0	700.5	8.58	1.91	19.21	2.15	23.73	236.293	Vertical	Pass
		707.5	8.96	1.91	19.26	2.15	24.16	260.496	Vertical	Pass
		714.5	8.72	1.93	19.34	2.15	23.98	250.076	Vertical	Pass
3.0MHz Band 16 QAM	15/0	700.5	7.21	1.91	19.21	2.15	22.36	172.028	Vertical	Pass
		707.5	7.75	1.91	19.26	2.15	22.95	197.414	Vertical	Pass
		714.5	7.67	1.93	19.34	2.15	22.93	196.265	Vertical	Pass
5.0MHz Band QPSK	25/0	701.5	8.90	1.91	19.23	2.15	24.07	255.219	Horizontal	Pass
		707.5	8.39	1.91	19.26	2.15	23.59	228.614	Horizontal	Pass
		713.5	8.13	1.92	19.33	2.15	23.39	218.313	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	701.5	7.85	1.91	19.23	2.15	23.02	200.293	Horizontal	Pass
		707.5	7.76	1.91	19.26	2.15	22.96	197.874	Horizontal	Pass
		713.5	7.83	1.92	19.33	2.15	23.09	203.868	Horizontal	Pass
10.0MHz Band QPSK	50/0	704	8.50	1.91	19.25	2.15	23.69	233.903	Horizontal	Pass
		707.5	8.96	1.91	19.26	2.15	24.16	260.727	Horizontal	Pass
		711	8.64	1.92	19.32	2.15	23.89	244.855	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	704	7.51	1.91	19.25	2.15	22.70	186.285	Horizontal	Pass
		707.5	7.05	1.91	19.26	2.15	22.25	168.041	Horizontal	Pass
		711	6.98	1.92	19.32	2.15	22.23	166.945	Horizontal	Pass

Radiated Power (EIRP) for Band 12										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	699.7	8.09	1.91	19.21	2.15	23.24	210.784	Horizontal	Pass
		707.5	8.65	1.91	19.26	2.15	23.85	242.850	Horizontal	Pass
		715.3	8.81	1.93	19.34	2.15	24.07	255.558	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	699.7	7.46	1.91	19.21	2.15	22.61	182.497	Horizontal	Pass
		707.5	7.70	1.91	19.26	2.15	22.90	194.827	Horizontal	Pass
		715.3	6.79	1.93	19.34	2.15	22.05	160.372	Horizontal	Pass
3.0MHz Band QPSK	15/0	700.5	8.64	1.91	19.21	2.15	23.79	239.526	Horizontal	Pass
		707.5	7.99	1.91	19.26	2.15	23.19	208.617	Horizontal	Pass
		714.5	8.27	1.93	19.34	2.15	23.53	225.658	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	700.5	7.28	1.91	19.21	2.15	22.43	174.839	Horizontal	Pass
		707.5	7.16	1.91	19.26	2.15	22.36	172.329	Horizontal	Pass
		714.5	7.11	1.93	19.34	2.15	22.37	172.419	Horizontal	Pass
5.0MHz Band QPSK	25/0	701.5	8.40	1.91	19.23	2.15	23.57	227.766	Horizontal	Pass
		707.5	8.25	1.91	19.26	2.15	23.45	221.291	Horizontal	Pass
		713.5	7.95	1.92	19.33	2.15	23.21	209.253	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	701.5	7.75	1.91	19.23	2.15	22.92	195.710	Horizontal	Pass
		707.5	6.83	1.91	19.26	2.15	22.03	159.587	Horizontal	Pass
		713.5	6.75	1.92	19.33	2.15	22.01	158.705	Horizontal	Pass
10.0MHz Band QPSK	50/0	704	8.43	1.91	19.25	2.15	23.62	230.386	Horizontal	Pass
		707.5	8.61	1.91	19.26	2.15	23.81	240.320	Horizontal	Pass
		711	8.33	1.92	19.32	2.15	23.58	227.905	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	704	7.25	1.91	19.25	2.15	22.44	175.557	Horizontal	Pass
		707.5	6.76	1.91	19.26	2.15	21.96	157.191	Horizontal	Pass
		711	7.71	1.92	19.32	2.15	22.96	197.786	Horizontal	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238 and §27.53

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

§27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:
a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB; and
b. for mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB at the channel edges and 55 + 10 Log10 (p) at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

MODES TESTED

- ☐ LTE Band 2
- LTE Band 4
- ☐ LTE Band 5
- LTE Band 7
- LTE Band 12

RESULTS

PASS

9.1 LTE BAND 2

QPSK EIRP POWER FOR LTE BAND 2 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1850.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3701.40	-52.01	4.04	33.51	-22.54	-13	-9.54	Horizontal
3701.40	-54.26	4.04	33.51	-24.79	-13	-11.79	Vertical
5552.10	-56.62	5.24	35.84	-26.02	-13	-13.02	Vertical
5552.10	-67.13	5.24	35.84	-36.53	-13	-23.53	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-53.75	4.04	33.56	-24.23	-13	-11.23	Horizontal
3760	-53.95	4.04	33.56	-24.43	-13	-11.43	Vertical
5640	-54.60	5.24	35.91	-23.93	-13	-10.93	Vertical
5640	-56.07	5.24	35.91	-25.40	-13	-12.40	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-53.45	4.04	34.00	-23.49	-13	-10.49	Horizontal
3818.6	-55.08	4.04	34.00	-25.12	-13	-12.12	Vertical
5727.9	-57.66	5.24	36.04	-26.86	-13	-13.86	Vertical
5727.9	-56.75	5.24	36.04	-25.95	-13	-12.95	Horizontal

QPSK EIRP POWER FOR LTE BAND 2 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3720	-56.72	4.07	33.54	-27.25	-13	-14.25	Horizontal
3720	-52.29	4.07	33.54	-22.82	-13	-9.82	Vertical
5580	-58.98	5.28	35.86	-28.40	-13	-15.40	Vertical
5580	-60.15	5.28	35.86	-29.57	-13	-16.57	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-56.29	4.04	33.56	-26.77	-13	-13.77	Horizontal
3760	-53.12	4.04	33.56	-23.60	-13	-10.60	Vertical
5640	-57.88	5.24	35.91	-27.21	-13	-14.21	Vertical
5640	-58.54	5.24	35.91	-27.87	-13	-14.87	Horizontal
Test Results for High Channel 1900MHz							
3800	-55.50	4.04	34.00	-25.54	-13	-12.54	Horizontal
3800	-56.65	4.04	34.00	-26.69	-13	-13.69	Vertical
5700	-57.99	5.24	36.04	-27.19	-13	-14.19	Vertical
5700	-56.30	5.24	36.04	-25.50	-13	-12.50	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

. We test both H direction and V direction, recorded worst case direction.

9.2 LTE BAND 4

QPSK EIRP POWER FOR LTE BAND 4 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3421.4	-59.58	4.02	29.80	-33.80	-13	-20.80	Horizontal
3421.4	-56.78	4.02	29.80	-31.00	-13	-18.00	Vertical
5132.1	-61.31	5.24	35.84	-30.71	-13	-17.71	Vertical
5132.1	-62.69	5.24	35.84	-32.09	-13	-19.09	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-51.16	4.03	30.00	-25.19	-13	-12.19	Horizontal
3465	-54.80	4.03	30.00	-28.83	-13	-15.83	Vertical
5197.5	-58.50	5.25	35.86	-27.89	-13	-14.89	Vertical
5197.5	-56.01	5.25	35.86	-25.40	-13	-12.40	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-50.73	4.05	30.01	-24.77	-13	-11.77	Horizontal
3508.6	-57.58	4.05	30.01	-31.62	-13	-18.62	Vertical
5262.9	-57.34	5.26	35.86	-26.74	-13	-13.74	Vertical
5262.9	-55.67	5.26	35.86	-25.07	-13	-12.07	Horizontal

QPSK EIRP POWER FOR LTE BAND 4 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3440	-56.24	4.02	29.80	-30.46	-13	-17.46	Horizontal
3440	-57.34	4.02	29.80	-31.56	-13	-18.56	Vertical
5160	-59.50	5.24	35.84	-28.90	-13	-15.90	Vertical
5160	-61.77	5.24	35.84	-31.17	-13	-18.17	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-51.19	4.03	30.00	-25.22	-13	-12.22	Horizontal
3465	-53.87	4.03	30.00	-27.90	-13	-14.90	Vertical
5197.5	-60.52	5.25	35.86	-29.91	-13	-16.91	Vertical
5197.5	-59.07	5.25	35.86	-28.46	-13	-15.46	Horizontal
Test Results for High Channel 1745MHz							
2490	-53.64	2.91	27.68	-28.87	-13	-15.87	Horizontal
3490	-55.38	2.91	27.68	-30.61	-13	-17.61	Vertical
5235	-59.02	5.26	35.86	-28.42	-13	-15.42	Vertical
5235	-57.26	5.26	35.86	-26.66	-13	-13.66	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

. We test both H direction and V direction, recorded worst case direction.

9.3 LTE BAND 5

QPSK EIRP POWER FOR LTE BAND 5 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1649.4	-50.70	2.78	27.50	-25.98	-13	-12.98	Horizontal
1649.4	-55.88	2.78	27.50	-31.16	-13	-18.16	Vertical
2474.1	-54.82	2.90	27.80	-29.92	-13	-16.92	Vertical
2474.1	-53.51	2.90	27.80	-28.61	-13	-15.61	Horizontal
Test Results For Mid Channel 836.5MHz							
1673	-51.42	2.78	27.48	-26.72	-13	-13.72	Horizontal
1673	-49.79	2.78	27.48	-25.09	-13	-12.09	Vertical
2509.5	-51.95	2.91	27.70	-27.16	-13	-14.16	Vertical
2509.5	-51.98	2.91	27.70	-27.19	-13	-14.19	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-52.40	2.78	27.43	-27.75	-13	-14.75	Horizontal
1696.6	-53.90	2.78	27.43	-29.25	-13	-16.25	Vertical
2544.9	-50.41	2.92	27.74	-25.59	-13	-12.59	Vertical
2544.9	-52.33	2.92	27.74	-27.51	-13	-14.51	Horizontal

QPSK EIRP POWER FOR LTE BAND 5 (10MHZ BANDWIDTH)

Test Results for Low Channel 829MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1658	-53.66	2.78	27.50	-28.94	-13	-15.94	Horizontal
1658	-50.38	2.78	27.50	-25.66	-13	-12.66	Vertical
2487	-54.83	2.90	27.80	-29.93	-13	-16.93	Vertical
2487	-52.58	2.90	27.80	-27.68	-13	-14.68	Horizontal
Test Results For Mid Channel 836.5MHz							
1673	-51.63	2.78	27.48	-26.93	-13	-13.93	Horizontal
1673	-51.72	2.78	27.48	-27.02	-13	-14.02	Vertical
2509.5	-55.58	2.91	27.70	-30.79	-13	-17.79	Vertical
2509.5	-52.83	2.91	27.70	-28.04	-13	-15.04	Horizontal
Test Results for High Channel 844MHz							
1688	-55.13	2.78	27.43	-30.48	-13	-17.48	Horizontal
1688	-49.81	2.78	27.43	-25.16	-13	-12.16	Vertical
2532	-50.44	2.92	27.74	-25.62	-13	-12.62	Vertical
2532	-51.81	2.92	27.74	-26.99	-13	-13.99	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

. We test both H direction and V direction, recorded worst case direction.

9.4 LTE BAND 7

QPSK EIRP POWER FOR LTE BAND 7 (5.0MHZ BANDWIDTH)

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5005	-66.88	-66.56	35.81	35.49	-25	60.49	Horizontal
5005	-64.30	-63.98	35.81	35.49	-25	60.49	Vertical
7507.5	-69.05	-68.73	36.85	36.53	-25	61.53	Vertical
7507.5	-64.76	-64.44	36.85	36.53	-25	61.53	Horizontal
Test Results for Mid Channel 2535MHz							
5070	-63.48	-63.16	35.82	35.50	-25	60.50	Horizontal
5070	-65.60	-65.28	35.82	35.50	-25	60.50	Vertical
7605	-66.89	-66.57	36.85	36.53	-25	61.53	Vertical
7605	-68.04	-67.72	36.85	36.53	-25	61.53	Horizontal
Test Results for High Channel 2567.5MHz							
5135	-67.45	-67.13	35.83	35.51	-25	60.51	Horizontal
5135	-64.20	-63.88	35.83	35.51	-25	60.51	Vertical
7702.5	-66.27	-65.95	36.87	36.55	-25	61.55	Vertical
7702.5	-67.71	-67.39	36.87	36.55	-25	61.55	Horizontal

QPSK EIRP POWER FOR LTE BAND 7 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5020	-65.98	5.23	35.82	-35.39	-25	-10.39	Horizontal
5020	-63.66	5.23	35.82	-33.07	-25	-8.07	Vertical
7530	-67.10	5.67	36.86	-35.91	-25	-10.91	Vertical
7530	-63.33	5.67	36.86	-32.14	-25	-7.14	Horizontal
Test Results for Mid Channel 2535MHz							
5070	-64.06	5.23	35.82	-33.47	-25	-8.47	Horizontal
5070	-63.29	5.23	35.82	-32.70	-25	-7.70	Vertical
7605	-66.60	5.67	36.85	-35.42	-25	-10.42	Vertical
7605	-67.10	5.67	36.85	-35.92	-25	-10.92	Horizontal
Test Results for High Channel 2560MHz							
5120	-62.99	5.24	35.83	-32.40	-25	-7.40	Horizontal
5120	-66.51	5.24	35.83	-35.92	-25	-10.92	Vertical
7680	-67.19	5.70	36.88	-36.01	-25	-11.01	Vertical
7680	-67.14	5.70	36.88	-35.96	-25	-10.96	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

. We test both H direction and V direction, recorded worst case direction.

9.5 LTE BAND 12

QPSK EIRP POWER FOR LTE BAND 12 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1399.4	-49.93	2.60	27.2	-25.33	-13	-12.33	Horizontal
1399.4	-50.19	2.60	27.2	-25.59	-13	-12.59	Vertical
2099.1	-50.83	2.85	27.54	-26.14	-13	-13.14	Vertical
2099.1	-50.23	2.85	27.54	-25.54	-13	-12.54	Horizontal
Test Results For Mid Channel 707.5MHz							
1415	-52.23	2.61	27.28	-27.56	-13	-14.56	Horizontal
1415	-50.26	2.61	27.28	-25.59	-13	-12.59	Vertical
2122.5	-48.62	2.87	27.59	-23.90	-13	-10.90	Vertical
2122.5	-53.55	2.87	27.59	-28.83	-13	-15.83	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-51.96	2.63	27.28	-27.31	-13	-14.31	Horizontal
1430.6	-55.87	2.63	27.28	-31.22	-13	-18.22	Vertical
2145.9	-52.83	2.88	27.60	-28.11	-13	-15.11	Vertical
2145.9	-51.83	2.88	27.60	-27.11	-13	-14.11	Horizontal

QPSK EIRP POWER FOR LTE BAND 12 (10MHZ BANDWIDTH)

Test Results for Low Channel 704MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1408	-48.65	2.61	27.26	-24.00	-13	-11.00	Horizontal
1408	-52.94	2.61	27.26	-28.29	-13	-15.29	Vertical
2112	-52.68	2.87	27.58	-27.97	-13	-14.97	Vertical
2112	-52.70	2.87	27.58	-27.99	-13	-14.99	Horizontal
Test Results for Mid Channel 707.5MHz							
1415	-51.33	2.61	27.28	-26.66	-13	-13.66	Horizontal
1415	-55.15	2.61	27.28	-30.48	-13	-17.48	Vertical
2122.5	-52.89	2.87	27.59	-28.17	-13	-15.17	Vertical
2122.5	-52.14	2.87	27.59	-27.42	-13	-14.42	Horizontal
Test Results for High Channel 711MHz							
1422	-54.50	2.62	27.28	-29.84	-13	-16.84	Horizontal
1422	-50.28	2.62	27.28	-25.62	-13	-12.62	Vertical
2133	-53.18	2.87	27.60	-28.45	-13	-15.45	Vertical
2133	-52.80	2.87	27.60	-28.07	-13	-15.07	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

. We test both H direction and V direction, recorded worst case direction.

10. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = −30° to +50°C
- Voltage =low voltage,DC 3.2V, Normal, DC 3.7V and High voltage, DC 4.3V.

Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to -30ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

MODES TESTED

- LTE Band 2

LTE Band 4

- LTE Band5

LTE Band 7

LTE Band 12

RESULTS

See the following pages.

10.1 LTE BAND 2

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.2	1880	4.9	0.002605	2.5
3.7	1880	7.3	0.003892	2.5
4.3	1880	5.0	0.002662	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	6.3	0.003329	2.5
Extreme (50C)	1880	6.9	0.003644	2.5
Extreme (40C)	1880	7.9	0.004193	2.5
Extreme (30C)	1880	8.5	0.004526	2.5
Extreme (10C)	1880	8.6	0.004583	2.5
Extreme (0C)	1880	6.2	0.003313	2.5
Extreme (-10C)	1880	8.0	0.004261	2.5
Extreme (-20C)	1880	8.1	0.004328	2.5
Extreme (-30C)	1880	5.7	0.003008	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.2	1880	7.7	0.004093	2.5
3.7	1880	5.9	0.003163	2.5
4.3	1880	6.6	0.003516	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	7.3	0.003898	2.5
Extreme (50C)	1880	4.7	0.002482	2.5
Extreme (40C)	1880	5.3	0.002796	2.5
Extreme (30C)	1880	4.6	0.002451	2.5
Extreme (10C)	1880	6.3	0.003353	2.5
Extreme (0C)	1880	4.7	0.002492	2.5
Extreme (-10C)	1880	9.4	0.004991	2.5
Extreme (-20C)	1880	10.7	0.005674	2.5
Extreme (-30C)	1880	6.0	0.003211	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.2 LTE BAND 4

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.2	1732.5	5.6	0.003228	2.5
3.7	1732.5	10.2	0.005914	2.5
4.3	1732.5	10.3	0.005964	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	6.9	0.004011	2.5
Extreme (50C)	1732.5	6.2	0.003565	2.5
Extreme (40C)	1732.5	5.8	0.003329	2.5
Extreme (30C)	1732.5	9.1	0.005236	2.5
Extreme (10C)	1732.5	5.8	0.003327	2.5
Extreme (0C)	1732.5	4.6	0.002672	2.5
Extreme (-10C)	1732.5	8.9	0.005112	2.5
Extreme (-20C)	1732.5	8.9	0.005162	2.5
Extreme (-30C)	1732.5	8.9	0.005122	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.2	1732.5	6.9	0.003974	2.5
3.7	1732.5	7.8	0.004513	2.5
4.3	1732.5	6.7	0.003849	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	5.5	0.003158	2.5
Extreme (50C)	1732.5	6.4	0.003707	2.5
Extreme (40C)	1732.5	3.9	0.002223	2.5
Extreme (30C)	1732.5	7.3	0.004199	2.5
Extreme (10C)	1732.5	3.4	0.001974	2.5
Extreme (0C)	1732.5	4.7	0.002692	2.5
Extreme (-10C)	1732.5	6.7	0.003840	2.5
Extreme (-20C)	1732.5	7.1	0.004104	2.5
Extreme (-30C)	1732.5	6.3	0.003637	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.3 LTE BAND 5

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.2	836.5	0.9	0.001064	2.5
3.7	836.5	4.3	0.005164	2.5
4.3	836.5	5.2	0.006276	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	3.6	0.004284	2.5
Extreme (50C)	836.5	0.6	0.000687	2.5
Extreme (40C)	836.5	1.6	0.001880	2.5
Extreme (30C)	836.5	2.6	0.003066	2.5
Extreme (10C)	836.5	7.1	0.008455	2.5
Extreme (0C)	836.5	8.2	0.009785	2.5
Extreme (-10C)	836.5	6.5	0.007786	2.5
Extreme (-20C)	836.5	1.4	0.001616	2.5
Extreme (-30C)	836.5	0.9	0.001078	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.2	836.5	2.3	0.002800	2.5
3.7	836.5	4.1	0.004955	2.5
4.3	836.5	6.5	0.007789	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	3.6	0.004250	2.5
Extreme (50C)	836.5	5.9	0.007083	2.5
Extreme (40C)	836.5	4.1	0.004880	2.5
Extreme (30C)	836.5	8.0	0.009591	2.5
Extreme (10C)	836.5	4.9	0.005911	2.5
Extreme (0C)	836.5	4.1	0.004949	2.5
Extreme (-10C)	836.5	4.1	0.004896	2.5
Extreme (-20C)	836.5	4.9	0.005801	2.5
Extreme (-30C)	836.5	4.7	0.005567	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.4 LTE BAND 7

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.2	2535	5.4	0.002129	2.5
3.7	2535	11.9	0.004713	2.5
4.3	2535	8.7	0.003450	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	8.5	0.003340	2.5
Extreme (50C)	2535	6.2	0.002438	2.5
Extreme (40C)	2535	6.3	0.002469	2.5
Extreme (30C)	2535	4.7	0.001871	2.5
Extreme (10C)	2535	4.8	0.001898	2.5
Extreme (0C)	2535	7.0	0.002768	2.5
Extreme (-10C)	2535	6.5	0.002573	2.5
Extreme (-20C)	2535	9.2	0.003613	2.5
Extreme (-30C)	2535	12.1	0.004768	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.2	2535	8.0	0.003164	2.5
3.7	2535	7.2	0.002843	2.5
4.3	2535	7.7	0.003031	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	5.8	0.002301	2.5
Extreme (50C)	2535	8.8	0.003488	2.5
Extreme (40C)	2535	9.7	0.003814	2.5
Extreme (30C)	2535	3.6	0.001412	2.5
Extreme (10C)	2535	4.2	0.001651	2.5
Extreme (0C)	2535	5.2	0.002050	2.5
Extreme (-10C)	2535	7.2	0.002821	2.5
Extreme (-20C)	2535	5.8	0.002304	2.5
Extreme (-30C)	2535	8.0	0.003163	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.5 LTE BAND 12

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.2	707.5	4.7	0.006600	2.5
3.7	707.5	5.4	0.007600	2.5
4.3	707.5	5.3	0.007421	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	4.1	0.005857	2.5
Extreme (50C)	707.5	4.8	0.006716	2.5
Extreme (40C)	707.5	6.0	0.008448	2.5
Extreme (30C)	707.5	5.7	0.008114	2.5
Extreme (10C)	707.5	5.4	0.007672	2.5
Extreme (0C)	707.5	4.7	0.006632	2.5
Extreme (-10C)	707.5	3.3	0.004600	2.5
Extreme (-20C)	707.5	5.4	0.007639	2.5
Extreme (-30C)	707.5	5.0	0.007081	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.2	707.5	2.3	0.003317	2.5
3.7	707.5	3.8	0.005430	2.5
4.3	707.5	4.0	0.005588	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	6.9	0.009684	2.5
Extreme (50C)	707.5	5.9	0.008274	2.5
Extreme (40C)	707.5	6.8	0.009619	2.5
Extreme (30C)	707.5	8.1	0.011421	2.5
Extreme (10C)	707.5	8.6	0.012099	2.5
Extreme (0C)	707.5	3.3	0.004609	2.5
Extreme (-10C)	707.5	5.5	0.007801	2.5
Extreme (-20C)	707.5	9.1	0.012811	2.5
Extreme (-30C)	707.5	10.5	0.014858	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

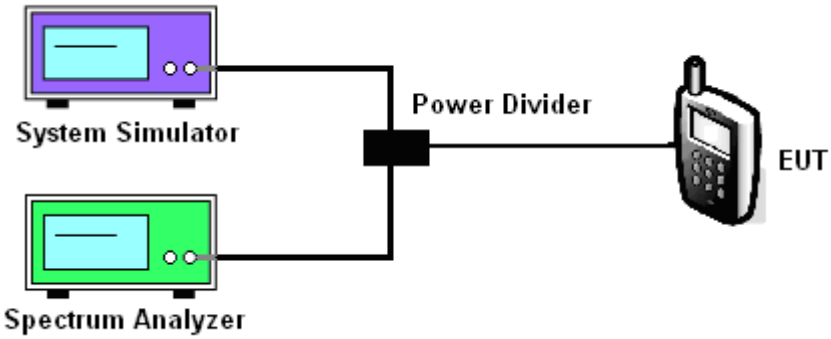
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For GSM/EGPRS operating modes:
   a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
   b. Set EUT in maximum power output, and triggered the burst signal.
   c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS operating modes:
   a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
   b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

11.4 Test Setup



MODES TESTED

- ☐ LTE Band2
- LTE Band 4
- ☐ LTE Band5
- LTE Band 7
- LTE Band 12

Test data reference attachment.

----END OF REPORT----